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“Value Loss of Activities Propelled by Digital  
Transformation: Theoretical Evaluation and  
Empirical Modelling to Identify Efficiency Potentials  
to Maximize Value in the Field of  
Marketing & Sales.”

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## **ABSTRACT**

Digital transformation of firms and the adoption of digital technologies is progressing inexorably. Decision-makers are preoccupied with the endeavor to identify the potentials of existing as well as newly emerging technologies and underutilize the entailed profits. This research study proposes a newly developed conceptualization and model to compute efficiency potentials in the field of marketing and sales, a business function with an intense consumer focus. While this conjoint business unit mainly fosters and propels the performance measure of effectiveness, the full exploitation of internal workforce efficiency stays neglected and barely treated by practice and science. By employing expert interviews with managers in this field, a tailored efficiency determination model is created with in total eight efficiency potentials allocated to three digital technology effects, acceleration, automation, and outsourcing. The efficiency coefficient of time weights the human labor input while the additive connection with digital technologies as input factor engenders either a complementary, substitutional, or no effect. With a sequential mixed-methods research approach, a further quantitative study with 251 employees in the field of marketing and sales uses the qualitative model to determine the efficiency potential based on individual task assessments, including the identification of task values. While distinguishing between office and customer interaction-related work, the study finds that 45 percent of the working time underlies an efficiency potential by utilizing the ONET database, which contains 214 individual tasks in the career cluster marketing and professional sales.

**Keywords:** Digitalization, Labor, Efficiency, Technologies, Tasks, Work



## RESUMEN

La transformación digital de las empresas y la adopción de tecnologías digitales avanzan inexorablemente. Los responsables de la toma de decisiones están preocupados por identificar los potenciales de las tecnologías existentes y emergentes y por no aprovechar los beneficios que conllevan. Esta investigación propone una conceptualización y un modelo de nuevo desarrollo para calcular los potenciales de eficiencia en el campo del marketing y las ventas, una función empresarial con una intensa orientación al consumidor. Mientras que esta unidad empresarial conjunta fomenta e impulsa principalmente la medida del rendimiento de la eficacia, la plena explotación de la eficiencia de la mano de obra interna permanece desatendida y apenas tratada por la práctica y la ciencia. Mediante el empleo de entrevistas de expertos con directivos de este ámbito, se crea un modelo de determinación de la eficiencia a medida con un total de ocho potenciales de eficiencia asignados a tres efectos de la tecnología digital: aceleración, automatización y externalización. El coeficiente de eficiencia del tiempo pondera el insumo de trabajo humano, mientras que la conexión aditiva con las tecnologías digitales como factor de insumo produce un efecto complementario, sustitutivo o nulo. Con un enfoque de investigación secuencial de métodos mixtos, se realiza un estudio cuantitativo con 251 empleados en el ámbito del marketing y las ventas utilizando el modelo cualitativo para determinar el potencial de eficiencia basado en evaluaciones de tareas individuales, incluida la identificación de los valores de las tareas. Al distinguir entre el trabajo de oficina y el relacionado con la interacción con el cliente, el estudio concluye que el 45 por ciento del tiempo de trabajo encierra un potencial de eficiencia, utilizando la base de datos ONET, que contiene 214 tareas individuales en el grupo profesional de marketing y ventas profesionales.

Palabras clave: Digitalización, Trabajo, Eficiencia, Tecnologías, Tareas, Trabajo





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## INDEX OF ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
AVE	Average Variance Extracted
BAuA	Federal Institute for Occupational Safety and Health
BERUFNET	German Expert Database of the Federal Employment Agency
BIBB	German Federal Institute for Vocational Training
B2B	Business-to-Business
CI	Condition Index
CR	Composite Reliability
ESS	European Social Survey
EWCS	European Working Conditions Surveys
ELM	External Labor Market
DOT	Dictionary of Occupational Titles
GoF	Goodness-of-Fit
IAB	Research Institute of the Federal Employment Service
ILM	Internal Labor Market
IT	Information Technology
KLDB	Classification of Professions
LDC	Low Development Countries
ML	Machine Learning
MR	Mobile Robots
NAAL	National Assessment of Adult Literacy
OECD	Economic Co-operation and Development

ONET	Occupational Information Network
PDII	Princeton Data Improvement Initiative
RDD	Random-Digit-Dialing
RBTC	Routine-Biased Technical Change
RBV	Resource-Based View
RTI	Routine Task Indicator
SBTC	Skill-Biased Technical Change
SEM	Structural Equation Model
SMAC	Social, Mobile, Analytics, and Cloud Computing
SMACIT	Social, Mobile, Analytics, Cloud Computing, and Internet of Things
SOC	Standard Occupational Code
TFP	Total Factor Productivity
U.S.	United States
VIF	Variance Inflation Factor

# **I – INTRODUCTION**





## 1 INTRODUCTION

Almost 100 years ago, Keynes (1931) already argued the possibility of technological unemployment, meaning that human labor is outpaced by technologically economizing its use versus finding new uses. Technological progress increases efficiency with which human labor cannot keep up, leading to the possibility of a fifteen-hour working week without experiencing a drop in output. Still today and with a more intense character, digital technologies impact societies and economies (Ritter and Pedersen 2020). Consequently, the interplay between digital technologies and work has been discussed for many years and is, even today, a relevant topic due to ongoing newly emerging technologies. Its combination also offers a broad scope of research fields. The following research study targets an optimization of the provided work input of digital technologies and human labor while aiming for an increase in efficiency. This first main chapter underlines the relevance of the targeted research in this study and derives the research problem, followed by the presentation of the objective and structure of the dissertation to counteract a potential research gap.

## 1.1 DERIVATION OF THE PROBLEM STATEMENT

With a particular focus on marketing and sales, recent literature discusses the progress of a firm's digital transformation (Kumar 2018; Reinartz et al. 2019; Verhoef and Bijmolt 2019). Marketing and sales as a conjoined business function enjoy current attention concerning implementing digital technologies (Harwardt 2019; Ritter and Pedersen 2020; Vadana et al. 2020). To also benefit from digital technology adoptions, firms, and their managers must be able to benefit from this progress successfully. Björkdahl (2020) presents a very current incapability of decision-makers across several business functions to profit from these effects since they are preoccupied with the endeavor to identify the offered performance potentials by digital technologies. Especially decision-makers in marketing and sales argue not to feel adequately equipped to steer through digital transformations successfully. Also, business-to-business (B2B) sales employees feel uncomfortable working with digital marketing and sales interfaces and platforms (Agnihotri 2021). With special attention to artificial intelligence applications, employees engaging in related sales activities show an insufficient knowledge of correctly managing those tools (Prieto and Braga 2021). Therefore, this research study focuses on enabling decision-makers to identify performance potentials and fully exploit the provided capabilities from digital technologies. The following literature summary details relevant discussions and conceptualizations to narrow the research gap.

Autor et al. (2003) 's task-approach is deemed a pioneer and seminal work concerning the effect of digital technologies on human labor tasks. They present a model for job substitutability and complementation in labor market research. Also, they argue that especially jobs intense in routine tasks can be replaced by computer capital since they function as perfect substitutes. Based on this initial model, a large set of literature was motivated to discuss and understand the effect of digital technologies on the labor market to provide evidence for specific labor market incidences such as job polarization (Autor et al. 2003; Spitz-Oener 2006; Goos and Manning 2007; Acemoglu and Autor 2011; Michaels et al. 2014; Autor et al. 2006; Autor et al. 2008; Autor and Dorn 2013; Autor and Handel 2013; Goos et al. 2009; Goos et al. 2014; Beaudry et al. 2016; Fernández-Macías and Hurley 2017). By

employing so-called task indices, they operationalize entire occupations to identify jobs as replaceable by digital technologies in case the task bundle of a job is determined as routine. High-skill employees experience a complementation effect; middle-skill employees intensively perform routine jobs and can be substituted; low-skill employees can neither be complemented nor substituted. Those low-skill occupations are vigorous in social or non-routine manual tasks whose capabilities cannot be compensated by digital technologies. Important to mention is that most of the presented research uses the wage scale as a measurement instrument to allocate employees into skill clusters, which is undoubtedly a possible approach but also proves the absence of a precise and accurate method. Primarily if international approaches are pursued, the salary varies from country to country and between the same occupational title, even in national analyses. However, since technology advances and newly emerging technologies develop capabilities that overrule the traditional task approach, a new framework is needed as “simply extrapolating past trends will be misleading” (Brynjolfsson and Mitchell 2017, 1533). Therefore, Frey and Osborne (2017) propose the susceptibility of jobs, Dengler and Matthes (2018b) the substitutability potential, and Fernández-Macías and Bisello (2020) the taxonomy of tasks. The susceptibility of jobs proposes three engineering bottlenecks that must be overcome to automatize jobs fully. The substitutability potential assesses as the first study on individual task-level whether jobs are replaceable (labeled as routine) by digital technologies or not. The taxonomy of tasks is a newly developed and extended task conceptualization based on the already presented job polarization literature. Still today, high-skill labor profits from having a comparative advantage over low-skilled labor in performing complex problem-solving tasks which are impossible to become fully automated. Low-skill labor performs non-routine manual tasks and is vulnerable to be substituted by digital technologies (Acemoglu and Restrepo 2018a). The workforce which is capable to perform such irreplaceable complex tasks should focus on new, more productive tasks (Acemoglu and Restrepo 2018c; Acemoglu and Restrepo 2019b) to not only drive performance by optimized input resource utilization, but also increased output. Nevertheless, even if these studies propose new frameworks, they solely put their emphasis on the labor market. Current literature also strongly concentrates on the automation of the production process and how it should be modeled and conceptualized (Acemoglu and Restrepo 2018b), but

entirely neglects the opportunity to translate similar ideas to business units such as the field of marketing and sales and conduct single tasks analyses with tailored models.

Since the study is supposed to help decision-makers in practice and motivate researchers with further scientific projects, a new approach is required. The already derived research gap in the last paragraphs, the lack of details concerning task conceptualizations in specific business units, can be further detailed in combination with performance management measures. The interconnection of the task-approach literature, advanced studies, and performance management measures as conjoint approaches could help managers feel more confident in digital transformation processes. Also, they could focus on profiting from the digitalization progress instead of being busy solely identifying the potential. Furthermore, the field of marketing and sales is chosen as the pre-selected business function which could profit the most from the proposed research approach. The concentration on marketing and sales is also justified by an intense consumer focus that follows the endeavor to improve effectiveness.<sup>1</sup> Sheth and Sisodia (2002b, 351) also argue that a compelling marketing mix toward the consumer is preferred over efficient resource utilization in marketing. Therefore, marketing and sales is deemed a business function that is only fragmentarily treated concerning efficiency maximizations, while no pertinent literature is available. Marketing and sales are “strongly interdependent” (Dewsnap and Jobber 2000), and business performance also suffers from a “war” between them (Kotler et al. 2006). As also already argued by Dengler and Matthes (2018b), the missing integration of the factor “time” as a weighting unit results in distorted results of their calculated substitutability potential across the labor market. Since the measurement unit of time (Globerson 1985; Chan 2003), or man-hours measured by the coefficient of time (Siegel 1980; Grifell-Tatjé et al. 2018), is one of the most common measures concerning efficiency, this proposed weighting scheme of human labor input to determine an efficiency increase, by also employing digital technologies as input resource, is adopted in this research study.

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<sup>1</sup> Exemplary studies from Mullins and Agnihotri (2022) and Agnihotri (2021) also only concentrate on the effectiveness of the sales process and an increase in effectiveness by frontline readiness to manage digital transformations successfully.

Also, the idea of concept to detail the currently known labor market approaches and transfer them to the firm by incorporating performance management measures is additionally argued by the so-called productivity paradox.<sup>2</sup> This paradox discusses the absent productivity growth after high information technology investments (David 1990; Brynjolfsson 1993; Brynjolfsson and Hitt 1995; Brynjolfsson and Hitt 1998; Dewan and Kraemer 1998; Stratopoulos and Dehning 2000) primarily driven by measurement faults of input and output, time delays, profit redistribution, and the wrong way to deal with technology (Brynjolfsson 1993, 76). As already stressed by Solow (1987), the effect of computers can be seen everywhere but the productivity statistics. This phenomenon is still present today, as Brynjolfsson et al. (2019) referred to as the “modern productivity paradox.” Even though sophisticated technologies have been introduced, performance management-related figures such as productivity reveal weak growth (Acemoglu and Restrepo 2019a). Therefore, the aimed model to identify performance potentials, such as efficiency, allows decision-makers to identify performance-hindering activities on task level and before digital technology investments are made.

To further narrow the already partially derived research gap, greater efficiency is used as the leading calculation approach in this dissertation and represents performance management-related matters. It must conceptually be delimited from productivity but especially from effectiveness, which is especially relevant in marketing and sales. Mouzas and Bauer (2022), for example, rethink business performance models and differentiate between market effectiveness (e.g., increased sales revenue or market shares) and operational efficiency (e.g., limiting costs of marketing and personnel) to improve the performance management figures of profitability, solvency, and growth. Their definition of operational efficiency neglects human labor input by dividing operational profit by sales revenue. Leaving human labor unnoticed is argued as a major problem of current

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<sup>2</sup> It is important to emphasize that the mentioned transfer to the firm does not refer to internal labor market (ILM) research building upon for example groundwork of Doeringer and Piore (1971). An internal labor market is an administrative unit governing labor-related matters (costs, worker allocation, etc.) within a firm with clear procedures. It excludes the external labor market (ELM). It applies a holistic perspective on a firm’s workforce, such as skill development, training, and workforce dynamics, to analyze talent attraction, retention, and more.

literature and performance management analyses in marketing and sales in this dissertation to achieve increased productivity by greater efficiency. The work input of human labor in marketing and sales is not considered adequately from an internal performance optimization perspective since the concentration on effectiveness represents the primary measure.

To summarize, the goal of this dissertation is based on the motivation to develop an efficiency calculation model tailored to the business function of marketing and sales. By utilizing the initial task approach literature and conceptualizations as the model basis, the perspective of the performance management measure of efficiency is integrated to achieve a model transfer from the labor market to the firm. The additive connection between human labor input and digital technologies is weighted with the coefficient of time. In total, three main interests are defined as the goal of the dissertation formulated as research questions presented in the following sub-chapter.

## 1.2 OBJECTIVE AND RESEARCH QUESTIONS OF THE DISSERTATION

The dissertation objective is based on the defined research problem derived from the existing literature or simply omitting certain aspects of existing literature. Thus, three research questions are developed, which are supposed to be answered by empirical methods. By employing a sequential mixed-methods approach, a qualitative study precedes a quantitative study, while the second builds upon the first one. The qualitative study has already been published by Goldmann and Knoerzer (2022) in the *Journal of Decision and Management Economics* with the title “Technology Advancement Propels Work Productivity: Empirical Efficiency Potential Determination in Marketing and Sales.” The following first research question has already been addressed in this research paper. However, this research paper does not thoroughly discuss the derived research gaps in this dissertation, which also covers the development of two further research questions. Therefore, the mathematical definition of efficiency potential determination (section 2.1.5) and the qualitative study (sub-chapter 3.2) refer to the already published source but are explained in more detail. Furthermore, the quantitative study, including an extended operationalization of the aimed efficiency computation model, is presented, mainly addressing research questions two and three. The following research questions are supposed to subdivide the derived research problem into three matters.

**Research question 1: To what extent can efficiency potentials be quantitatively calculated by empirical modeling and low-value activities conceptually identified and delimited?**

The first question is supposed to be answered by the effort to evaluate the development possibilities of an efficiency determination model based on the initial task-approach literature. With the time coefficient as a weighting scheme, the human labor and digital technology input represent an additive connection to achieve at least the same output by decreased input. By interviewing decision-makers in the field of marketing and sales, a general task conceptualization is developed to design the desired model.

**Research question 2: How far does digital transformation propel companies to fully exploit their efficiency potential to fulfill the requirements of new value propositions?**

The second question follows the endeavor to understand how far companies are already in their digital transformation journey measured by an efficiency potential value derived from the model from research question one. In the form of a quantitative study, employees in the field of marketing and sales are asked to state how they perform their daily tasks. Based on their answers, the developed model is supposed to be able to determine the tasks weighted by the coefficient of time either as efficiency potential or as non-efficiency potential. Also, the average value of the efficiency potential provides a benchmark to put individual results in proportion to the market standards.

**Research question 3: Which tasks in marketing and sales are determined as low-value activities causing efficiency potentials?**

Based on the developed model and the market benchmark for efficiency potentials in marketing and sales, the third research question is supposed to detail the root cause of the potential in the form of individual work tasks. The quantitative research participants are asked for several characteristics of how they perform their tasks. Analyzing job duties at the task level thus makes it possible to identify particular efficiency deficiencies and improve business performance. Consequently, depending on the effective efficiency potential and to ultimately benefit as decision-makers from the efficiency potential identification by shifting the duty of performing tasks from human labor to digital technologies, the respective digital technologies must be introduced.

This dissertation uses the three-research questions as guiding principles to steer through the research studies. In total, four main chapters (including the introduction) are employed. The remainder of the work is structured as follows. In the second main chapter, the theoretical foundation is created for relevant conceptual distinctions, framework conditions are determined to calculate efficiency potentials, and the business unit of marketing and sales is analyzed to justify the focus on this specific field of interest. In the third main chapter, the empirical research is conducted based on the theory work from chapter two. The research design, methods, and results are presented by differentiating between qualitative and quantitative research. The fourth main chapter presents the



answers to the research questions and provides an outlook on the scientific field and a research agenda for further and advanced research.



## **II – FRAMEWORK FOR EFFICIENCY POTENTIAL CALCULATIONS**



## **2 FRAMEWORK FOR EFFICIENCY POTENTIAL CALCULATIONS**

The second main chapter represents the theory section of the research study by employing a literature review and identifying the most relevant experts in this area across already conducted research and is distinguished between three sub-chapters. First, the operational performance in firms is emphasized to derive calculation parameters for defining measurement criteria for efficiency potential determinations. Second, the interplay between the ever-increasing digitalization and work is analyzed. It contains conceptual distinctions for digitalization-related terminologies, the digital transformation effect on firms, and the conceptualization of work, jobs, as well as tasks under the consideration of the influencing aspect of digital technologies. Third, the description and definition of the field of marketing and sales are explained by presenting the key business levers to achieve greater efficiency, accompanied by the ultimate justification to use marketing and sales as the pre-selected business unit in this study.

## 2.1 OPERATIONAL PERFORMANCE IN FIRMS

In general business administration and based on the work of Erich Gutenberg, the three functional areas of production, turnover, and financing can be combined into one closed and interconnected system.<sup>3</sup> The terminology of turnover is further differentiated into procurement, production, and turnover<sup>4</sup> and represents the end phase of a firm's operational process, including all measures of sales activities (Gutenberg 1966, 2).<sup>5</sup> This operational process is a combination of human labor performance and machine equipment. The result of the applied elementary factors of work performance of human labor, operational equipment, and material<sup>6</sup> plus the three dispositive controlling factors of management, planning, and organization represent the factor combination (or return of factor input) based on quantities (Gutenberg 1958, 27).

To further detail the operational performance in firms, the following sections compile the firm's performance measurement indicators, the applied ratios of productivity, effectiveness, and efficiency, as well as the creation of value-added. Furthermore, since a major of this dissertation lies in the field of marketing and sales, the functional area of turnover is considered with special attention.

### 2.1.1 A Firm's Performance Measurement

Performance measurement "is the process of quantifying action, where measurement is the process of quantification and action leads to performance" (Neely et al. 1995, 80; Neely et al. 2005, 1228). The measurement needs to exceed

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<sup>3</sup> For other summary references see, for example, Albach (1989, 215–216).

<sup>4</sup> The concepts are in their original form written in German language, which can lead to ambiguities when translating due to its conceptual proximity.

<sup>5</sup> Gutenberg (1966, 1) also explains and differentiates the terminology of turnover, first as part of the general operational process as "Umsatz," which he uses as the general holistic "Umsatz"-process before differentiating the terminology even more in detail as end phase of the operational process calling it "Absatz" He further summarizes that the usage in commercial practice of "Absatz" more refers to the sold quantities of good while "Umsatz" more reflects the value of these quantities of goods (revenue), when however, there is no unique distinction.

<sup>6</sup> Chew (1988, 111) summarizes the input simply as labor, capital, and material.

financial measures to achieve competitiveness, and optimal business strategies have already been widely discussed in the literature (Johnson and Kaplan 1987; Bititci 1994; Neely et al. 1995; White 1996; Neely et al. 2005). Bititci (1994, 16) recommends proactively considering a holistic performance measurement covering all critical sensitives and key figures.

The most popular methodology to apply a comprehensive performance measurement system in organizations is the balanced scorecard (Neely et al. 2000, 1122) by Kaplan and Norton (1992)<sup>7</sup>, designed for a firm's senior management team. Because this scorecard is tailored to senior executives, it simultaneously reveals its crucial limitation due to missing operational applicability (Ghalayini et al. 1997, 209). Additionally, there are further well-known performance measurement systems, besides others, depicted as follows. Sink and Tuttle (1989) define organizational performance as a complex structure of interrelationships between seven performance criteria: efficiency, effectiveness, productivity, quality, innovation, quality of work-life, and profitability, with, however, lacking focus on the consumer perspective and flexibility. Johnson and Kaplan (1987) developed the activity-based costing approach identifying a firm's indirect costs and determining drivers, or activities, responsible for the specific indirect costs. Kaplan and Cooper (1998) further developed this approach by focusing on process-based costing, which is solely considered from the financial measurement perspective. Neely et al. (2001) created the performance prism capturing the needs of different stakeholders such as employees, customers, suppliers, and more which leads to the development of the business strategy and performance measurement tools. It is about analyzing the strategy first and further deriving the performance criteria from the firm's objectives accordingly (Globerson 1985, 640).<sup>8</sup>

To leverage the balanced scorecard, the assembly of financial and operational measures, consisting of the customer, internal business, innovation, and learning,

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<sup>7</sup> With the great interest of business and science about the balanced scorecard, Kaplan and Norton (1993) published a second article in the Harvard Business Review presenting an eight-step guideline for executives to design a balanced scorecard before providing a holistic approach of translating strategy into action (Kaplan and Norton 1996).

<sup>8</sup> For a detailed presentation and discussion of several performance management systems, see Neely et al. (1995; 2005). The great acceptance and empirical investigations of performance measurement concepts between 1980 and 2000 were argued by raising global competition (Hannula 2002, 57).

enables a firm's executives to decide on a sound and holistic basis (Kaplan and Norton 1992, 71). The operational measures drive businesses to harvest financial success as a consequence. To achieve maximized customer satisfaction, internal measures such as time, quality, productivity, and employee skills have the most significant impact on the results by still considering the costs of the products (Kaplan and Norton 1992, 73). However, to keep being competitive, a company needs to stay innovative and capable of learning to improve on an ongoing basis.

By reflecting the different presented perspectives of the performance measurement approaches, the dissertation focuses on the internal business performance measurement, including productivity, to satisfy consumer demand. These two perspectives are allocated to the non-financial measures of a company's complex reality of business units (Hannula 2002, 58). Efficiency, which embraces the critical measure within the literature analysis and empirical research is, according to Kaplan and Norton (1992), stated as a measure of the goal of productivity. The following chapter captures the definitions and calculation basis for productivity and efficiency while differentiating these terminologies from effectiveness.

### 2.1.2 Productivity Measurement

"The difficulties which arise in the measurement of productivity for almost any type of activity relate to the definitions of both the output and the input factors and their quantification." (Fisher 1990, 61)

The literature proposes a clear conceptual distinction to measure a firm's productivity to counteract this measurement difficulty. Gutenberg (1958, 28) deduces productivity as the ratio between the factor input return (output) and the factor input (input) concerning a time unit (t).

Formula 1: Productivity

$$Productivity_t = \frac{factor\ input\ return}{factor\ input}$$

Source: in the style of Gutenberg (1958, 29)

The general understanding of productivity enormously varies in definition and form. Some authors use, for example, the formula of Gutenberg (Chew 1988, 111;



Fisher 1990, 62; Siegel 1980, 23; Anderson et al. 1997, 131; Sheth and Sisodia 2002a, 350; Sumanth 1998, 13; Grifell-Tatjé et al. 2018, 24). Others present an adjusted formula by designating the numerator as “value-added” (Schröder and Nebl 2009, 118), the denominator as “expected resources used” (Sink and Tuttle 1989, 171) while again others describe the performance indicator of productivity as “a measure of production efficiency” (Bitran and Chang 1984, 29), “a comparison of the physical inputs to a factory with the physical outputs from the factory” (Kaplan and Cooper 1998, 29) or relationship between output and input (Hannula 2002, 59). Production, concerned with producing goods and services, must be differentiated from productivity since productivity is concerned with the production efficiency and effectiveness of goods and services (Sumanth 1998, 12; Stainer 1997, 224).

For this dissertation, the productivity calculation, according to Gutenberg (1958), is applied. Fisher (1990, 62) details this definition in the context of a business productivity approach by arguing that total productivity (P) equals total output (O) divided by total input (I). Exemplary literature (Sumanth and Yavuz 1983, 260; Fisher 1990, 62; Sumanth 1998, 5) distinguish possible productivity measures as partial factor (ratio of output to a single input), total factor (net output to the sum of multiple inputs)<sup>9</sup>, and total productivity (ratio of total output to all input factors). For practical calculation purposes of total productivity, it is furthermore emphasized that it is effectively impossible to determine, also affected by additional intangible factors (Fisher 1990, 61). This issue leads to a missing realization of summarizing the input factors to a standardized output (Gutenberg 1958, 29) which Bitran and Chang (1984, 31) overcome by proposing a conversion factor. They, however, still argue the vagueness of total productivity measures, including all input factors. Especially when digital technologies became increasingly relevant to calculate productivity, input, and output determination difficulties arose (Brynjolfsson 1993, 69). Therefore, it is proposed that productivity can also be calculated as partial productivity (PP) for the whole enterprise and single operational functions (Gutenberg 1958, 30; Fisher 1990, 62; Bitran and Chang 1984, 31), such as marketing and sales. Within the context of partial productivity, Sumanth (1998, 15–18) explains four relevant concatenations for this dissertation.

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<sup>9</sup> For fundamental research on changes in total factor productivity, see, for example, Jorgenson and Griliches (1967). Also, the utilization of the formulation of “factor” meets the definition of Gutenberg (1958).

First, partial productivity with labor as input (labor productivity), measured as output per man-hours, is the most common measure. Second, firms regularly neglect the impact of additional resources, such as materials and machinery, to present labor productivity improvements. Third, labor productivity savings are used to justify new digital technologies instead of arguing total factor productivity with two inputs. Fourth and finally, there are difficulties in measuring non-direct labor. Clerical and professional white-collar employees perform tasks such as thinking and creative activities, especially when possible measurable output has a time-lapse between the initially provided input. As mentioned, Fisher (1990) also describes intangible factors as a measurement difficulty.

Following the four considerations of Sumanth, partial productivity within the operational function of marketing and sales is derived as follows. First, labor productivity with labor as input factor measured with man-hours is considered respectively. Second and third, the integration of digital technologies creates a multiple input of human labor ( $I_L$ ) and digital technologies ( $I_{digtech}$ ) within the partial factor equation, which produces quantities as output ( $O_L$  and  $O_{digtech}$ ).<sup>10</sup> Fourth, the difficulty of measuring intangible factors such as creative tasks will be addressed in a later section. Since the business function of marketing and sales contains several human labor inputs which are hard to operationalize, intangible factors will enjoy special attention.

Ultimately, the general productivity (P) formula is presented as output (O) divided by input (I) in a certain period (t).

Formula 2: Productivity 2

$$P = \frac{O_t}{I_t}$$

Source: in the style of Fisher (1990, 62)

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<sup>10</sup> As further inputs, literature also mentions energy as well as services, supplies, and other non-capital (Fisher 1990, 62; Hannula 2002, 59). Bitran and Chang (1984, 30) provide an overview of several input and output factors of production activities. Siegel (1980, 35) argues that the input concept of labor, employment, or man-hours is the most familiar denominator with what Grifell-Tatjé et al. (2018, 24) agree and also use as an example for definition purposes.

Derived from that, the definition of total factor productivity (TFP) contains human labor and digital technologies as multiple inputs.

Formula 3: Total Factor Productivity

$$TFP = \frac{(O_L + O_{digtech})_t}{(I_L + I_{digtech})_t}$$

Source: own illustration

For exemplary productivity calculations, literature from the 1990s and 2000s provides several examples. Anderson et al. (1997) review the relationship between productivity and consumer satisfaction, which is considered negative, by calculating a single-factor labor productivity ratio by dividing a firm's total sales by the number of employees. Crepon et al. (1998) argue a positive correlation between firm productivity and increased innovation output, considering the composition of labor skills and physical capital intensity. Bartel et al. (2007b) analyze the relationship between computer capital and productivity growth on plant-level data in valve manufacturing, considering the effects of process efficiency, product customization, work organization, and worker skills. The key results highlight the development of new business strategies, product customization, efficiency in the production process, increasing worker skill requirements, and new work practices of human labor. Bartelsman and Doms (2000) provide a literature review of research about productivity and split the studies in the twenty's century generally into two groups: documenting as well as describing productivity and examining the factors of productivity growth. As a reason for productivity growth, Anderson et al. (1997, 131) stress several aspects already driven by digitalization: the substitution of capital for labor, technology improvements, and process automation. Additional aspects are summarized as growth through managerial ability, human capital, and technology (Bartelsman and Doms 2000, 570). Furthermore, Hannula (2002) deals with the challenge of productivity measurement as a practical measurement concept with validity on the business unit level for total productivity. Also, at the beginning of the 1980s, Sumanth and Yavuz (1983) provide a conceptual framework to improve organizational productivity by emphasizing five productivity improvement

techniques, including a technology-based approach.<sup>11</sup> The technology-based techniques have significantly improved, which will be presented in later sections. Based on the two approaches of technology- and skill relation, Acemoglu and Zilibotti (2001) present a model, based on several studies stressing significant TFP differences across countries due to technology transfer barriers, that there would still be significant productivity and output differences across countries if they would have the same set of technology. As a critical result, they present a mismatch of required technology skills. In certain countries, unskilled labor is supposed to perform tasks initially created for skilled labor who work as skill complementation for digital technologies. Consequently, skills must match the performed task.

Productivity from a business point of view is related to organizational performance. A standard quantitative measure for digital technologies is required to combine input and output consistently, which literature compares, for example, with the profound field of accounting and monetary equivalents to measure productivity effectively (Fisher 1990, 63). Sheth and Sisodia (2002b, 349) follow this approach and emphasize the sophisticated and well-defined methods in accounting functions. They propose that a similar approach is also needed for marketing to achieve greater productivity. Furthermore, they define marketing productivity as a combination of efficiency and effectiveness and highlight productivity as the central marketing problem, as also identified by Sheth and Sisodia (2002a), due to rising costs while effectiveness stays vague.

Productivity improvement, in general, can be engendered by five interpretations: i) managed growth (output increases faster than the input), ii) working smarter (more outputs from the same input), iii) the ideal (more outputs with a reduction in inputs), iv) greater efficiency (same output with fewer inputs) and v) managed decline (output decreases, but input decreases more) (Mistereck et al. 1992, 32–33). Those relationships can also be presented vice versa. The following section enlightens the calculation coherences of productivity, effectiveness, and efficiency to contextualize these three organizational measures. With particular regard to the field of marketing and sales, a demarcated understanding of greater efficiency is discussed.

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<sup>11</sup> Also, aspects of employee-based techniques are considered, such as skill enhancements, training, and education, which are supposed to play an essential role in the input factor concept of human labor performing complementing tasks for digital technologies.

### 2.1.3 Effectiveness Versus Efficiency

“There is surely nothing quite so useless as doing with great efficiency what should not be done at all.” (Drucker 1963, 54)

Besides the calculation obstacles of productivity, the quantification concepts of effectiveness and efficiency display similar clarification needs. They are, however, key measurement indicators for determining organizational performance (Mouzas 2006, 1124). Referring to the definition of both terminologies, Drucker (1963, 54) raises two questions. “Are we doing the right things?” for effectiveness and “Are we doing the things right?” for efficiency. In the general economic content, Kreutzer (2017, 132) argues from a practice-orientated perspective that the former targets the usefulness and successfulness of activities while the latter describes an input-output relation. Reduced input resources (money, skills, and time) lead to greater efficiency by any given output level (Clark 2000, 5). Thus, the productivity of one input resource can increase while efficiency directly relates to all input resources of an organization (Achabal et al. 1984, 113). Consequently, the optimization of input resource utilization (e.g., labor, capital, capacity, energy) by the coefficient of time and money improves an organization’s performance (Chan 2003, 538).

For the performance measurement unit (coefficient) of efficiency, Globerson (1985, 643) emphasizes the coefficients of time and volume. Defined differently, Sumanth (1998, 13) determines efficiency as the actual output divided by standard output measured with, e.g., production units, resulting in a ratio. He indirectly disregards the input by arguing a relative result between actual output and planned output. He furthermore adds that productivity is not directly related to efficiency but effectiveness. By differentiating these two measurement indicators, Achabal et al. (1984, 114) argue that efficiency never assures effectiveness as it only relates to the possible utilization of resources within the scope of a specific corporate strategy. Additionally, the question of the most suitable strategy to maximize ROI, in the long run, requires the most effective resource utilization, indicating efficient resource input. According to Mouzas (2006, 1125), the primary concern of efficiency is minimizing costs to achieve higher margins, whereas effectiveness describes the present value and future organizational income, basically, a firm’s capability to achieve set objectives (Sumanth 1998, 12). Keh et al.

(2006, 266) provide research on precisely these two perspectives, efficient minimization of marketing expenses and effective execution of marketing activities to maximize output. An amplified and more precise distinction of the two terms, also based on the marketing perspective, is defined as follows: "Effectiveness refers to the extent to which customer requirements are met, while efficiency is a measure of how economically the firm's resources are utilized when providing a given level of customer satisfaction" (Neely et al. 1995, 80). A summary of both is provided by Sheth and Sisodia (2002b, 351), arguing that a firm needs to have the most effective marketing mix and the most efficient marketing spendings by putting the former always first and seek for efficiency after achieving effectiveness. Consequently, they define "marketing productivity conceptually as the quantifiable value added by the marketing function, relative to its costs."

However, to contribute to marketing productivity by achieving quantifiable value-added, the measurement of efficiency by the time coefficient is further penetrated by focusing on the efficient resource utilization of the employees working in the field of marketing and sales.

#### **2.1.4 The Creation of Value-Added**

A firm's performance measurement in the form of the measurement indicator of efficiency is required to obtain value-added results. The achievement of competitive advantage to create value-added is in research commonly (Brandenburger and Stuart 1996, 5; Bowman and Ambrosini 2000, 5; Amit and Zott 2001, 494; Lepak et al. 2007, 180; Adner and Kapoor 2010, 309) embedded in a value chain (Porter 1980; 1985) to position the firm. It analyses a firm's five primary activities: operations, inbound logistics, outbound logistics, service, and marketing and sales. These activities directly impact value creation, e.g., physical products, and support activities such as a company's infrastructure, procurement, technological development, and human resources. Porter (1985, 38) defines value as "the amount buyers are willing to pay for what a firm provides them," which he proposes to measure by total revenue. The value commanded by a firm needs to exceed the involved costs to be profitable. Porter (1985, 124–127) defines several sources of value creation, such as marketing and sales, to be as valuable as possible.

In his subdivision of marketing and sales, he differentiates between marketing management, sales force administration, advertising, sales force operations, promotion, and technical literature (Porter 1985, 46), which are activities supposed to position the products in the market while delimiting them from competitors (Porter 1985, 40). Nevertheless, nowadays, the value chain also experiences criticism by being refuted due to newly required digital value-added through proposing an adjusted resource allocation of, for example, labor and capital (Kirchner et al. 2018, 30), which Porter (1985, 167) already indicated with a representative technology allocation within the value chain. Later, he also emphasized the relationship between strategy and the internet impacting the value chain by differentiating physical and virtual activities (Porter 2001, 74). However, value and value-added can also be understood and embedded within different approaches. Details are presented in the further execution of this section.

“For the firm, resources and products are two sides of the same coin.” (Wernerfelt 1984, 171)

Analyzed from a firm’s internal perspective, the resource-based view (RBV), which dominated with intense research in the 1990s (Barney 1991; Conner 1991; Mahoney and Pandian 1992; Grant 1996b; Conner and Prahalad 1996; Russo and Fouts 1997) argues value-added of firm resources as the source of competitive advantage, if their implementation indicates improved efficiency or effectiveness (Barney 1991, 106). When Amit and Zott (2001, 496–497) published empirical evidence on value creation in internet businesses, they even argued that Schumpeter (1934) was the pioneer of the resource-based view that technological progress and innovation lead to new value creation by innovative resources. Great value creation results from a firm’s ability to succeed in innovation (Adner and Kapoor 2010, 306). Resources themselves are defined by the strength and weaknesses of a firm, such as capital, employed skilled personnel, and technology knowledge (Wernerfelt 1984, 172), which is also part of Porter’s five forces tool of product analysis (Porter 1980). Therefore, the RBV describes a collection of internal resources with the primary goal of maximizing value by optimizing resource deployment while shaping a firm’s resources for the future (Grant 1996b, 110). In pursuing research Russo and Fouts (1997, 536) emphasize a lack of corporate environmental performance consideration, which is vaguely described in literature at this time. Within the context of the RBV to achieving sustainable competitive

advantage, Barney (1991, 106–112) further links organizational performance to a firm's skills and resources that are valuable, rare, firm-specific, imperfectly imitable, and challenging to substitute by other resources. In the case of owning and applying these resources, a firm's primary pursuit is offering distinctive products versus competition or selling the identical product as competition at a lower cost position, ultimately creating value (Conner 1991, 132). Based on the RBV, Bowman and Ambrosini (2000, 1) present a theory of value creation defined as combining and deploying human labor (and other resources) to generate profit. Therefore, resources achieve value creation, and profit equals value capture. The human labor resource is furthermore distinguished between generic labor (easily understandable skills and routineness), differential labor (high skills, talent, competitiveness), and unproductive labor (destroying value, unnecessary tasks) (Bowman and Ambrosini 2000, 6–7). To create value, which refers to the job, tasks, or products, it must be exceeded by the exchange value, such as a monetary amount in return for the value received (Lepak et al. 2007, 182).

However, the RBV has experienced an extension by the dynamic capabilities approach. Besides different understandings, it is defined as "the firm's ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al. 1997, 516), which definition Eisenhardt and Martin (2000, 1107) follow closely. This understanding somehow reflects the requirement of changing business environments which induced literature to define it more as a bunch of collective activities which are systematically modified to pursue improved effectiveness (Zollo and Winter 2002, 340). Winter (2003, 992) then focused on arguing the existence of dynamic capabilities while emphasizing the supply of new products. Helfat and Peteraf (2003, 997–998) introduce in the same year and issue of the *Strategic Management Journal* the capability lifecycle with which they explain different stages of firm capabilities such as growth, decline, and maturity. Additional research on information technology and the RBV has been conducted through which the dynamics of information system resources are especially emphasized and will become even more relevant within the course of digitalization (Wade and Hulland 2004). Especially the profitability growth in correlation to information technology investment has been examined empirically, revealing a negative correlation or no correlation at all (Bharadwaj 2000, 186), as more detailed discussed in sub-section



2.2.5.1. The management research, nevertheless, is still intensively conducted on an ongoing basis, with several conceptual and empirical publications reaching out to managerial cognitive capabilities (Helfat and Martin 2015; Helfat and Peteraf 2015) with a focus on explaining a firm's performance utilizing value-added with internal resources as the root cause.

Changing the perspective from the presented internal resources to further possibilities of how value-added can be interpreted, different approaches are discussed in this section. Sirmon et al. (2007, 274) argue that value creation only starts when value is provided to customers. Value creation experiences value optimization when rectified internal resource allocation and management leads to improved performance measurement criteria, as reduced prices for consumers due to efficiency increases. Therefore, the internal RBV mainly focuses on the firm's resources, but only after the value is provided to the customer. Priem (2007, 219) adds that "consumers are arbiters of value," which concludes external determination of value from the consumer perspective (Priem and Butler 2001a, 36; Priem and Butler 2001b, 57) and is furthermore associated with both sides of the coin of Wernerfelt (1984).

Suggested differently, Hall and Jones (1999, 83) analyze the several outputs per worker on a country level considering aggregated production variables such as human capital, physical cap, productivity, and social infrastructures, by which output is deemed the main objective to create value.

The presented perspectives on value-added can also be found in performance measurement literature, namely within the activity-based costing approach introduced at the beginning of the chapter (2.1.1) by Kaplan and Cooper (1998, 157), who summarize the different perspectives on achieving value-added:

1. value-adding from a customer's perspective
2. activities performed as efficiently as possible
3. producing outputs as the primary objective

This dissertation emphasizes the internal resources, specifically the tasks to be performed, assuming value has already been provided to the customer. With a particular reference to Kaplan and Cooper (1998), activities must be performed as efficiently as possible.

### 2.1.5 Summary of the Applied Measurement Criteria

Operational performance in firms can be recorded in several variants and key figures. To be finally able to answer the research questions, the applied measurement indicators in this dissertation are summarized and translated into formulas as follows.

The measurement of productivity underlies input to generate output. The used variables of input are determined as human labor ( $I_L$ ) and digital technologies ( $I_{digtech}$ ), which are measured by the efficiency coefficient of time (t). Therefore, the input is displayed as human labor and digital technology work ( $I_{L+digtech}$ ), measured with the unit of time (t) by producing at least the same output (O) after applying time-saving actions. The differences between input before and after time-saving actions are determined as the value-added measure, namely efficiency increase (EI). An efficiency potential (EP) is identified if non-value or low-value activities are determined, underlying the assumption that every input is measurable and specifiable. As value is already provided to the consumer, at least the same quality (q) is already achieved. This dissertation's measurement criteria and indicators are limited to efficiency calculations to achieve optimized resource input utilization concerning TFP. The argued additive connection between digital technologies and human labor is defined as multiple input. Also, the reasonability relates to the literature in the introduction concerning the task approach and other job evaluation processes for human labor substitution or complementation through digital technologies. As argued by Autor and Salomons (2018, 4), "all margins of technological progress ultimately induce a rise in TFP - either by increasing the efficiency of capital or labor in production or by reallocating tasks from labor to capital or vice versa." This dissertation uses the possible shift of tasks from human labor to digital technologies as a leading approach to determine efficiency potentials. The merging of human labor and advanced digital technologies as multiple inputs can remedy the measurement difficulties caused by unambiguous definitions of input and output factors, as also used by Koch et al. (2021) in a current approach. Also, the digital technology contribution and efficiency improvement assessment offer a possibility to measure total factor productivity (Dabla-Norris et al. 2015). The following mathematical derivation for efficiency determination, efficiency increase, and efficiency increase conditions are based on Goldmann and

Knoerzer (2022). The efficiency (E) measure calculated out of  $O_{L+digtech}$  and  $I_{L+digtech}$  with the efficient coefficient of time (t) is defined as follows:

Formula 4: Efficiency

$$E_t = \frac{(O_{L+O_{digtech}})_t}{(I_{L+I_{digtech}})_t}$$

Source: Goldmann and Knoerzer (2022, 3)

To identify an efficiency increase (EI) and, in addition to that, also the possibility to identify efficiency potentials (EP), the efficiency measure at t+1 must be positive. The greater the value, the greater the efficiency increase. Formula 5 determines an efficiency increase while it equals formula 6, which unravels the calculation for efficiency in the denominator and nominator from formula 4.

Formula 5: Efficiency Increase

$$EI = E_{t+1} - E_t$$

Source: Goldmann and Knoerzer (2022, 3)

Formula 6: Efficiency Increase 2

$$EI = \frac{(O_{L+O_{digtech}})_{t+1}}{(I_{L+I_{digtech}})_{t+1}} - \frac{(O_{L+O_{digtech}})_t}{(I_{L+I_{digtech}})_t}$$

Source: own illustration

As argued, the condition to solely concentrate on efficiency increase is stressed by stable output as a prerequisite.

Formula 7: Efficiency Increase Condition

$$(O_L + O_{digtech})_t = (O_L + O_{digtech})_{t+1}$$

Source: Goldmann and Knoerzer (2022, 3)

In case  $EI \neq > 0$ , a missing identification of EP is indicated. Having derived the calculation basis for creating the empirical model, the variables of  $O_L$ ,  $O_{digtech}$ ,  $I_L$ ,  $I_{digtech}$  must be specified. To be more precise and having set the framework for the relevant operational measures in this dissertation, the following chapter determines the theoretical conditions to elaborate the variables in detail further. Additionally, it emphasizes existing empirical studies applying related concepts and compiles the value-added of the targeted empirical model to identify efficiency potentials in marketing and sales to maximize value.

## 2.2 THE PROGRESSING DIGITALIZATION AND WORK

Digitalization impacts a significant part of business and society (Legner et al. 2017, 301), the working methods (Loebbecke and Picot 2015, 149; Parviainen et al. 2017, 66), and business processes (Demirkan et al. 2016, 14) but without reflecting causality (Klotz 2018, 12). The respective firm's capabilities and strategies of how to utilize technologies or behavioral change are neither new to the economy (Ritter and Pedersen 2020, 180) nor society. However, they are characterized by the pace of development and the occurrences of many incidents simultaneously (Klotz 2018, 12). At the beginning of the 21st century, the just stressed effects on firms have been described as steady and intense digital transformation changing our reality by becoming even more interconnected (Stolterman and Croon Fors 2004, 689). Lucas et al. (2013, 371) describe the application of transformational digital technologies<sup>12</sup> as the reason for transforming the already emphasized aspects of society, businesses, and work by adding markets and industries. Organizational boundaries disappeared already years ago, the geographical distance decreased, time effort condensed (Kohli and Grover 2008, 32), business accelerated, accompanied by increased anonymity (Klotz 2018, 12; Bharadwaj et al. 2013, 472), and visualized products became the standard (Kirchner et al. 2018, 28). The never-ending demand for digital systems causes the emphasized dynamic of these developments, primarily resulting in performance improvements and an increase in efficiency as well as the conservation of resources (Neugebauer 2018, 2). Especially in information systems research, there is, on the one hand, remarkable scalability of infrastructural possibilities highlighted (Tilson et al. 2010, 753), while on the other hand, there is a reference to the transformation of price-performance ratios of products and services (Yoo et al. 2010, 724). Therefore, regarding the business impact, companies are also affected by the change propelled by the digital era (Demirkan et al. 2016, 14; Hess et al. 2016, 123; Matt et al. 2015, 339), incapable of escaping the consequences (Hess et al. 2016, 123). The introduction of the internet is understood as an enabler of change and transformation, but the further development of technologies, such as hardware and software technology, is causing the main effect (Vadana et al. 2020, 471). From a business point of view, it

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<sup>12</sup> Lucas et al. (2013) initially use the terminology of "information technology"

facilitates the analysis of consumer habits and big data, which transforms business models more and more from physical to digital (McAfee and Brynjolfsson 2012, 62). However, in the scientific literature, there is no standard and unique conceptual differentiation for the notion of digitalization (Harwardt 2019, 2; Botzkowski 2018, 22), especially between digitalization and digital (Krickel 2015, 42; Ritter and Pedersen 2020, 181). Furthermore, literature frequently confuses the notions of digitization, digitalization, and digital transformation (Legner et al. 2017, 301; Vial 2019, 119). For example, Parviainen et al. (2017, 64) apply digital transformation and digitalization as synonyms. From a technical point of view, digitization, for example, describes the transformation from analog to digital information by screening the analog output (Loebbecke 2006, 360; Loebbecke and Picot 2015, 149; Negroponte 1995). A conceptual clarification is needed before basing further literature on these terminologies for empirical research on task-level inducing efficiency improvements.

This second main chapter of the theory framework comprises five subchapters. First, an extensive conceptual determination of the main terminologies (digitization, digitalization, digital transformation, and digital technologies) is compiled, preceded by an introduction of why nominal and meaningful theory concepts are necessary and how they are built. Second, digitalization intensively affects firms during a digital transformation, transforming business models and formulating digital business strategies and related work activities, which are derived in detail. Third, the analysis of those activities or tasks is in literature embedded within the task approach from Autor et al. (2003), describing the labor market phenomena of disappearing routine tasks driven by automation and the inviolability of manual non-routine tasks. A plethora of literature built on this seminal work to explain labor market developments impacted by technological progress (Autor et al. 2006; Spitz-Oener 2006; Goos and Manning 2007; Autor et al. 2008; Goos et al. 2009; Autor and Dorn 2009; Acemoglu and Autor 2011; Autor 2013; Autor and Dorn 2013; Autor and Handel 2013; Goos et al. 2014). Fourth, building on the task-based approach, several studies investigated the automation probability on job-level including operationalization proposals, such as the susceptibility of jobs and the substitutability potential (Frey and Osborne 2013; 2017; Pajarinen and Rouvinen 2014; Bowles 2014; Brzeski and Burk 2015; Bonin et al. 2015; Arntz et al. 2016; 2017; Dengler and Matthes 2018b).

Fifth, it is argued that with progressing technological progress, automation has so far developed that the initial task-based approach has overcome the obstacles of manual non-routine tasks leading to the necessity of an adjusted task-based approach. These tasks have been initially labeled as neither functioning as substitution nor complementation by digital technologies (Autor et al. 2003), while progressing technological development later only describes engineering bottlenecks needed to be overcome until full automation of tasks: perception and manipulation, creative intelligence tasks and social intelligence tasks (Frey and Osborne 2013; 2017). The evaluation of tasks due to technological substitutability and susceptibility has only been done on a general basis by, for example, describing tasks as monitoring or leading, which is appropriate to transfer results flexibly on job-level and ultimately on the labor market. However, in this dissertation, it is deemed not detailed enough to transfer the tasks to the field of marketing and sales for efficiency potential determinations, and a new approach is required.

### **2.2.1 Literature Review: Conceptual Distinctions**

The definition of digitalization differs across sources (Harwardt 2019, 2; Ritter and Pedersen 2020, 180). The following literature review emphasizes the existing conceptual distinctions from literature, preceded by a short framing of meaningful theory creation and definition determination, to create a unique understanding of the different possible terminologies which are either not uniquely defined or used as synonyms among themselves. Those definitions will henceforth be used as general understanding within the dissertation.

#### *2.2.1.1 Nominal and Meaningful Theory Concepts*

The different usage, application, and understanding of terminologies are, according to Wacker (2004, 634), no basis for valuable and valid measurements driven by unclear conceptual characteristics. Empirical findings need to be abstractly generalized, conceptually established, and robust in their condition, ensured by understandable theory definitions according to the intended meaning (Suddaby 2010, 347). Especially in marketing scholars, theoretical scientific concepts need to be meaningful (Teas and Palan 1997, 52), theory formulations have to facilitate “both theoretical analysis and empirical testing” (Hunt 1991, 163),

and internal consistency is a prerequisite of meaningful theory concepts (Bagozzi 1980, 117). According to Handfield and Melnyk (1998, 321), a primary concern in research efforts is knowledge development, which is, in particular, built empirically to create new theoretical concepts and complement or revise existing theories that cannot withstand the investigation of research. If conceptual definitions or constructs cannot withstand research and are not built consciously, difficulties such as unclear measures, missing causality, and overlapping understandings can occur (Wacker 2004, 633). MacCorquodale and Meehl (1948, 96) emphasized the impossibility of observing a construct directly due to its abstractive conceptual creation. Even if they would be observable, they cannot be reduced to a single construct observation but to an accumulation of abstract categories (Priem and Butler 2001b, 61). Its adoption or inventions has a “special scientific purpose” (Kerlinger 1973, 29). These categories or bundles of interrelated constructs ultimately create a theory (Bacharach 1989, 498) by which meaningful empirical data can be generated distinguishable in positive and negative findings (Kerlinger 1986, 23). Consequently, continuous theory-building ensures continued success, concluded by van de Ven (1989, 488) as “nothing is so practical as a good theory,” while the scientific process of getting there consists of i) observation, ii) induction, and iii) deduction (Bergmann 1957, 31). Also, from a firm’s RBV, as already introduced concerning value-added through firms’ internal resources, the possibility of empirically testing constructs is essential. Barney (2001, 42) emphasizes that “the critical issue is not whether a theory can be restated in such a way as to make it tautological—since this can always be done— but whether at least some of the elements of that theory have been parameterized in a way that makes it possible to generate testable empirical assertions.” By this statement, he emphasizes Porter's five forces (1980) and argues that its successful parameterization introduces empirical testing.

The general conceptual determination of terminologies represents the first step, followed by the second, a holistic theory review within the course of the dissertation resulting in the third, empirical research to create measurable and parameterized theory. To emphasize conceptual characteristics of the terminologies, eight rules for conceptual definitions (Wacker 2004, 634–637) complemented by three aspects to ensure conceptual clarity (Suddaby 2010, 347) are used to eliminate circularity, conflation and unclear terminologies (Vial 2019,

119–121). Vial (2019) summarized this procedure in an adapted manner to remove all obstacles hindering digital transformation from being understood explicitly.

Table 1: How to Create Conceptual Terminologies

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Rule 1: “Definitions should be formally defined using primitives and derived terms.”
Rule 2: “Each concept should be uniquely defined.”
Rule 3: “Definitions should include only unambiguous and clear terms.”
Rule 4: “Definitions should have as few as possible terms.”
Rule 5: “Definitions should be consistent within [their] field.”
Rule 6: “Definitions should not make any term broader.”
Rule 7: “New hypotheses cannot be introduced in the definitions.”
Rule 8: “Statistical test for content validity must be performed after the terms are formally defined”
Guideline 1: “Offer definitions of key terms and constructs.”
Guideline 2: “The definition should capture the essential properties and characteristics of the concept or phenomenon under consideration.”
Guideline 3: “A good definition should avoid tautology or circularity.”
Guideline 4: “A good definition should be parsimonious.”

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Source: in the style of Vial (2019, 121) summarizing Wacker (2004, 634–637) and Suddaby (2010, 347)

Not only is the internal consistency of concepts a prerequisite (Bagozzi 1980, 117), but the continuous conceptual application is also a premise. The creation of an inappropriate definition is especially identifiable as not unique (Wacker 2004, 631), while a good definition captures the essentials of the concepts effectively and concisely, not utilizing tautology or circularity (Suddaby 2010, 347).

#### 2.2.1.2 *Conceptualization of Digitalization-Related Terms*

“As digitalization is embracing all aspects of our private and professional lives, it is becoming a priority for managers and policymakers, and has made it into the headlines of newspapers, magazines, and practitioner conferences.” (Legner et al. 2017, 301).

Motivated by this perspective, a clear conceptual understanding of related terms is required to support decision-makers with tangible notions. This subsection is based on the publication of Goldmann (2021a), extended by more recent literature. Even if the definitions originate mainly from before the Covid-19 pandemic, which led to pertinent, abrupt, and accelerated digital transformation of firms (Nagel 2020, 870; Battisti et al. 2022, 38), the following term collections (table



2, 3) are supposed to provide a holistic understanding of the notions, and not to emphasize the impact of Covid-19. Although a digital transformation is considered a radical and accelerated use of technologies as a consequence of the pandemic (Winarsih et al. 2021, 472; Rupeika-Apoga et al. 2022, 671; Battisti et al. 2022, 38), the literature does not reveal differences concerning the understanding of terms.

Table 2: Literature Review of Digitalization-Related Terms

<b>Digitalization</b>	
Tilson et al. (2010, 749)	"...a sociotechnical process of applying digitizing techniques to broader social and institutional contexts that render digital technologies infrastructural."
Dougherty and Dunne (2012, 1467)	"Digitalization goes beyond the technical process of encoding information in digital format and involves organizing new sociotechnical structures (e.g., science) with digitized artifacts."
Brennen and Kreiss (2016, 6)	"... to broadly refer to the structuring of many and diverse domains of social life around digital communication and media infrastructures."
Legner et al. (2017, 301)	"While digitization puts emphasis on digital technologies, the term digitalization has been coined to describe the manifold sociotechnical phenomena and processes of adopting and using these technologies in broader individual, organizational, and societal contexts."
Rupeika-Apoga et al. (2022, 671)	"... digital technology to adapt the business model and provide new opportunities for generating income and creating value ... digitalization improves rather than transforms the existing business process, transforming the process from a human-driven event to a software-driven event."
<b>Digitization</b>	
BarNir et al. (2003, 792)	"The transition from conducting business activities in a traditional manner to conducting them in a digital form."
Johnson and Bharadwaj (2005, 3–4)	"... creation of a technology-based capability to perform activities previously performed by human capital as the digitization of firm capability."
Yoo et al. (2010, 725)	"... carrying out of new combinations of digital and physical components to produce novel products."
Tilson et al. (2010, 749)	"... the process of converting analog signals into a digital form, and ultimately into binary digits (bits)."
Loebbecke and Picot (2015, 149)	"... conversion of analog to digital information ..."
Brennen and Kreiss (2016, 1)	"... the technical process of converting streams of analog information into digital bits of 1s and 0s with discrete and discontinuous values."

- Legner et al. (2017, 301) "Digitization dematerializes information and decouples information from physical carriers and storage, transmission, and processing equipment."
- Ross (2019, 3) "Digitization involves standardizing business processes and is associated with cost cutting and operational excellence."
- Rupeika-Apoga et al. (2022, 671) "... process of transforming information from a physical format to a digital version... Digitization can improve efficiency if digitized data are used to automate processes and make them more accessible, but digitization is not aimed at optimizing processes or data."

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### **Digital Transformation**

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- Stolterman and Croon Fors (2004, 689) "The digital transformation can be understood as the changes that the digital technology causes or influences in all aspects of human life."
- Lucas et al. (2013, 372) "... a change precipitated by a transformational information technology."
- Matt et al. (2015, 340) "... digital transformation strategy is a blueprint that supports companies in governing the transformations that arise owing to the integration of digital technologies, as well as in their operations after a transformation. ... use of technologies, changes in value creation, structural changes, and financial aspects."
- Demirkan et al. (2016, 14) "Digital transformation is the profound and accelerating transformation of business activities, processes, competencies, and models to fully leverage the changes and opportunities brought by digital technologies and their impact across society in a strategic and prioritized way."
- Hess et al. (2016, 124) "Digital transformation is concerned with the changes digital technologies can bring about in a company's business model, which result in changed products or organizational structures or in the automation of processes."
- Li et al. (2018, 1130) "... digital transformation highlights the impact of IT on organizational structure, routines, information flow, and organizational capabilities to accommodate and adapt to IT. In this sense, digital transformation emphasizes more the technological root of IT and the alignment between IT and businesses."
- Legner et al. (2017, 306) "Digital transformation is the technology-induced change caused by digital business. It embraces the necessary goal-oriented organizational, process, and technological transformation necessary for organizations to succeed in the digital age. Digital transformation requires organizations to understand how business models can be implemented and how digitalization changes how organizations are managed."

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Vial (2019, 121)	“... a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.”
Gong and Ribiere (2021, 12)	“A fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve an entity and redefine its value proposition for its stakeholders.”
Winarsih et al. (2021, 472)	“In general, digital transformation is a radical and comprehensive shift in the use of technology with the aim of improving company performance.”
Rupeika-Apoga et al. (2022, 671)	“... digital transformation is the integration of digital technology across all areas of the business, revolutionizing the ways of working and delivering value to customers. ... Digital transformation is a multidimensional phenomenon, which implies the use and applications of a broad range of technologies for different purposes.”

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Source: own illustration but based on the work of Goldmann (2021a, 4–7)

A review of the diverse definitions of terms in the literature shows that digitalization is emphasized as a sociotechnical process or phenomenon (Tilson et al. 2010, 749; Dougherty and Dunne 2012, 1467; Legner et al. 2017, 301). Also, it describes the application of digital technologies in different contexts individually, organizationally, and socially which expounds the existence of different understandings (Dougherty and Dunne 2012, 1467; Legner et al. 2017, 301; Loebbecke and Picot 2015, 150). For example, Tilson et al. (2010, 749) limit digital technology adoption to the individual point of view, while Brennen and Kreiss (2016, 6) concentrate on the perspective of society's life concerning digital technologies. Thus, authors follow different motivations when defining digitalization.

Digitization concentrates, from a technical perspective, on converting or transitioning analog to digital information (Loebbecke and Picot 2015, 149; Brennen and Kreiss 2016, 1) or signals (Tilson et al. 2010, 749). With an emphasis on the business, it is also referred to as the digital transition of traditional activities (BarNir et al. 2003, 792) and duties formerly executed by human capital (Johnson and Bharadwaj 2005, 3–4). Yoo et al. (2010, 725) concentrate neither on the conversion of signals nor human labor performed activities but on the interaction of physical and digital task constituents to create novel products. Legner et al. (2017, 301) address the dematerialization and decoupling of data. It is also understood as the

standardization of business processes, including cost-cutting effects and operational excellence (Ross 2019, 3), which can be associated with an efficiency increase.

The causing changes explain digital transformation employing digital technologies influencing several aspects of human life (Stolterman and Croon Fors 2004, 689), society (Demirkan et al. 2016, 14), business structures, and value-added (Matt et al. 2015, 340) and the transformation of organizational processes (Demirkan et al. 2016, 14; Hess et al. 2016, 124) plus company's business models (Hess et al. 2016, 124). Legner et al. (2017, 306) offer a broad scope of the definition within the context of organizations by emphasizing the technology-induced change, the necessity of being successful in the digital age, and understanding how firms are managed. It is also mentioned as a change while opportunities arise (Demirkan et al. 2016, 14). Li et al. (2018, 1130) underline the effect of digital technologies on organizations in line with the business perspective. On the contrary, Lucas et al. (2013, 372) only lean with their definition on a change encompassed by digital technologies. The definition of Vial (2019, 121) is derived from 23 unique definitions through an extensive literature review and the application of a grounded theory methodology. It is already preempted that this will not be the working definition in this dissertation, as he argued that his terminology determination "is not organization-centric" (Vial 2019, 121).

Three final working definitions are compiled with a focus on the aimed efficiency impact in organizational contexts, which are the common thread in all upcoming chapters and ensure consistency from definition determination until the final summary of the dissertation.

#### **Working definition of digitalization**

This dissertation leverages Legner et al. (2017) while shortening the definition to the main essence: "Digitalization is the manifold sociotechnical phenomenon and process of adopting and using digital technologies in broader organizational contexts."

#### **Working definition of digitization**

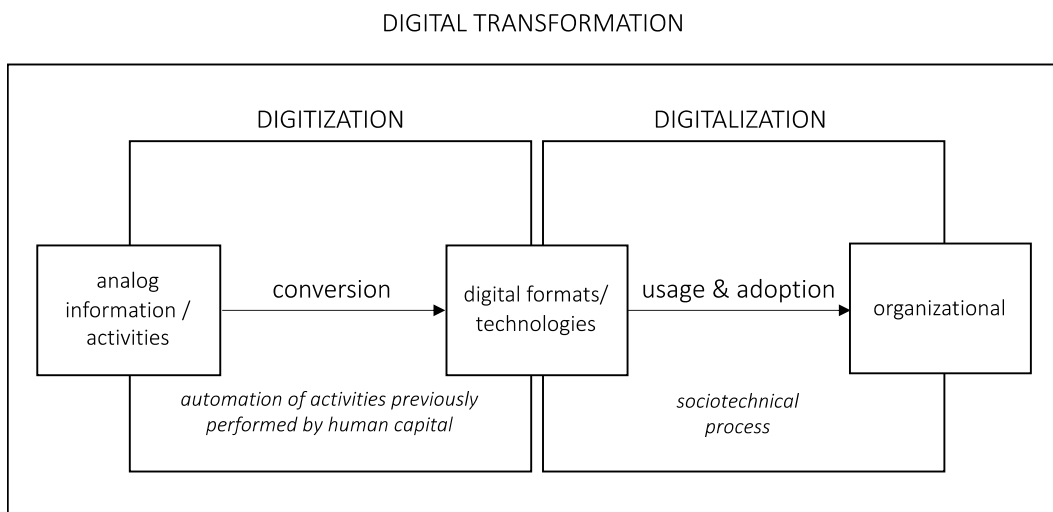
The notion of digitization needs to be simplified as the vague concepts' frequency is higher than in the context of digitalization combined with missing organizational relations. Johnson and Bharadwaj (2005) emphasize the

rationalization of human capital as a resource in the context of firm capability, which is enriched with the aspect of conversion from Loebbecke and Picot (2015). Therefore, the following working definition is applied: “Digitization is the conversion of analog to digital firm capability to perform activities previously performed by human capital.”

**Working definition of digital transformation**

Digital technologies resulting in the conversion process of digitization cause changes in companies or emphasize efficiency effects, as successfully highlighted by Hess et al. (2016). Consequently, this dissertation will use the following working definition for further understanding purposes: “Digital transformation is concerned with the changes digital technologies can cause within a company’s business model, which result in changed products or organizational structures or in the automation of processes.”

Figure 1: Digitization, Digitalization, and Digital Transformation



Source: Goldmann (2021a, 10)

The analysis of these definitions reveals a holistic relationship between the terminologies to classify them as steps in the digital transformation process (Verhoef et al. 2021, 890). However, digital technologies' scope, application, and determination remain vague within the terminologies of digitization and digitalization. The process of digitalization and digital transformation contains the application and integration of digital technologies (Legner et al. 2017, 301;

Stolterman and Croon Fors 2004, 689; Matt et al. 2015, 340; Demirkan et al. 2016, 14; Hess et al. 2016, 124) which is in literature also understood as a technique for information digitization (Tilson et al. 2010, 749), digitized artifacts (Dougherty and Dunne 2012, 1467), transformational information technology (Lucas et al. 2013, 372) or information technology (Yoo et al. 2010, 725; Yoo 2010, 214). Digital technology as a notion, including synonyms, unveil various conceptual understandings. Denner et al. (2018, 347) stress in their research the lack of clarity of the terminology and propose further research to focus on the classification of the terminology. Vial (2019, 122–124) offers an in-depth literature review of digital technologies and describes its characteristic. In contrast to the sole consideration of digital technologies, Nambisan (2017, 1031–1032) does not define digital technologies as such but explains three interconnected elements: digital artifacts, digital platforms, and digital infrastructure, which are constituents of the leading term illuminating subtleties of the conceptuality.

Table 3: Literature Review Digital Technologies

<b>Digital Technologies</b>	
Legner et al. (2017, 306)	"... social media, bigdata, the Internet of Things, mobile, computing, and cloud computing ..."
Legner et al. (2017, 302)	"... digital technologies complement and/or enrich existing products and services and allow building entirely new business models."
Ross (2019, 3)	"... powerful, accessible, and potentially game-changing technologies like social, mobile, cloud analytics, internet of things, cognitive computing, and biometrics."
Ritter and Pedersen (2020, 181)	"Information technology uses binary digits, such that a digit can have a value of either 0 or 1. When digits are used to represent data, the data become digitized. In contrast, analog data are not available as strings of zeros and ones."
<b>Digital Artifacts</b>	
Ekbia (2009, 2555)	"It has aspects that make it special—an active, immanent, unstable, and loosely bounded entity that meaningfully constitutes, and is constituted by, its environment. It is a quasi-object."
Nambisan (2017, 1031) summarizes the understandings of Ekbia (2009) and Kallinikos et al. (2013)	"... a digital component, application, or media content that is part of a new product (or service) and offers a specific functionality or value to the end-user."

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**Digital Platforms**


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Tiwana et al. (2010, 675)	"... extensible code base of a software-based system that provides core functionality shared by the modules that interoperate with it and the interfaces through which they interoperate."
McAfee and Brynjolfsson (2017, 118)	"... a platform can be described as a digital environment characterized by near-zero marginal cost of access, reproduction, and distribution."
Nambisan (2017, 1032) summarizes Parker et al. (2016) <sup>13</sup> and Tiwana et al. (2010)	"... a shared, common set of services and architecture that serves to host complementary offerings, including digital artifacts."
Sebastian et al. (2017, 203) refer to a digital service platform	"... the technology and business capabilities that facilitate rapid development and implementation of digital innovations."
Reinartz et al. (2019, 352)	"Platforms are digital intermediaries that efficiently link external producers/sellers to consumers, thereby enabling value-creating interactions."

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**Digital Infrastructure**


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Tilson et al. (2010, 748)	"... digital infrastructures can be defined as the basic information technologies and organizational structures, along with the related services and facilities necessary for an enterprise or industry to function."
Hanseth and Lyytinen (2010, 4) <sup>14</sup>	"... a shared, open (and unbounded), heterogeneous and evolving socio-technical system (which we call installed base) consisting of a set of IT capabilities and their user, operations and design communities."
Henfridsson and Bygstad (2013, 908) summarize the understanding of Braa et al. (2007) and Tilson et al. (2010).	"... the collection of technological and human components, networks, systems, and processes that contribute to the functioning of an information system ..."
Nambisan (2017, 1032)	"... digital infrastructure is defined as digital technology tools and systems (e.g., cloud computing, data analytics, online communities, social media, 3D printing, digital makerspaces, etc.) that offer communication, collaboration, and/or computing capabilities to support innovation and entrepreneurship."

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Source: own illustration but based on the work of Goldmann (2021a, 7–9)

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<sup>13</sup> Reuver et al. (2018, 124) also refer to Parker et al. (2016), besides Tiwana (2014), in the context of digital platforms, pointing to several perspectives on digital platforms and their impact on business, organizational structures, and economies.

<sup>14</sup> Hanseth and Lyytinen (2010, 4) actually apply the conceptuality of information infrastructure.

Digital artifacts are blogs, websites, social networks (Ekbia 2009, 2554), transactions, or exchange rate systems (Kallinikos et al. 2013, 358). Kallinikos et al. (2013, 358) furthermore present a literature review of different definitions: a quasi-object (Ekbia 2009), an intangible, reproducible, combinability (Faulkner and Runde 2009), reprogrammable unit (Yoo 2010; Yoo et al. 2010). Yoo (2010, 216) uses digitized consumer product examples: televisions, telephones, and refrigerators. For example, the synonym digital object is used to portray its four constitutional attributes (Kallinikos et al. 2013, 358): i) editable to steadily modify digital information, ii) interactive to create digital content, improve responsiveness and flexibility, iii) approachable and editable by different digital artifacts (Yoo 2010, 219) and iv) borderless, distributed, and can facilitate several connections of digital objects (Kallinikos et al. 2013, 358–360). Yoo (2010, 225–226) homogenizes analog data to approach the digital artifacts conceptualization. Digital artifacts are independent software or hardware elements or a digital service operating on digital platforms (Nambisan 2017, 1031). In literature, there is no stringent utilization of the notion. One source uses the example of computers to describe digital artifacts (Yoo 2010, 220), while another uses computers to explain digital technologies (Yoo et al. 2010, 726).

The derivation of the notions of digital artifacts leans on the function of digital platforms, which consists of modules. Modules are “... an add-on software subsystem that connects to the platform to add functionality to it ...” (Tiwana et al. 2010, 675). This understanding complies with the definition of Nambisan (2017) describing so-called “integrated” digital artifacts. Android and iOS can be used as corresponding platform examples representing such an operating system. (Reuver et al. 2018, 124; Nambisan 2017, 1032; Tiwana et al. 2010, 675). On the contrary, Tiwana et al. (2010) utilize Android and iOS to describe digital platforms. Furthermore, they use iPhone apps as an example to define modules. Creating an understanding of digital platforms also requires the involvement of sociotechnical and technical views. The sociotechnical perspective describes “technical elements (of software and hardware) and associated organizational processes and standards” (Reuver et al. 2018, 127). The technical perspective describes digital platforms as “an extensible codebase to which complementary third-party modules can be added” (Reuver et al. 2018, 127). The differentiation of analog from digital platforms emphasizes the imperative of multiple elements, which are, for example,



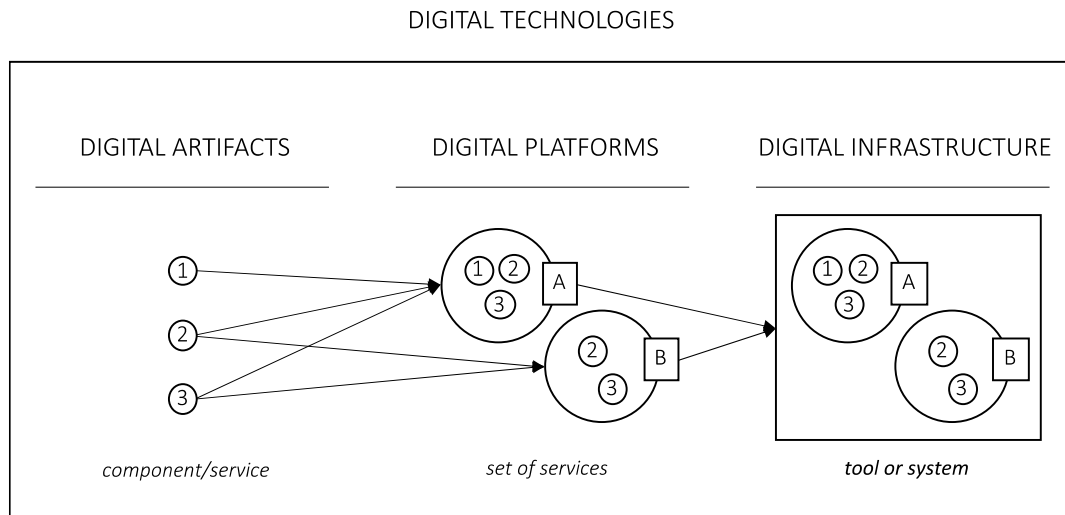
operating systems (hardware) or applications (software) (Reuver et al. 2018, 127). With a focus on business communities, which do not use shared platforms such as salesforce.com being also accessible to competitors, they represent a digital infrastructure that supports connected processes within ecosystems (Markus and Loebbecke 2013, 651). Examples are business processes in marketing and sales (Rangaswamy et al. 2020, 73). Holistically, firms are instructed by information systems research either to be platform providers themselves or to participate in network platform capitalization of their products and services (Legner et al. 2017, 303). The marketing perspective highlights digital platforms as a consumer value creation tool to efficiently combine them with sellers such as Alibaba, eBay, and Amazon Marketplace (Reinartz et al. 2019, 352).

The notion of digital infrastructure has evolved from the pure understanding of independent systems to a unit of connected systems (Henfridsson and Bygstad 2013, 908). Tilson et al. (2010, 751) stress digital infrastructure “as a new type” of digital artifacts and emphasize its interference resistance to create and develop new digital artifacts (2010, 754). To establish a sound and promoting conceptualization and to comply with the approach of narrowing the definition of digital platforms down to the technical perspective, the only matching conceptualization is the one, according to Nambisan (2017). The assembling of the conceptualizations of digital platforms, modules, and the connected ecosystem (compilation of platforms and modules) (Tiwana et al. 2010, 675; Cusumano and Gawer 2002, 54) are summarized as digital infrastructure.

Hence, to comply with the concept determination of digitalization in the organizational context, the understanding of digital artifacts follows the definition of modules according to Tiwana et al. (2010). The associated understanding from Tiwana et al. (2010) is used to define digital platforms. The elaboration of both definitions is embedded in the holistic socio-technical system of Hanseth and Lyytinen (2010), namely digital infrastructure, assuming an organizational environment that coincides with the applied working definition of digitalization (Legner et al. 2017).

Digitization results are the conceptualizations and content-related composition of digital technologies, digital artifacts, digital platforms, and digital infrastructure. Porter (2001, 64) also describes the example of the internet as enabling technology as part of every business strategy.

Figure 2: Digital Technologies and Subordinated Terminologies



Source: Goldmann (2021a, 11)

Digital technologies summarize the elements of digital artifacts, digital platforms, and digital infrastructure according to Tiwana et al. (2010) as well as Nambisan (2017) and describe examples such as social media, internet of things, cloud computing, mobile (Ross 2019, 3; Legner et al. 2017, 306), web services, customer relationship management or data warehousing (Sambamurthy et al. 2003, 238). Lastly, the differentiation between digitalization and digitization is relevant not only in research concerning information systems, as mainly utilized references in this chapter but also in recent marketing scholars (Ramaswamy and Ozcan 2018, 19).

### 2.2.2 Firms in Times of Change

“To become digital, leaders must articulate a visionary digital value proposition. This value proposition must reassess how digital technologies and information can enhance an organization’s existing assets and capabilities to create new customer value.” (Ross 2019, 5)

Society and the economy are changing, and digitalization will continue to influence business processes and models to an even greater extent, but the sole concentration on digitization is not materializing added value driven by technology (Kirchner et al. 2018, 28–29). Digitization embodies a business enabler

(Ross 2019, 4). In this context, the internet of things is argued as digital technology facilitating almost every business strategy (Porter 2001, 64). Furthermore, a firm's digital transformation needs to go above and beyond the pure adjustment of operations and a rethought value proposition (Ross 2019, 4). The process of digitalization results in innovations (Legner et al. 2017, 301), which goes beyond pure digitizing data from analog to digital information while digitization functions as an operational imperative to increase efficiency, excellence in execution, predictability, scalability, and facilitation of product portfolio expansion (Ross 2019, 4). The impact of digitalization on firm-level can be reviewed from different angles to either increase efficiency internally, create opportunities externally, or, lastly, by the accompaniment of disruptive change (Parviainen et al. 2017, 66). These aspects affect companies' products (e.g., novel products), internal structures, and process automation, resulting in adjusted business models (Hess et al. 2016, 124; Matt et al. 2015, 339).

Still today, managers are incapable of profiting from digitalization as they are preoccupied with the endeavor to understand how it will further affect their businesses (Björkdahl 2020, 17). They are extensively confusing a digital transformation with solely digitizing operations such as enhancing a customer experience (Ross 2019, 4). It rather concentrates on a holistic understanding of value proposition, value demonstration (Ritter and Pedersen 2020, 188), and value co-creation mechanisms (Lenka et al. 2017, 95) accompanied by a digitalization capability build-up.

The following two sections emphasize first, a firm's digital transformation, its embeddedness in literature, and its impacts on business models, and second, the formulation of a digital business strategy to successfully navigate through the ambiguity and complexity of a digital transformation (Matt et al. 2015, 340). Furthermore, sections three and four emphasize the conceptions of new work and so-called non-value adding activities that accompany workplace automation and are indicators of managing internal resource efficiency successfully by being able to determine it.

#### 2.2.2.1 *A Firm's Digital Transformation*

A firm should be understood as a "social community specializing in the speed and efficiency in the creation and transfer of knowledge" (Kogut and Zander

1996, 503).<sup>15</sup> This traditional theory of the firm is highly affected by recent incidents driven by digital transformation, which is discussed in this section.

In social sciences, the current wave of digitization is bringing to the fore the need for transdisciplinary research (Legner et al. 2017, 303), mainly observed in business and information systems research. In general, information systems research suggests reviewing a company's digital transformation process across multiple functions to understand its impact holistically (Tarafdar and Davison 2018, 525–528). Business research has identified three steps along with the transformation process analog to the derived conceptual determinants: digitization, digitalization, and digital transformation (Verhoef et al. 2021, 890). Additionally, business research further uses a firm's digitalization capabilities to investigate the digitalization of business models (Ritter and Pedersen 2020, 182).

Information systems research in the 1990s was very present in evaluating low productivity even if investments in digital technologies have been substantial (details in 2.2.5.1). The strategy-related reason is argued by lacking alignment between digital technologies and business strategy (Henderson and Venkatraman 1999, 472).<sup>16</sup> Bharadwaj et al. (2013, 472) provide seminal work on this topic by stating that this alignment is a mandatory endeavor to be successful. They argue that the standard view of IT strategy being subordinate to business strategy needs to change towards a digital business strategy. Research about determining the value of IT stresses that the required capabilities of business strategy must be defined first to maximize value rather than force digital technologies to be allocated into the value system of business (Kohli and Grover 2008, 31).<sup>17</sup> More or less, digital technologies have to be seen as transformation enablers (Lucas et al. 2013, 372). The extent of a firm's digital transformation can be viewed from four different dimensions: i) technology use, ii) value creation changes, iii) changes in structure, and iv) financial aspects (Matt et al. 2015, 340; Hess et al. 2016, 124) through a full organizational adoption to digital technologies (Bharadwaj et al. 2013, 472). The targeted benefits are increased productivity, cost reduction, value creation through

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<sup>15</sup> Adjusted with reference to Kogut and Zander (1992, 384).

<sup>16</sup> Article first published in 1993, see Henderson and Venkatraman (1993), and reprinted in 1999.

<sup>17</sup> For a detailed overview of IT research concerning IT impacting the business performance see Melville et al. (2004).

innovation, and novel consumer interactions (Matt et al. 2015, 339; Hess et al. 2016, 124).<sup>18</sup> Especially the miniaturization of hardware and the ever-increasing power of software as storage capacity and communication bandwidth has pushed digital technologies to the edge for years (Hanseth and Lyytinen 2010, 1; Yoo 2010, 215; Yoo et al. 2010, 724). Understanding these unique characteristics becomes essential to profit from the digitalization effects (Tilson et al. 2010, 753). More current literature reports the third wave of digitalization with advancing technologies, converging SMAC technologies accompanied by ongoing miniaturization and increasingly powerful software (social, mobile, analytics, and cloud computing) (Legner et al. 2017, 302) or SMACIT, which adds internet of things (Sebastian et al. 2017, 197). The first and second waves have been shaped by increased automation of work routines and the global communication infrastructure emerging new businesses (Legner et al. 2017, 301). Furthermore, current information systems research treats several aspects of digital transformation research by, for example, assessing the role of a Chief Digital Officer during a digital transformation (Singh and Hess 2017), qualitative case studies of firms experiencing the digital transformation (Li et al. 2018), the digital transformation strategy of pre-digital firms (Chanias et al. 2019) as well as conceptual grounded theory work across several transformation aspects (Vial 2019).

Business research, on the contrary, especially strategic management research, strongly emphasizes the digitalization of business models toward a digital business strategy. For example, Amit and Zott (2001, 511) offer the following definition for a business model: “A business model depicts the content, structure, and governance of transactions designed to create value through the exploitation of business opportunities.” Teece (2010, 173) argues that “a business model defines how the enterprise creates and delivers value to customers, and then converts payments received to profits.”<sup>19 20</sup> Two main functions, value creation and value

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<sup>18</sup> When defining the benefits, Matt et al. (2015, 339) confuse the notion of digital transformation with digitization

<sup>19</sup> Schallmo (2016, 6) provides a similar understanding. For an overview and comparison of further conceptual distinctions for business models in literature, see, for example, Becker (2019, 18).

<sup>20</sup> Chesbrough (2007, 13) has developed an extensive working definition and functions of a business model by further arguing: “A better business model often will beat a better idea or technology” (Chesbrough 2007, 12).

capture (Chesbrough 2007, 12). Literature puts the business model in contrast to two different strategies for competitive advantage generation, the industry position view and the RBV, as well as dynamic capabilities (McGrath 2010, 248), already thoroughly discussed in 2.1.4. The capability-related argumentation focuses on creating differential models which are difficult to copy rather than imitating from the competition (Teece 2010, 173; McGrath 2010, 248). The design characterizes the model connecting the common threads between the firm and related stakeholders (Zott and Amit 2008, 4). Zott and Amit (2007) offer an efficiency-centered design view to analyze the performance of entrepreneurial firms. A well-developed business model is mandatory for firms to benefit from their innovations and yield profits (Teece 2010, 172). However, it differs from strategy, which refers to the choice of the business model, while the latter determines the logic of operations and value creation for customers (Casadesus-Masanell and Ricart 2010, 196).

The above-utilized research concerning business models is mainly focused on the differentiation of value creation and value capture, as this topic especially gained attention since the special issue in the journal *Long Range Planning* in 2010, followed by an extensive enhancement of the research field (Baden-Fuller and Haefliger 2013, 419). Chesbrough (2010, 354) furthermore connects the implementation of new technologies with a firm's business model, arguing that digital technologies only become valuable until they are commercialized within a business model, basically brought to the consumer. This aspect defines the relevant scope of business models within this dissertation, while, nevertheless, the general theory of business models is deemed out of scope.

The connection of a firm's business model with the ever-altering occurrence of digital transformation changes both the value creation (value proposition for the customer) as well as the value capture (generate turnover) (Iansiti and Lakhani 2014, 94). The transformed operations through digital technologies enhance consumer interactions and collaboration (Berman 2012, 17). However, the sole application of digital technologies is insufficient as new capabilities, practices, and strategies need to be developed. Digital technologies are only the prerequisite (Björkdahl 2020, 17). "Whatever the goal is, it should frame the technology as an opportunity for the business rather than frame the business as an opportunity for the technology." (McGrath and McManus 2020, 129)

Schallmo (2016, 8) presents five components as part of the technology-driven change of business models.

Figure 3: Digital Transformation of Business Models (Components)

COMPONENTS	DESCRIPTION
Dimensions (which)	Time ( <i>more efficient supply of products or services</i> )
	Financials ( <i>cost savings, revenue increase</i> )
	Scope ( <i>connectivity, automation</i> )
	Quality ( <i>products, processes</i> )
Approach (how)	The sequence of tasks and decisions
	Application of technologies to produce novel products
	Obtain and exchange data as well as its analysis to derive options
Transformation degree (how intense)	Incremental ( <i>marginal</i> ) or radical ( <i>fundamental</i> )
Reference unit (for whom)	Customers, own company, partner, industry, or competition
Objects (what)	Single business model elements (processes, products), whole business models, value chains, or value networks

Source: own illustration but in the style of Schallmo (2016, 8)

Following the model of Schallmo (2016, 8), this dissertation focuses on the single business functions of marketing and sales as objects within the company's reference unit, analyzing tasks performed by internal resources using the dimension of time for approach and dimension. Concerning the importance of successfully managing a digital transformation, Hess et al. (2016, 125) and Matt et al. (2015, 339) argue that a holistic digital transformation strategy is neither being integrated within the IT strategy nor the business strategy to identify their "digital sweet spots" (Hess et al. 2016, 125) but in conformity with former strategies without totally replacing them (Chaniyas et al. 2019, 18). Digitalization deflates old models and introduces new opportunities (Iansiti and Lakhani 2014, 99). Sebastian et al. (2017, 198) add the incorporation of opportunities the digital economy offers while not merely considering single strategies. With this concept, literature generally emphasizes the essential alignment between all strategies, according to Bharadwaj et al. (2013), who build their work on the RBV and dynamic capabilities literature.

### 2.2.2.2 *Digital Business Strategy to Achieve Value*

“The future of digital business strategy is already here, it is just unevenly distributed.” (Bharadwaj et al. 2013, 481)

As a firm’s digital transformation involves a broad spectrum of functions, a holistic digital transformation strategy<sup>21</sup> is beyond opportunity and risk assessments solely considering digital technologies (Singh and Hess 2017, 2) or IT strategy (Bharadwaj et al. 2013, 472) as such. A digital business strategy is an “organizational strategy formulated and executed by leveraging digital resources to create differential value” (Bharadwaj et al. 2013, 472) or defined differently as a “pattern of deliberate competitive actions undertaken by a firm as it competes by offering digitally enabled products or services” (Woodard et al. 2013, 538). Latter literature refers through this argumentation to Yoo et al. (2010, 730), who recommend a detailed examination of digital business strategy considering both IT and business strategy. Sebastian et al. (2017, 198) add the capability of flexibly responding to changed market conditions within volatile environments by employing a successful digital strategy. Within the course of digital business strategy, the “holy grail” (Markus and Loebbecke 2013, 652) is the achievement of efficiency without dispensing differentiation and flexibility. Therefore, the fundamental organizational capability, which is “a firm’s ability to perform repeatedly a productive task which relates either directly or indirectly to a firm’s capacity for creating value through effecting the transformation of inputs into outputs” (Grant 1996a, 377) needs to become digital and take the opportunity to redesign the business model (Ross 2019, 5). A cross-functional digital business strategy involves the scale, scope, speed, and sources of value creation as well as value capture influenced by internal and external trends (Bharadwaj et al. 2013, 472), which especially challenges pre-digital firms (Chaniias et al. 2019, 17).

Furthermore, the relationship between digital technologies and corporate strategies, such as a digital business strategy, can also reveal a natural bias of their respective developments and application, which was already summarized and translated by Loebbecke (2006, 363) from literature into either technology biased by the firms positioning strategy (Porter 2001), strategy biased by technology

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<sup>21</sup> In this context a firm’s digital transformation strategy and digital business strategy are used as synonyms.



(Galliers 1993) or independency between both variables (Shapiro and Varian 1999). Yoo et al. (2010, 733–734), on the contrary, formulate a new environment that arises out of technology progress and solely emphasizes strategy developments impacted by digital technologies supporting the holistic digital strategy approach as introduced in the previous section.

Finally, emphasizing metrics capturing value through digital transformation, information system research emphasizes the necessity to identify and measure it first (Kohli and Grover 2008, 28). Research concerning digital transformation in business reveals a clear measurement proposal in conformity with the derived specialization of the business model focus, return on time invested (ROTI): total revenue (TR) divided by the employee number, interpreted as human labor input ( $I_L$ ), following the assumption, that the increased utilization of digital technologies ( $I_{digtech}$ ), lead to fewer human labor resources (McGrath and McManus 2020, 130).

Formula 8: Return on Time Invested

$$ROTI = \frac{TR}{I_L}$$

Source: own illustration according to McGrath and McManus (2020, 130)

ROTI is deemed successful if:

$$I_{digtech} \text{ at } t < I_{digtech} \text{ at } t+1 \text{ while } I_L \text{ at } t > I_L \text{ at } t+1.$$

Such perspectives must be treated carefully since they disclose only partial factor input by solely considering human labor as an input factor while assuming that human labor input decreases caused by a substitution through digital technologies. The new and reduced input by human labor is also highly affected by new work mechanics driven by workplace automation, which transforms the previous working methods into valueless activities. The following two sections describe essential conceptualities of new work and non-value adding activities and frame the trend of modernizing work.

### 2.2.2.3 *New Work and Imminent Workplace Automation*

Reviewing exemplary technical literature (Jobst-Jürgens 2020, 2; Hackl et al. 2017, 3; Vollmer and Poppenborg 2018, 21; Berend and Brohm-Badry 2020, 11–12;

Bruns 2018, 268),<sup>22</sup> the terminology new work almost consistently refers back to founder and eponym the Austrian-American philosopher Frithiof Bergmann with his publication “on being free” (Bergmann 1977). Detailed explanations and expectations of the future of work are published in the book “Neue Arbeit neue Kultur” (Bergmann 2004). The general criticism is directed to wage, labor, and work, which compete for the health of the executing force (Bergmann 2004, 203), while the aim of work should be something genuinely desired (Bergmann 2004, 327). Without concretely conceptualizing new work, this kind of work is stated as complex, surprising, and challenging to understand (Bergmann 2004, 331). Våth (2016, 16) challenges this clear distinction of new work by raising the questions of its reference and what kind of work should become new. Is it only paid work?

On the contrary, and through the definition, Lin (2011, 554) argues to borrow the term “new work” from Jacobs (1969). The elementary understanding of new work is based on the further development and expansion of economies, which is not achieved by adding more of what is already done but by adding new kinds and forms of work to create new goods and services (Jacobs 1969). By transferring this understanding with a focus on digitalization of the labor market, it is “jobs requiring new combinations of activities or techniques that have emerged in the labor market in response to the application of new information, technologies, or “recipes” to production” (Lin 2011, 554). While Bergmann (2004) focuses on a particular part of work, the emphasis in this dissertation concentrates on new work within the course of digitalization and efficiency-boosting tasks based on the latter definition of Lin (2011).

The effects of new technologies directly changing the workplace is no question of today. Exemplary empirical literature, such as Black and Lynch (2001), discussed the productivity impact of companies by using samples of manufacturing businesses already at the beginning of the twenty-first century. In the context of adjusting work requirements caused by advancing technologies, the characteristics of changing workplace practices are mainly impacted by increasing flexibility of place, time, organization, and design (Neuburger 2020, 3–4), the creation of value-added and meaningfulness of work (Berend and Brohm-Badry 2020, 13; Bruns 2018, 268), a new division of labor and the automation of specific

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<sup>22</sup> The references portray only a small portion of the possible referenceable literature

tasks (Neuburger 2019, 595–602). In addition to that, virtual working places are created, which result in the just mentioned increased flexibility, compatibility with modern work practices, increasing efficiency and effectiveness, new formats of collaboration, facilitated access to work, sustainable working concepts, and employee incentives, such as work-life balance and home office. (Neuburger 2020, 8–10). The business enabler is digitalization, but the value-added is the respective human labor with the needed skills and competencies using digital technologies (Neuburger 2020, 11–13). Following these aspects, it seems like new work contributes to companies' efficiency and productivity. Vollmer and Poppenborg (2018) argue the opposite, also supported by Jobst-Jürgens (2020, 5): new work is nothing to be implemented, but it collectively subsumes everything that deals with the current changes in work, leadership, and organizations. New work will not disappear soon, but single elements of it will (Vollmer and Poppenborg 2018, 22).

Due to the ever-changing workplace, several research publications deal with the collateral aspects of uncertainty. Exemplary current studies explore the need for future job creation (Abeliansky et al. 2020), the changing working place (Cijan et al. 2019), as well as positive and negative effects of mass automation (Spencer 2018), all referring to automation, digitalization, and technological progress. Apart from the future of work and the generalized research field of workplace automation, literature already proposes an even more detailed analysis of task calculation within the course of digitalization, which will be focused on in a later chapter.

#### 2.2.2.4 *Non-Value Adding Activities*

According to new work and the emphasized aspects of value-based activities, an additional field of research is introduced – non-value-adding activities. Rohtlin and Werder (2007) introduce that the phenomenon of boreout defines a “stressed society” which is only a sham due to a significantly higher entertainment value in conversations at ease or human labor is psychologically incapable of leaving work before anyone else, as colleagues could argue about probable low workload. Boreout is the opposite of burnout and describes, in this context, a condition of mental underload, lack of interest, or boredom (Rohtlin and Werder 2007, 13). Prammer (2013) further analyzes boreout through sociological analysis to determine its real cause and derives counteracting proposals. Stock (2015)

combines boreout with frontline employees' striving for insights affecting their innovative work behavior, analyzed with descriptive statistics. The framework also contains three dimensions of boreout as independent variables: meaning at work, job boredom, and growth crisis (Stock 2015, 576).

The initial idea of new work from Bergmann (2004, 161), who described work as either mild disease or vocation, was further developed by Graeber (2018). He controversially discusses the existence of "bullshit jobs" in "a form of paid employment that is so completely pointless, unnecessary, or pernicious that even the employee cannot justify its existence even though as part of the conditions of employment, the employee feels obligated to pretend that this is not the case" (Graeber 2018, 9–10). Under the disguise of the term, he applies a subjective element of truth, meaning that a person who argues to perform non-value-adding activities reflects reality.<sup>23</sup> He furthermore highlights a decrease in the main activities executed, activities that define the core meaning of employment, from 46 percent in 2015 to 39 percent in 2016, while non-value adding activities increased (Graeber 2018, 25). Assuming this is real, it would result in employees' daily business, which is highly distorted by several useless side activities. This argument fits besides others also the argumentation of Gaedt (2014) to explain the myth of the lack of specialists in Germany by not focusing on the core of actual work. Additionally, building upon Graeber (2018), Dur and Lent (2019) present a summary of experimental studies emphasizing the negative impact of reduced human labor motivation driven by "socially useless jobs" on productivity and present results about the usefulness of their jobs, effects on the employees, geographical and occupational differences, the root cause of these jobs and what can be done about it.<sup>24</sup>

In general, the presence of those defined non-value adding activities would result in intense efficiency potentials concerning human labor work as input measured with the coefficient of time. Important to mention is that non-value adding activities are solely enlightened under the condition of digital technology advancement. Therefore, the consideration of "non-value activities" is not applied

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<sup>23</sup> For reference, see also Dahlgreen (2015) with results from a YouGov study in Great Britain applying the subjective element of truth.

<sup>24</sup> International Social Survey Program dataset covering waves from 1989, 1997, 2005, and 2015 with more than 100.000 workers in forty-seven countries.

concerning the presented understanding in this sub-section but is mandatory to be discussed since this term could be used differently, leading to a confused utilization in the context of this dissertation. The literature has not yet elaborated on the effect of task automation on this subjective issue of work meaningfulness. Nevertheless, there has already been intensive research on task-level concerning automation possibilities describing labor market developments, which is presented in the following section.

### 2.2.3 Task Approach Based on Routinization Hypothesis

“What is it that computers do —or what is it that people do with computers —that appears to increase demand for educated workers?” (Autor et al. 2003, 1322).

This statement is the leading quote throughout this section, arguing that digital technologies can complement skilled personnel and substitute less skilled personnel and is structured as follows.

The 1980s and 1990s have been shaped by an increase in skilled labor relative to less skilled labor, commonly known as skill-biased technical change (SBTC), argued by the intense adoption of new digital technologies (Berman et al. 1998, 1246; Machin and van Reenen 1998, 1215; Autor et al. 2003, 1279; Goos and Manning 2007, 118; Bresnahan et al. 2002, 340; Acemoglu 1998, 1055). This concept, however, only explains occurrences at the top of the wage and skill distribution (Goos and Manning 2007, 132), which led to the introduction of the task approach of Autor et al. (2003), short ALM, argued as a more “nuanced way” (Goos and Manning 2007, 118; Autor et al. 2006, 190) of the SBTC hypothesis, described as routine-biased technical change (RBTC). This concept motivated a large set of literature to examine certain labor events such as job polarization (Autor et al. 2006; Goos and Manning 2007; Goos et al. 2009; Goos et al. 2014; Autor and Dorn 2013) and offshoring (Blinder and Krueger 2013; Blinder 2009).

#### 2.2.3.1 *Origin and Emergence of Task Approach (SBTC)*

The last century was coined by substantial reallocations of human labor resources with an apparent transition to well-educated and skilled workers (Autor et al. 1998; Goldin and Katz 1998; Machin and van Reenen 1995). The root causes of this “skill premia (return to skills)” (Acemoglu 2003, 199) in the labor market are

summarized as relative high-skilled labor supply, technology-driven skill bias, and international trade (Acemoglu 2003, 220). In the manufacturing industry, for example, earning differentials between operatives and managers increased up to ten percentage points between 1979 and 1989 (Berman et al. 1994, 367). Low-skilled workers have therefore been impacted by increased unemployment and the reduction of relative wages (Berman et al. 1998, 1245) and literature at this time, e.g., Berman et al. (1994; 1998), focused with their research on the manufacturing industry because the measurement is deemed as the easiest (Berman et al. 1998, 1273). The comparison of high- versus low-paid jobs in the composition of occupations is also identifiable as good versus bad jobs in literature, which is supposed to indicate the “level of employment” (Acemoglu 2001, 1–2). Keeping this aspect in mind for ensuing research in marketing and sales and the value analysis of activities, the measurement of variables is subject to be determined. However, the dissemination of new technologies has already provided in the last century plausible explanation for this phenomenon (Autor et al. 1998, 1170). The transition from skills categorized in low- and middle-skill occupations causes a shift of wage share of the income distribution toward highly rewarded jobs requiring an exceptional level of education (Bresnahan et al. 2002, 339).

From an organizational point of view, Caroli and van Reenen (2001, 1449) address a development toward extended responsibilities and task scope as a consequence of organizational changes, which furthermore decentralizes the workplace and requires higher-skilled labor resources to deal with a rising level of responsibilities and uncertainty (see also Caroli et al. 2001; Piva et al. 2005). They also argue that literature, primarily referring to Autor et al. (1998) and Machin and van Reenen (1998), has, until this point in time, been mainly focused on technological change as a reason for upskilling rather than organizational changes, which is “extremely difficult to empirically proxy” (Caroli and van Reenen 2001, 1451). Nevertheless, this dissertation's focus remains on technological progress and digitalization. Therefore, the relationship between skill bias and organizational changes is not contributing to creating the aimed empirical model.

The most common root to explain the ongoing changing employment structure (Goos et al. 2009, 58) or composition (Barbieri et al. 2020, 7) is the intense adoption of new technologies leading to increased demand for skilled labor relative to less educated, which is described as “skill-biased technical change” (Berman et

al. 1998, 1246; Machin and van Reenen 1998, 1215; Autor et al. 2003, 1279; Goos and Manning 2007, 118; Bresnahan et al. 2002, 340; Acemoglu 1998, 1055).<sup>25</sup> An alternative description as a response to the changed skill level and technology within the labor market is also called “qualitative change in the composition of jobs” (Acemoglu 1999, 1259). Biases in the context have also already been discussed in the last chapter regarding the direct influence of a corporate strategy on technologies or vice versa (Loebbecke 2006, 363), while skill-biased technical change deals with the demand of a firm’s labor. This demand is mainly measured by analyzing wage differences between target groups such as college versus high school graduates (Autor et al. 1998). For example, Acemoglu (1998, 1055) referred to this comparison by taking these results for granted and summarized that in 1970 college graduates' income was 55 percent higher. In 1980 it decreased to 41 percent, but in 1995 income increased again to 65 percent, which SBTC explains. This publication leans on the general explanation that new technologies are skill complementary, which also refers to Autor et al. (1998), who argue a positive correlation between the relative worker supply with a college equivalent education, especially from 1970 until 1995 (Acemoglu 1998, 1055–1056). The question “why do new technologies complement skills?” (Acemoglu 1998, 1082) is discussed by providing an answer on the direction of technical change determined by the respective market size receiving the innovation. The more skilled workers are allocated in a specific market, the higher the technological adoption complementing skills since those workers invent more new technologies (Acemoglu 1998, 1082).

The SBTC hypothesis indicates a competition between perpetual technological progress and the demand increase for skilled workers followed by a decrease for less-skilled workers (Acemoglu and Autor 2011, 1044–1045). The relationship between information technology and skills are correlating variables, which do not necessarily reveal causality, based on quantitative research mainly from the 1990s (Bresnahan et al. 2002, 340). Autor et al. (1998) distinguish between two significant conjectures regarding technological progress. On the one hand, SBTC incorporating production and organizational changes is the main propulsion of the mundane favoring of skilled workers. On the other hand, the relative

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<sup>25</sup> The relationship between worker skills and technology adoption with regards to productivity impacts has also been discussed by Bartelsman and Doms (2000, 572).

demand for skilled workers in the 1980s was already propelled by technological progress resulting in wage inequality (Autor et al. 1998, 1170). Technological change could also lead to intensified information gathering, focusing on product and service customization, or propelled novel product development (Autor et al. 1998, 1186). Complementing these aspects, Bresnahan et al. (2002, 370) created a new hypothesis of SBTC leading to an increased demand for skilled labor affecting the labor mix, based on i) raised IT usage, ii) organizational change, and iii) changed services and products. The results of this study based on firm-level evidence revealed a positive correlation between IT, workplace organization, and the resource of human capital, while changed services and products disclosed measurement difficulties (Bresnahan et al. 2002, 370). Additionally, and important to mention, organizational changes leading to skill bias have already been excluded from the dissertation scope. However, the skill-biased organizational change caused by technological progress is argued to be the possibly greatest effect on labor skills than the pure analysis of the technical change effect (Bresnahan et al. 2002, 371). Also, the literature reveals a positive correlation between SBTC pervasiveness and its effect on prices (Berman et al. 1998, 1249). The price effect (i) was also identified and determined by Acemoglu (2002a, 783) as one of two competing forces affecting the equilibrium bias of new technologies on the economy to generate incentives by new technologies. "When skill-biased techniques are more profitable, firms will have greater incentives to develop and adopt such techniques" (Acemoglu 2002b, 12). Complemented by the market size effect (ii), which supports the further development of new technologies to ensure a larger consumer acquisition, both forces indicate the direction of technical change by determining the relative profitability of new technologies (Acemoglu 2002b, 12). These two effects act under competitive conditions because the price effect indicates an increase in technological progress favoring scarce factors while the market sizes effect targets the development of new technology encouraging abundant factors (Acemoglu 2002a, 783).

As empirical evidence on skill-biased technical change on employment was intensively created in the 1990s and early 2000s, a consolidated conspectus of research from the most relevant authors is supposed to provide a holistic overview of the studies and their research content.



Table 4: Exemplary Studies on SBTC 1994-2002

<b>Research Paper</b>	<b>Research Content</b>
Berman et al. (1994): Changes in the demand for skilled labor within U.S. manufacturing: Evidence from the annual survey of manufactures	American manufacturing industry experienced in the 1980s a skill upgrading due to technological change as the root cause. The waiver of operative but increased use of professional employees also relates to capital expenditure for research, development, and technologies.
Machin and van Reenen (1998): Technology and changes in skill structure: Evidence from seven OECD countries	The U.S. is compared with six OECD countries utilizing employment, wage structure, and skill demand in the 1970s and 1980s. Furthermore, technology as skill complementation exists across the analyzed countries, and labor shifts favoring skilled labor rather occurring within industries than between.
Autor et al. (1998): Computing inequality: have computers changed the labor market?	The pace of favored demand for skilled workers increased from 1960-1970, especially accelerated in manufacturing from 1970-1980, and remained high in the 1990s. SBTC and computer-based technological progress affected relative skill demand growth at the beginning of the 1970s.
Acemoglu (1998): Why Do New Technologies Complement Skills? Directed Technical Change and Wage Inequality	The answer to the question “why new technologies are skill complementary?” is answered by the more skilled workers in a market. The higher the technological adoption complementing skills, the more advanced technologies are invented. The increased ratio of skilled labor and decreased acquisition costs for such skills could escalate wage inequality even more.
Berman et al. (1998): Implications of skill-biased technological change: international evidence	In manufacturing industries, SBTC was pervasive in the 1980s and reduced the relative wages of unskilled labor, and data proved substitution toward more educated labor combined with an at least stable wage structure. However, pervasive SBTC is likely not the sole reason for the increased demand for skilled labor.
Katz and Autor (1999): Changes in the Wage Structure and Earnings Inequality	The framework assesses measurement issues and the roles of SBTC, globalization forces, demographic change, and supply of relative skills in the evolution of the U.S. and among OECD countries to understand alterations in the wage structure and earnings inequality,
Bresnahan et al. (2002): Information Technology, Workplace Organization and the Demand for Skilled Labor: Firm-Level Evidence	Examination of three complementary variables as adjusted hypotheses for SBTC 1) IT usage, 2) organizational changes, and 3) changed services and products lead to an increased skill demand on firm-level. Results show a positive correlation between variables one, two, and human capital, while predictions on variable three are difficult to measure.

Source: own illustration

Further research was often reaching back to this literature to explain the significant widening of the wage structures generally. The incidence of the wage structure widening was primarily investigated in the U.S. due to the most significant growth of educational, occupational, age-related, and experience-related wage differentials in the 1980s (Autor et al. 2006, 189), driven by technological progress (Autor et al. 2008, 300). The SBTC hypothesis that technology is biased, favoring high-skilled workers relative to low-skilled workers (Goos and Manning 2007, 118), was broadly used to comprehend these changes in employment structure towards high-skilled labor (Goos et al. 2009, 58; Goos et al. 2014, 2509).

The following section emphasizes a more “nuanced” (Goos and Manning 2007, 118; Autor et al. 2006, 190) way and a “richer version” (Autor et al. 2008, 301) of SBTC to understand the technology-driven impact in general and on the labor market besides the SBTC hypothesis.

#### 2.2.3.2 *ALM Hypothesis as Essence of Task Approach*

Autor et al. proposed already in 1998 that white-collar tasks fall victim to long-time lasting and most likely ongoing computer technologies, which indicates that computers can substitute human considerations and decisions, which more likely occurs in administrative jobs than in professional and managerial occupations (Autor et al. 1998, 1186). A few years later, Autor et al. (2003) emphasize that the latest studies about SBTC only prove the existence of the correlation between the adoption of digital technologies and the increased demand for highly skilled labor, but not what is causing the shift itself, to which they are proposing an explanation.<sup>26</sup> Previous research merely tended to explain the impact of technological change on the labor market through SBTC (Goos and Manning 2007, 118). The rapid adoption of digital technologies, mainly driven by declining

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<sup>26</sup> Autor et al. (2003, 1279) provide an aggregated overview of related studies dealing with SBTC evidence, based on quantitative research and case studies, which portrays the relationship between the adoption of digital technologies and the increased demand for high-skilled labor within industries, across plants within industries and firms: see e.g. Berman et al. (1994), Autor et al. (1998), Machin and van Reenen (1998), Berman et al. (1998), Bresnahan et al. (2002) for evidence-based literature, Katz and Autor (1999) for a summary of literature, and Card and DiNardo (2002) offering a critique on the SBTC hypothesis.

prices, impacts the composition of jobs and tasks performed by human labor (Autor et al. 2003, 1280). Technologies function either as substitutes or as complements for human labor by testing an economic model that answers how demand for workplace tasks changes when economywide prices for computer-based technologies fall.<sup>27</sup> <sup>28</sup> Therefore, a task-related approach of how technology substitutes or complements activities performed by human labor is provided, which differentiates between routine and non-routine tasks (Autor et al. 2003, 1280):

1. Routine tasks: “computer capital substitutes for workers in carrying out a limited and well-defined set of cognitive and manual activities, those that can be accomplished by following explicit rules”
2. Non-routine tasks: “computer capital complements workers in carrying out problem-solving and complex communication activities”

Based on the assumption that routine and non-routine tasks are “imperfect substitutes” (Autor et al. 2003, 1280), the two observations imply changes in the task structure on jobs which could be tested if two identical economies acting completely autarkic (one having a price decline and one do not) would exist. Their solution is defined by an economic model predicting how demand for workplace tasks will develop in response to a price decline of computer capital. The model forecasts that industries intensive in routine labor will invest strongly in computer capital as soon as prices fall, relative to industries with less intense routine labor input. Computer capital is an optimal substitute for routine labor input and complementation for non-routine workers, who are mostly highly educated (Autor et al. 2003, 1280–1281). The general question of the model answers, “which of these tasks can be formed by a computer” (Autor et al. 2003, 1282) and differentiates the task composition into the categories routine cognitive, routine manual, non-routine cognitive, and non-routine manual (Autor et al. 2003, 1283). Illustratively

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<sup>27</sup> The phenomenon of declining prices for computer capital having the capabilities to substitute workers performing routine tasks is still observable in current research, see for example vom Lehn (2020, 62).

<sup>28</sup> A similar idea of concept related to firm capabilities has already proposed a framework for enhancing or destroying competencies (Tushman and Anderson 1986).

summarized, figure 4 provides a two-by-two matrix by adding the computer impact concluding whether technology is a substitution or complementation.<sup>29</sup>

Figure 4: Two-by-Two Task Model Matrix - Technology Impact on Tasks

	routine tasks	non-routine tasks
analytic/ interactive	Examples: • Record keeping • Calculation • Repetitive customer service	Examples: • Forming/testing hypotheses • Medical diagnosis • Legal writing • Persuading/selling • Managing others
	Impact: substantial substitution	Impact: Strong complementarities
manual	Examples: • Picking or sorting • Repetitive assembly	Examples: • Janitorial services • Truck driving
	Impact: substantial substitution	Impact: Limited opportunities for substitution or complementarity

Source: in the style of Autor et al. (2003, 1286)

According to the above framework, there are three assumptions formulated describing the expected demand for routine and non-routine tasks (Autor et al. 2003, 1286):

- "A1. Computer capital is more substitutable for human labor in carrying out routine tasks than nonroutine tasks.
- A2. Routine and nonroutine tasks are themselves imperfect substitutes.
- A3. Greater intensity of routine inputs increases the marginal productivity of nonroutine inputs."

As non-routine manual tasks reveal limited opportunities to be directly substituted or complemented, it is neglected within the following Cobb-Douglas

<sup>29</sup> The operationalization of the proposed five task composition is data-based on the U.S. Department of Labor 's Dictionary of Occupational Titles (DOT), which defines more than 13,000 detailed occupations and types of work and was since its first publication in 1939 updated four times (1949, 1965, 1977, 1991) due to changes in the workplace and skill demand, accompanied by higher educational requirements. The DOT was created by specialized occupational analysts identifying the physical demands, required capabilities and tempers per occupation (U.S. Department of Labor 1991). Even if the successor database ONET reveals more current data on occupations, they argued to use DOT data which is more suitable for time series analysis, while also referring to exemplarily literature (Autor et al. 2003, 1292–1293).

production function in which  $Q$  equals output,  $L_N$  labor input for non-routine tasks,  $L_R$  labor input for routine tasks, and  $C$  computer capital.

Formula 9: Cobb-Douglas Production Function (5 Tasks Composition)

$$Q = (L_R + C)^{1-\beta} L_N^\beta$$

Source: Autor et al. (2003, 1287)

In general, the model predicts that firms and industries strong in routine tasks invest in computer capital as soon as prices fall, which results in decreasing labor input for routine tasks (substitution) and increasing labor input for non-routine tasks (complementation), which consequently leads to increasing demand for skilled labor (Autor et al. 2003, 1280–1281). The conclusion of the hypothesis is shaped by reasonably answering the initial question at the beginning of the chapter: by employing a demand shift favoring skilled labor (college-educated labor), as they have a “comparative advantage” (Autor et al. 2003, 1322) over low-skilled labor.<sup>30</sup> The general assumption is based on supportive evidence explaining the demand shift over the last three decades, portrayed in SBTC literature, which leads to disappearing routine tasks, increasing non-routine tasks, or newly created tasks indicating a change in job task content (Autor et al. 2003, 1322). However, one might ask whether this job task content based on the proposed two-by-two matrix is still relevant today, as analyzed data only covers 1960-1998. The following sections elaborate on this aspect.

Nevertheless, even if this approach is seen as seminal work, literature concerning productivity measurement and value creation has already published certain aspects of the ALM approach. Sumanth (1998) stresses four major aspects within the context of partial productivity presented in section 2.1.2. The fourth aspect states that clerical and professional white-collar employees performing tasks such as thinking and creative activities (non-direct labor) are challenging to measure because they are intangible (Fisher 1990). This understanding matches ALM's general definition of analytical or interactive non-routine tasks. Furthermore, the differentiation of labor into skill groups has also already been proposed by Bowman and Ambrosini (2000) by presenting the split of generic labor

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<sup>30</sup> “Comparative advantage in production means that the factor with the lowest economic cost of performing a task is assigned that task.” (Autor 2013, 187).

(easily understandable skills and routineness), differential labor (high skills, talent, competitiveness), and unproductive labor (destroying value, unnecessary tasks), which has also been presented in section 2.1.4.

However, the idea of the task approach concept enjoys in further research different terminologies, which are either “ALM hypothesis” (Goos and Manning 2007, 118; Autor and Dorn 2009, 45), “routinization hypothesis” (Goos et al. 2009, 58), “routinizability” (Blinder and Krueger 2013, 114), “routine-biased technological change” (Goos et al. 2014, 2509), “task-biased technical change” (vom Lehn 2020, 62).<sup>31</sup> This hypothesis, hereafter “ALM hypothesis,” is also frequently used in further research to measure, for example, job opportunities by using the occupational age structure (Autor and Dorn 2009) to rationalize a job polarization pattern (Autor et al. 2006; Goos and Manning 2007; Goos et al. 2009; Goos et al. 2014; Autor and Dorn 2013) or to measure the phenomenon of offshoring (Blinder and Krueger 2013; Blinder 2009). Notably, in this dissertation, the ALM hypothesis's deepening is limited to only identifying efficiency potentials due to digital transformations.

### 2.2.3.3 *Current Embeddedness of Task Approach in Literature*

To detail the task-based approach of Autor et al. (2003), that technologies function either as a substitution for routine tasks or complementary for non-routine tasks, the initial empirical focus generally shifts from skills (SBTC) towards tasks (RBTC). The two terminologies can be conceptualized as follows: a task is “a unit of work activity that produces output (goods and services)” (Acemoglu and Autor 2011, 1045), and a skill is “a worker’s endowment of capabilities for performing various tasks” (Acemoglu and Autor 2011, 1045).<sup>32</sup> This differentiation of

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<sup>31</sup> This literature and research illustrate the variety of terms applied and reveals only exemplarily authors which used these terms, among others.

<sup>32</sup> The assessment and conceptual distinction of skills are persistent in literature. The concept is especially important in sociology research areas e.g., studies on income inequality. Attewell (1990, 422–426) emphasizes skills as competence or proficiency of human labor - in general, “the ability to do something well”. As mental proficiency, he highlights understanding or knowledge, and as physical proficiency dexterity. Furthermore, he argues that researchers tend to treat skills as characteristic of jobs to assess complexity which he links to the DOT database as the core of related and respective research.

terminologies becomes especially relevant when technological progress causes a change of tasks performed by workers with a certain level of skills and ultimately leads to a shift of skills assigned to tasks to produce output (Acemoglu and Autor 2011, 1045). Acemoglu and Zilibotti (2001, 564) highlighted already ten years earlier that the possible mismatch between technologies and skills would lead to significant productivity differences with wide output gaps. According to the ALM hypothesis, tasks complemented by digital technologies are supposed to be assigned to skilled workers leading to reduced productivity and, consequently, lower output if human labor is incapable of performing this task properly.<sup>33</sup>

Based on that, a large set of literature<sup>34</sup> was motivated to elaborate the ALM hypothesis further and mainly used it to explain the labor market phenomenon of job polarization mainly during the 1980s, 1990s, and 2000s but also until 2017, besides others Autor et al. (2006; 2008), Autor and Dorn (2009), Autor and Dorn (2013), Beaudry et al. (2016), Barany and Siegel (2018), vom Lehn (2020) and Jaimovich and Siu (2020) for the U.S., Spitz-Oener (2006) for Germany, Goos and Manning (2007) for the United Kingdom, Goos et al. (2009; 2014), Fernandez-Macas and Hurley (2017) for Europe, Michaels et al. (2014) for international evidence and Buyst et al. (2018) for Belgium.<sup>35</sup> For further analysis of the literature, it is important to mention that the presentation of data and models reflecting the labor market itself is limited since the primary focus emphasizes the determination

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<sup>33</sup> Acemoglu and Zilibotti (2001) base their study on a comparison between LDC (low-development countries) and advanced countries which offer different levels of skills leading to productivity differences by performing tasks complemented by technology. Furthermore, they offer more geographically related variables (climate, tastes, cultures, and institutions) affecting the technology-driven relative productivity which are not considered in this dissertation.

<sup>34</sup> The operationalization by means of task indexes, definitions, and variables used is applied differently. For details see appendix 1.

<sup>35</sup> Autor et al. (2006): 1973-2004, Spitz-Oener (2006): 1979-1999, Goos and Manning (2007): 1979-1999, Autor et al. (2008): 1963-2005, Goos et al. (2009): 1993-2006, Autor and Dorn (2009): 1980-2005, Acemoglu and Autor (2011) for an overview, Autor and Dorn (2013): 1980-2005, Goos et al. (2014): 1993-2010, Michaels et al. (2014): 1980-2004, Beaudry et al. (2016): 1979-2013, Fernandez-Macas and Hurley (2017): 1995-2007, Barany and Siegel (2018): 1950-2007 who argued to only take data until 2007, to exclude any potential effects of the financial crisis, Buyst et al. (2018): 1846-2011, vom Lehn (2020): 1982-2015 and Jaimovich and Siu (2020): 1962-2017

of efficiency potentials caused by digital technology adoption and how to derive related calculation measures.

Job polarization in the context of employment, skills, and wages can be distinguished between wage polarization as well as employment polarization and is described by an increase in high- and low-paying/skill occupations relative to occupations determined as middle-wage/skill (Autor et al. 2006, 189; Goos and Manning 2007, 118). The impact and consequences of SBTC have formerly been used to provide a reason for wage inequality in the 1980s (Goos and Manning 2007, 118; Autor and Dorn 2013, 1553). Even if SBTC, as the leading cause for the demand shift in favor of skilled workers in the 1990s was revised (Goos et al. 2009, 58) and Goos and Manning (2007, 118) propose through the ALM hypothesis a new and “more subtle” reason for job polarization, the root cause is not stringently identifiable in literature. Goos et al. (2009, 58) refer to three approaches: First, the replacement of routine labor tasks by technology in the middle of the wage scale (Autor et al. 2003). Second, the interaction between globalization and offshoring caused a change in employment structure, especially in rich countries (Blinder 2006). Third, the literature indicates a correlation between job polarization and wage inequality by increasing income share for the upper part of the wage scale leading to an increased demand for low-qualified workers providing service for the upper part (Manning 2004). A further summary portrays the interaction between the “non-neutral technical change” augmented by offshoring (Autor and Dorn 2009, 45). Consumer preferences favoring product and goods variety interact with non-neutral technical change and reduce the price of performing routine tasks with minor cost impact on low-skill service tasks executed in-person (Autor and Dorn 2013, 1558–1559). However, the ALM hypothesis is the most frequently referred explanation in literature (see ALM-based polarization studies above). It is cited as the leading root cause of job polarization (Bárány and Siegel 2018, 57), which provides the most robust evidence besides offshoring and wage inequality (Goos et al. 2009, 62).<sup>36</sup>

Goos and Manning (2007) were almost the first researchers to apply the task-related ALM hypothesis concerning the respective allocation of skills to the wage

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<sup>36</sup> The relevance of offshoring was further investigated in literature by even showing a statistical significance between the routinization of jobs and offshorability in European countries for pervasive job polarization (Goos et al. 2014, 2513).



scale ranked by the mean wage of occupations, besides Autor et al. (2006). They provide evidence that non-routine tasks are allocated at the bottom and top tail of the wage distribution but both with increasing demand. Routine tasks are allocated in the middle of the wage scale with decreasing demand (Goos and Manning 2007, 119)<sup>37</sup> which they call “lovely” and “lousy jobs.” Autor et al. (2006, 190) follow the ALM hypothesis arguing that computerization’s first order is the displacement of middle-skilled jobs, which are also in the middle of the wage scale distribution. From an employment structure perspective, employment grows at the bottom and top relative to the middle of the wage as well as skill distribution which leads to a polarization (Autor et al. 2006, 189) or “hollowing out” (Spitz-Oener 2006, 237) of the labor market.

Based on the ALM hypothesis, Autor et al. (2006, 192) propose to collapse the original five task indices into three aggregated tasks indices. In addition, they followed the idea of task routinization propelled by technological change and the polarization evidence from research. Abstract and manual tasks are performed by high- and low-skilled labor, and computerization has either no or complementary effects. Consequently, a set of middle-skilled and -educated labor can be displaced, which lowers the wage in the middle of the wage scale distribution and contrarily raises the wages for low-skilled (non-routine manual) and high-skilled (abstract) labor (Autor et al. 2006, 193). This generates a wage and employment polarization (Autor et al. 2006, 190).

Formula 10: Cobb-Douglas Production Function (3 Tasks Composition)

$$Y = A^\alpha R^\beta M^\gamma$$

Source: Autor et al. (2006, 192)

Based on the three tasks, abstract (A), routine (R), and manual (M), the labor input is respectively provided by  $L_A$ ,  $L_R$  and  $L_M$ . Computer capital (K) is a perfect substitute for routine tasks (R) to produce output (Y) (Autor et al. 2006, 192).<sup>38</sup>

<sup>37</sup> See also similar evidence from literature based on the ALM hypothesis.

<sup>38</sup> With reference to the original ALM hypothesis which used Q for output and C for computer capital.

Table 5: 3 Task Composition based on ALM Hypothesis

ALM Tasks Indexes	Collapsed Task Indexes	Skill-level of human labor	Technology Impact
Non-routine cognitive (analytic and interactive)	Abstract (A)	High	Complementation
Routine (manual and cognitive)	Routine (R) Computer Capital (C)	Intermediate	Substitution
Non-routine manual	Manual (M)	low	neither complementation nor substitution

Source: own illustration based on the information of Autor et al. (2006, 192)

SBTC only explains what happens with the well-educated labor at the top (Goos and Manning 2007, 132), while RBTC offers a framework to measure the individual skill requirements directly based on tasks (Spitz-Oener 2006, 239).

Empirical evidence about changing skill requirements due to technical change from Germany used different data, where the skill requirements measures are defined by voluntary specialists performing the respective jobs (Spitz-Oener 2006, 236).<sup>39</sup> Based on the argument that jobs nowadays are characterized by greater complexity than a few decades ago, the increasing non-routine cognitive tasks lead to a decline in routine manual and routine cognitive tasks (Spitz-Oener 2006, 237). However, there is also criticism of the ALM hypothesis. Goos and Manning (2007, 119–120) pursue an aspect they deem neglected by ALM, which argues that jobs intensive in routine tasks are not accurately distributed across the wage scale. They propose that routine manual jobs are allocated at the bottom of the wage scale and routine cognitive jobs in the middle. Additionally, the criticism argues that non-routine manual tasks are neither complemented nor substituted by digital

<sup>39</sup> The data are based on the “Qualification and Career Survey”, a survey managed by the German Federal Institute for Vocational Training (BIBB) which surveyed data until the publication of Spitz-Oener (2006) in four cross sections, 1979, 1985/86, 1991/92, together with the Research Institute of the Federal Employment Service (IAB) each covering approximately 30,000 individuals. In the years 1998/99, 2006, and 2012 they extended the data surveys in collaboration with the Federal Institute for Occupational Safety and Health (BAuA). Spitz-Oener (2006, 242) furthermore argues to use these data as the score assignment by experts is diluted by the analyst underestimations of the real changes in occupational content while emphasizing that the occupational titles are not consistent over time with reference to Spenner (1983) for detailed criticism.

technologies by emphasizing its invalidity<sup>40</sup> and referring to the general equilibrium effect of Baumol (1967) that employment share increases in jobs with low productivity growth due to the missing presence of technology progress. Further literature offers criticism on the whole RBTC argument while calling it “circular” as it defines routine tasks substitutable by computers, but the most common definition of routine is tasks that can be performed by machines (Fernández-Macías and Hurley 2017, 566).<sup>41</sup>

After providing evidence for the United Kingdom, Goos et al. (2009) published a study examining job polarization in Europe by delivering data analyzing the share changes measured by hours worked ranked according to their mean wage rate in sixteen European countries.<sup>42</sup> They provide evidence showing that in fifteen countries, highly-paid jobs extended relatively to middle-paid jobs, and in all sixteen countries, low-paid occupations extended, strongly indicating job polarization due to task routinization (Goos et al. 2009, 58–59). By providing a new task composition following the idea of three aggregated tasks, they first introduce the task index of service tasks, which is supposed to reflect the non-routine manual tasks (Goos et al. 2009, 60–62). A few years later, Goos et al. (2014) extended the study by also integrating additional parameters, i) the routineness of occupations, ii) offshorability, and iii) job polarization within and between industries, also proposed by Bárány and Siegel (2018, 88) as a cross-industrial shift of occupations and reallocation between industries. However, from this comprehensive research, only the routineness parameter is integrated and considered a key indicator for value-loss of activities during digitalization, even if the ALM hypothesis changes the employment structure between industries (Goos et al. 2014, 2510). The main

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<sup>40</sup> Also argued by Frey and Osborne (2013, 22) which will be further elaborated in later chapters.

<sup>41</sup> See for example the routine tasks definition of Acemoglu and Autor (2011, 1076): “efficiently well understood that the task can be fully specified as a series of instructions to be executed by a machine.”

<sup>42</sup> For this task measure the authors applied ONET data which replaces the DOT. Data are created by job incumbents, occupational experts, and analysts which are collected for 812 occupations (in December 2006 version) based on SOC. For worker characteristics, worker requirements, and general work activities there have been 100 variables of which 96 were used closest to the DOT task requirements of Autor et al. (2003) which were allocated to either abstract, routine, or service group (Goos et al. (2009) based on Goos et al. (2008, 14)).

research objective focuses on identifying efficiency potentials and not the possible consequences on the labor market.

The so-called routine task indicator (RTI) was first introduced by Autor and Dorn (2009, 47) in their study to examine if routine and middle-skilled jobs are “getting old”<sup>43</sup> by using a rating scale from 0-10 where R and M reflect the intensity of task input, in a specific job ( $k$ ) and year ( $y$ ).<sup>44</sup>

Formula 11: Routine Task Indicator (RTI)

$$RTI_k = \ln (T_{k,y}^R / T_{k,y}^M)$$

Source: in the style of Autor and Dorn (2009, 47)

The further elaboration of the RTI, also integrating the dimension of abstract tasks, was proposed by Autor and Dorn (2013, 1570) based on DOT data according to Autor et al. (2003) while arguing that DOT data allows the creation of occupational definitions consisting of multiple tasks at different intensity standards. Summarizing these measures, they create a new model of the RTI calculation. The routine task intensity ( $RTI$ ) is calculated by occupation ( $k$ ) building upon the three aggregated task inputs ( $I$ ) routine ( $T^R$ ), manual ( $T^M$ ) and abstract ( $T^A$ ) according to Autor et al. (2006):

Formula 12: Routine Task Intensity

$$RTI_k = I(T_{k,y}^R) - I(T_{k,y}^M) - I(T_{k,y}^A)$$

Source: Autor and Dorn (2013, 1570)

The measurement solely focuses on the significance of routine tasks, and the variables of abstract and manual tasks only serve to calculate the share of routine tasks (Autor and Dorn 2013, 1570). This measurement factor was, as already mentioned, also used as a “routineness” factor by Goos et al. (2014, 2511) to prove the existence of job polarization in several European countries.

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<sup>43</sup> This novel idea of the study assessed the labor reallocation across occupations, as older workers’ mobility cost rise with developing occupation-specific skills, which creates an incentive for them not to exit the occupation when demand for this kind of jobs declines (Autor and Dorn 2009, 46–47).

<sup>44</sup> Job as well as tasks symbols adjusted from the original source to be stringent, see next formula.

Contradictory to the presented empirical results based on the task composition approach, Beaudry et al. (2016) state declining demand for non-routine cognitive tasks since the turn of the century, which was neglected by previous research. This “de-skilling process” has a substantial impact on both high-skilled and low-skilled workers as this demand reversal forces high-skilled workers (usually performing non-routine cognitive tasks) to perform jobs executed by low-skilled workers (Beaudry et al. 2016, 201). This direct impact on high-skilled workers also indirectly impacts low-skilled workers as they get pushed down the occupational ladder even further or entirely out of the employed labor force (Beaudry et al. 2016, 244).

The latest conceptualization observed in literature is replacing the commonly used task indexes of “manual,” “non-routine manual,” or “service” with the task index “social,” which reveals the inconsistency of task compositions in existing literature (Fernández-Macías and Hurley 2017).<sup>45</sup> Following the initial definition of routine from Autor et al. (2003, 1283), “tasks require methodical repetition of an unwavering procedure,” literature also presents synonyms for routine such as repetitive and standardized, which therefore deem them as crucial components within the definition of routine (Fernández-Macías and Hurley 2017, 565). The special emphasis of criticism lies on the conceptualization of routine from Autor et al. (2003), Spitz-Oener (2006), and Goos et al. (2014), who misses applying the factor of repetitiveness. This factor of repetitiveness is included by Autor and Handel (2013, 71), who describe the variable as “short, repetitive tasks and complete absence of face-to-face interactions.” Additionally, a new measure and category of “social interaction” is introduced (Fernández-Macías and Hurley 2017, 566). Regarding the RBTC framework impacting computerization, it is argued that social interactions are not directly part of technology-driven changes, but social interactions are, by definition, human nature and resilient to computerization and, consequently, relevant. (Fernández-Macías and Hurley 2017, 571). Their

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<sup>45</sup> The main data sources of this research are EWCS and ESS data. In these surveys the workers themselves provide the input about work characteristics, types of work and assign scores which they compare to e.g., ONET database and emphasize both, advantages, and disadvantages. Specifically, they argue ONET to be more detailed while EWCS survey allows analyzing the task content intra-occupational variability (Fernández-Macías and Hurley 2017, 571).

conclusion, however, emphasizes the elusiveness of the total task concept of routinization, missing consistency within the proposed concept of ALM, on which the most relevant literature in this field is built. The impact of digital technologies is stronger on non-routine cognitive intense jobs than in reducing the demand for routine jobs, which leads increasingly to skill-upgrading and is, therefore, more in line with the original concept of SBTC (Fernández-Macías and Hurley 2017, 81–82).

The reviewed literature reveals inconsistent results, which generally refer to the different conceptualizations of tasks elaborated in more detail in appendix 1. For overview purposes, the most relevant literature and research based on the ALM hypothesis to explain job polarization is summarized in the following table. The skill requirement measures and task determinations vary based on the applied data on which the task composition indexes and variables are built.

Table 6: Task Composition Overview

	<b>Tasks Indexes</b>	<b>Relevant Publications</b>
<b>5 Tasks Composition</b>	1. non-routine analytic	Autor et al. (2003), Spitz-Oener (2006), Goos and Manning (2007), Acemoglu and Autor (2011), Michaels et al. (2014)
	2. non-routine interactive	
	3. manual cognitive	
	4. manual routine,	
	5. non-routine manual	
<b>3 Tasks Composition</b>	1. abstract	Autor et al. (2006), Autor et al. (2008), Acemoglu and Autor (2011), Autor and Dorn (2013), Autor and Handel (2013), Goos et al. (2014), Beaudry et al. (2016)
	2. routine	
	3. manual	
<b>3 Tasks Composition</b>	1. abstract	Goos et al. (2009)
	2. routine	
	3. service	
<b>3 Tasks Composition</b>	1. cognitive	Fernández-Macías and Hurley (2017)
	2. routine	
	3. social	

Source: own illustration

To summarize the different data sources evaluated by the authors and concerning research based on the ALM hypothesis, the following overview is supposed to emphasize the advantages and limitations of the respective data. It compares four different databases according to their advantages, limitations, and specifics.

Table 7: Criticism of Used Data Sources for Task Indexes Measurement

<b>Advantages &amp; limitations of applied databases</b>	<b>Literature</b>
<b>U. S. Department of Labor's Dictionary of Occupational Titles (job analysts)</b>	
<b>Advantages:</b>	
analysis of task input changes within industries, education groups, and occupations over time	Autor et al. (2003, 1281)
<b>Limitations:</b>	
limited sampling of occupations, vague definition of measures, missing job skills, no natural or cardinal scale	Autor et al. (2003, 1293)
variety of potential task scales leads to unclear task construct representation (if any fits at all) → 44 scales	Acemoglu and Autor (2011, 1078)
<b>German Federal Institute for Vocational Training &amp; Research Institute of the Federal Employment Service (job incumbents)</b>	
<b>Advantages:</b>	
no underestimation of true changes in job content, survey participants indicate themselves which activities they perform on the job, data are consistent over time.	
<b>Limitations:</b>	Spitz-Oener (2006, 242)
possible impairing of data from well-educated survey participants systematically biasing toward analytical and interactive activities, which is unlikely due to only naming activities performed rather than assigning a score	
<b>European Working Conditions Survey by Eurofound (job incumbents)</b>	
<b>Advantages:</b>	
permits intra-occupational variability analysis in task content, survey about the work type and characteristics of the jobs of the respondents	Fernández-Macías and Hurley (2017, 571)
<b>Limitations:</b>	
Not as detailed and close to the concept of tasks as ONET	
<b>Occupational Information Network from the U.S. Department of Labor (job analysts, job incumbents)</b>	
<b>Advantages:</b>	
no time variation, respondents allocate ranges from 1 (not important at all) to 5 (extremely important) about the task importance.	Goos et al. (2008, 14)
Subjectively preferable as it is the successor of DOT	Acemoglu and Autor (2011, 1079)
<b>Limitations:</b>	
variety of potential task scales leads to unclear task construct representation (if any fits at all) → 400 scales which are deemed as loosely defined and weakly differentiated scales	Acemoglu and Autor (2011, 1078–1079)

Source: Goldmann (2021b, 21)

The measurement challenge of the task approach has also been emphasized by Autor (2013, 190), arguing that skills are not tasks but are used to perform tasks. Additionally, there is no consistent job task information frequently gathered and aggregated in one representative data source, as also summarized in the comparison of data sources above. To illuminate the measurement difficulties even further, Autor (2013, 190–192) has summarized three approaches applied in research to resolve the measurement obstacles:

Table 8: Research Approaches to Overcome Task Measurement Issues

Task Measurements	Approach Execution & Critical Evaluation
Occupations are used instead of tasks	<ul style="list-style-type: none"> <li>• Occupations can be conceptualized as a package of tasks</li> <li>• National statistical agencies contain a variety of occupational classification schemes, which are too imprecise for task measures</li> <li>• Solution: aggregation to a few vast categories</li> <li>• Solution’s limitation: obfuscation of tasks similarities of different occupations for equal tasks</li> </ul>
Subjectivity reduction in the task categorization	<ul style="list-style-type: none"> <li>• Possibility to add professional job analysts for measure developments</li> <li>• Advantage: data validation of these job measures by statistical agencies supplying the data</li> <li>• Limitations: i) intrinsic and ii) shortcomings in existing data collections (it misses tasks heterogeneity among individuals within a job and skills as well as actual job tasks vary within occupations and among workers)</li> <li>• Furthermore: task measures at occupational levels are static, and if the task assignment changes over time, the results are diluted</li> <li>• Solution: database needs to be refreshed ongoingly</li> <li>• Solution’s limitation: high effort needed</li> <li>• Additionally: a variety of scales in current databases from which researchers need to choose. The discretion becomes crucial for comparable results of different studies (e.g., DOT with 40 and ONET with 400 scales)</li> </ul>
Data collection from new survey respondents directly	<ul style="list-style-type: none"> <li>• Advantage: task definition to test a specific hypothesis, the assumption of static task measures is void, and no variability restrictions within and across occupations</li> <li>• Furthermore: it is highlighted as a promising way to ask for tasks performed regularly directly</li> </ul>

Source: own illustration but based on the work of Goldmann (2021b, 22) and the information of Autor (2013, 190–192)



The critical consideration and treatment of data to develop an accurate measure for the task content confronted empirical research for years. In the empirical section of this dissertation, the already revealed criticism of the data evaluation is factored carefully. Further criticism of job polarization literature emphasizes the aspect of job quality, which is solely displayed by using wages as criteria, which nevertheless satisfies the requirements for labor market analyses (Fernández-Macías 2012, 164) but probably not performance measurement approaches.

To summarize the task approach for labor markets: it is distinguished between two distinct aspects of production: i) the used factors for input, e.g., machinery (capital) or labor, and ii) the provided service of these factors. The economic logic behind novel tasks is that they are first assigned to human labor due to their flexibility and adaptive capabilities before their reallocation to the capital after formalizing, coding, and automating them concerning the cost advantage for performing repetitive tasks. If unexpected obstacles occur, human labor can apply problem-solving skills to create workarounds before that task is capable of becoming fully automated (Autor 2013, 186)

#### 2.2.3.4 *Offshorability as Variable Within Task Approach*

The terminology of offshoring was already partially introduced concerning job polarization and the ALM hypothesis in the last sections. From a labor market perspective, it is one of the most important variables to explain the decline of the U.S. labor share in the 1990s and 2000s (Elsby et al. 2013). From a job perspective, offshorability “allows the work to be moved overseas in principle, even if that movement has not occurred” (Blinder and Krueger 2013, 99).<sup>46</sup> Driven by progressing technological development and global communication, offshoring of impersonal services significantly increases, as they can be performed with improved technology around the globe with almost the same quality if the tasks had been performed locally (Blinder 2006, 113). The counterpart is personal services, described by four characteristics that make them impossible to offshore: i) face-to-face contact, ii) inherently “high-touch,” iii) high level of personal trust, and

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<sup>46</sup> Notably, offshoring is a shift of jobs than can theoretically be observed and offshorability as job characteristic is arguing whether it is possible to offshore the respective job or not (Blinder and Krueger 2013, 99).

iv) location-specific – these attributes are influenced by improving technology which transforms personal services more and more into impersonal services (Blinder 2006, 120).<sup>47</sup> The task index of social interaction, according to Fernández-Macías and Hurley (2017, 571), introduced in the last section, also refers to offshoring. With the distinction of personal and impersonal, Blinder (2009, 43) refers to the task approach according to Autor et al. (2003) and emphasizes similarities even its not identically. By applying the mentioned key attributes to differentiate personal and impersonal jobs, Blinder (2009) created an offshorability index from 0-100 by studying the offshoring possibilities of several U.S. occupations based on ONET data. Based on a flow chart, the jobs were allocated to four different categories identifying whether they were offshorable or not and to what degree (Blinder 2009, 54).<sup>48</sup> Each of the four categories assigns offshorability ranks commencing with non-offshorable between 0-25, hard to offshore between 26-50, offshorable between 51-75, and highly offshorable between 76-100, and subjectively assessing the ONET tasks based on its need for face-to-face contact (Blinder 2009, 54–56). However, this idea of concept neglects that different types of tasks are executed within the same occupation and generalizes the entire occupation. Nevertheless, his two key defining characteristics to identify offshorability are not answered with a yes or no variable and are therefore basis for the numerical index for occupations (Blinder and Krueger 2013, 113). Following up on that there are different measures of offshorability provided based on the Princeton Data Improvement Initiative (PDII) dataset of a preexisting survey, i) professional coders assessment, and new survey results also based on PDII survey ii) one self-reported question and iii) a combination of self-reported questions (Blinder and Krueger 2013, 104–111). Based on the preexisting survey<sup>49</sup> they

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<sup>47</sup> The attributes of location-specific jobs and face-to-face contact is mainly highlighted by Blinder (2009, 49).

<sup>48</sup> This four-point scale of offshorability was extended by Blinder and Krueger (2013, 104) with “mixed and neutral” in the middle.

<sup>49</sup> 2003 National Assessment of Adult Literacy (NAAL) including 18,000 participants providing answers. The drew sample contained 3,000 random respondents which have been reexamined by coders by the input of three questions to allocate a respective job profile: “For what kind of business or industry do you work?”, “What is your occupation, that is, what is your job called?”, “What are the most important activities or duties at this job?” (Blinder and Krueger 2013, 104).

allocated the respondent's jobs on a five-point scale (Blinder and Krueger 2013, 104).

1. "not offshorable
2. offshorable only with considerable difficulties and/or loss of quality
3. mixed or neutral
4. offshorable, though with some difficulties or loss of quality (that can be overcome)
5. easily offshorable with only minor (or no) difficulties or loss of quality."

Regarding both ends of the scale, they allocated eight variables for "not offshorable" and five for "easily offshorable." Critical to mention is the subjective judgment of the coders. In a similar procedure, they applied for new survey results of the PDII survey with random-digit-dialing (RDD) also externally coded (Blinder and Krueger 2013, 106–107). For the self-reported offshorability measure, Blinder and Krueger (2013, 107–111) proposed six different questions, whereas only one of them indicates the result for the first self-reported measure, and the combination of the following five indicate the result of the second self-reported measure, what they call "inferred."<sup>50</sup> They finally conclude and subjectively judge that the external coders' measures are the most accurate evaluations arguing that there is no objective standard measurability (Blinder and Krueger 2013, 125)<sup>51</sup> but illuminate the inconsistencies in the three measures and responses, which they argue as "hardly unusual in survey work" (Blinder and Krueger 2013, 112). However, the commonalities of the different measures and indicators exceed the discrepancies (Blinder and Krueger 2013, 114).

The conceptualization of offshoring within the context of answering the research questions is only deemed relevant because the tasks can be performed from somewhere else apart from being personally present, basically remote work. Offshoring "refers to the movement of home-country jobs to another country—whether or not those jobs go to another company" (Blinder and Krueger 2013, 99), including cultural aspects and crossing national borders. Contractor et al. (2010,

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<sup>50</sup> For details of the different applied measures and variables see appendix 2.

<sup>51</sup> Also argued by Goos et al. (2014, 2511) calculating the routineness and offshorability of occupation within European countries.

1417–1418) consider offshoring from a firm’s perspective and emphasize its geographical reallocation. The fact that firms, jobs, or tasks are transferred to another country does not directly propel efficiency in executing tasks, and it mainly answers the question of whether the job can be performed only locally or also from abroad. In this dissertation, the aimed variable is performing tasks remotely, not reflecting variables driven by geographical circumstances such as “cultural sensitivity” (Blinder and Krueger 2013, 104). A further aspect are the lowered wage costs if jobs are offshored to less-developed countries, which indeed reveals demand shifts of different labor groups affecting the employment structure (Acemoglu and Autor 2011, 1146) but misses to effectively contribute to catering efficiency increases in the execution of the tasks.

The correlation between the ALM variables of abstract, routine and manual, and offshorability is, in this context, described as “performed in a remote location without substantial quality degradation” by Autor (2013, 195), who followed Blinder (2009). Therefore, all variables fostering efficiency increase due to performing tasks from a remote location, irrelevant whether the geographical location is in the domestic or a foreign country, are included in the scope of the dissertation.

#### **2.2.4 Automation of Occupations and Tasks**

“How susceptible are jobs to computerization?” (Frey and Osborne 2013, 2)

With this question, Frey and Osborne (2013; 2017)<sup>52</sup> published research examining how computerization affects jobs. Also, they argue that no study quantifies the likelihood of technology’s impact on the future of employment. This idea achieved great acceptance in the following years, and the approach was transferred to several other countries besides the U.S. (Bowles 2014; Brzeski and Burk 2015; Pajarinen and Rouvinen 2014; Bonin et al. 2015; Arntz et al. 2016; 2017). Changing the perspective from jobs to tasks, Dengler and Matthes (2018b) published a related approach labeled as substitutional potential. The idea of the

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<sup>52</sup> After the first online publication in 2013 this study was again published in 2017 in the *Journal of Technological Forecasting & Social Change*. For further reference purposes in this dissertation the publication from 2017 is cited.

concept, the differences between the studies, and the methodologies are presented in the following sections.

#### 2.2.4.1 *Susceptibility of Jobs According to Frey and Osborne*

The study by Frey and Osborne (2017) is based on previous research of Autor et al. (2003), Goos and Manning (2007), and Autor and Dorn (2013) explaining the task content of employment. Also, Brynjolfsson and McAfee (2011) argue that technology capabilities will constantly advance, which is expanded by the view of what computers will and could be doing soon. They furthermore base their approach on the variable of offshorability by also referring to Blinder (2009) and Blinder and Krueger (2013), that 22 to 29 percent are or will be soon offshorable (Frey and Osborne 2017, 255). Based on this study, the presented results show that 47 percent of workers in the U.S. are at high risk of losing their jobs within the next ten to twenty years. Generally, the study is built on the two-by-two matrix of ALM by also arguing that the dimension of non-routine jobs and the inability of technology to substitute them is not accurate anymore due to the rapid development of task computerization which goes beyond the now commonly known routine tasks (Frey and Osborne 2017, 258–259). “With the availability of big data, a wide range of non-routine cognitive tasks are becoming computerizable” (Frey and Osborne 2017, 259), with which computers enjoy two main competitive advantages over human labor: scalability and the absence of human bias. They furthermore differentiated the computerization of the task index of non-routine between cognitive with a focus on machine learning (ML) (2017, 259–260) and manual with a focus on mobile robotics (MR) (2017, 260–261), both processing big data.

They exemplarily present the more effective and efficient task execution of computers and machines versus human labor as follows: digital technologies lead in extensive calculations and pattern detection (Campbell-Kelly 2009, 68). Human labor needs to fulfill additional tasks such as sleeping besides occupation-related requirements (Kahneman et al. 1982), which was, e.g., presented by experiences from Israeli judges who applied increased generosity after a lunch break which can be argued as bias (Danzinger et al. 2011, 6889). Finally, mobile robots already fulfill logistic tasks in hospitals (Bloss 2011, 567–571). Employing these aspects complemented by several more possibilities, McKinsey (2013, 40) estimates the

replacement of 110 to 140 million well-educated full-time workers worldwide in 2025 with an annual economic impact of approximately \$6 trillion due to the implementation of algorithms, machine learning, and mobile robots.

Due to the provided arguments of missing accuracy for non-routine tasks concerning computerization, the study also issues to revise the task model and its content of employment by replacing the indexes of routine and non-routine by susceptible labor input ( $L_S$ ) and non-susceptible labor input ( $L_{NS}$ ) while computer capital ( $C$ ) remains consistent in the task content:

Formula 13: Cobb-Douglas Production Function (Task Susceptibility)

$$Q = (L_S + C)^{1-\beta} L_{NS}^\beta$$

Source: Frey and Osborne (2017, 261)

Due to the rapid development of ML and MR and the in addition to that accompanying pattern recognition which allows it to replace tasks beyond routine tasks, based on big data processing. However, there are still bottlenecks impossible to automate every task by not having a sufficient amount of data to allow pattern recognition, for which they define three task categories of  $L_{NS}$  (Frey and Osborne 2017, 261):<sup>53 54</sup>

1. perception and manipulation ( $L_{PM}$ )
2. creative intelligence tasks ( $L_C$ )
3. social intelligence tasks ( $L_{SI}$ )

Formula 14: Calculation of Non-Susceptible Labor Inputs

$$L_{NS} = \sum_{i=1}^n (L_{PM,i} + L_{C,i} + L_{SI,i})$$

Source: Frey and Osborne (2017, 261)

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<sup>53</sup> The unlikelihood of substitution by computer capital is defined by the period of “time” of the next decade or two.

<sup>54</sup> Bonin et al. (2015, 3–4) summarize the three emphasized technical “bottlenecks” as:  $L_{PM}$  comprises tasks based on skills which allow orientation in complex and unstructured environments to identify errors followed by error remedy;  $L_C$  is defined by tasks requiring creativity to create new and value added ideas or artefacts especially though the changes within the course of time and across cultures, such as concepts or scientific theories;  $L_{SI}$  are tasks for which social intelligence is mandatory to fully imitate human emotions such as negotiation or convincing (more insights about the human brain are necessary).

To evaluate the susceptibility of 702 different jobs, they used ONET as the database to apply a two-step approach labeling the first 70 occupations they felt most confident about providing the most accurate evaluation (Frey and Osborne 2017, 263):

- hand labeling with several ML researchers with 1 and 0 indicating whether it is automatable or not, answering the question: “Can the tasks of this job be sufficiently specified, conditional on the availability of big data, to be performed by state-of-the-art computer-controlled equipment?”<sup>55</sup>
- application of nine ONET variables relating to the three non-susceptible labor input bottlenecks to computerization<sup>56</sup>

For the remaining 632 jobs in the ONET database, a probabilistic classification algorithm evaluates the job susceptibility by reaching an 0.9 classification score which indicates a positive subjective assessment of the first 70 occupations (Frey and Osborne 2017, 264–265).

The results reveal that 47 percent of the occupations hold a high likelihood to become computerized, 19 percent medium, and 33 percent low likelihood, thresholding at 0.3 and 0.7. For example, service occupations, identified by Autor and Dorn (2013) as a large growing occupation group in the U.S., are highly susceptible to computerization (Frey and Osborne 2017, 267–268) and not shielded anymore by the classification of manual non-routine tasks. In a forward-looking manner, the extent of job susceptibility will be determined by overcoming the automation bottleneck (Frey and Osborne 2017, 265). The conclusion in terms of winning the race against machines from a human labor perspective is acquiring creative and social skills (Frey and Osborne 2017, 269).

#### 2.2.4.2 *Criticism on Frey and Osborne’s Study*

The susceptibility of jobs study with the key results that 47 percent of jobs in the U.S. are at high automation risk to be replaced by computers or computer-controlled machines, which reflects 33 percent of the total of employees in the U.S.,

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<sup>55</sup> 1 has only been assigned if automation was deemed 100% possible.

<sup>56</sup> Survey respondents were asked to assign scores based on “importance” and “levels” on several scales.

has created much attention in related scientific fields. The additionally associated advanced studies, presented in the following chapter, emphasize significant aspects of criticism and especially assail the study's limitations.

First, it assesses only the automation potential within the next one to two decades of existing jobs, while the idea that artificial intelligence (AI), machine learning, and mobile robots could also create new tasks and jobs is consciously neglected by the authors (Bonin et al. 2015, 3). This fits the argument that it does not necessarily result in technological unemployment, less work to do (Pajarinen and Rouvinen 2014, 4), or even take place at all (Arntz et al. 2016, 7). Not to mention political and societal forces which slow down or probably entirely hinder the technological adoption pace, for example, ethical and legal barriers (Pajarinen and Rouvinen 2014, 4; Arntz et al. 2016, 8), basically not only the dependence on technological capabilities (Dengler and Matthes 2015b, 6). Second, they indicate that the task composition defining an occupation does not change over time (Bonin et al. 2015, 5), where it is more likely to end up in an adjusted division of labor and machines exchanging and switching tasks (Arntz et al. 2016, 8). Third, other criticism displays the three engineering bottlenecks of perception and manipulation, creative intelligence tasks, and social intelligence tasks. On the one hand, they argue that machines can overcome these limits through disassembling single bottlenecks tasks, and on the other hand, they conjecture the automation impossibility of these bottlenecks (Bonin et al. 2015, 4). Fourth, based on the transfer of the study to other countries, data barriers and local obstacles reveal difficulties of specific labor market peculiarities as well as education system characteristics (Dengler and Matthes 2015b, 10). Fifth, and probably the most relevant criticism, the study is based on an occupation-based approach and does not differentiate between tasks. Thus, once a job is labeled as automatable, tasks difficult to automate within that task bundle (job) are disobeyed (Bonin et al. 2015, 5; Dengler and Matthes 2015b, 6; Arntz et al. 2016, 7), and that the task composition of occupations is “in a constant flux” (Pajarinen and Rouvinen 2014, 4). Changing job tasks within occupations was also emphasized by Autor and Handel (2013, 79) when they put tasks to the test explaining the differences. Autor (2015, 27) claims a challenge in “unbundling” tasks of an occupation without a significant drop in quality. Computer and computer-controlled machines can perform specific tasks faster, with greater precision, and more perseveringly, but they can simply not



perform all of them (Dengler and Matthes 2018b, 304). Sixth and finally, based on the initial task-based approach of Autor et al. (2003), Arntz et al. (2016, 10) emphasize an essential differentiation to the susceptibility study: the former focus on a firm perspective maximizing profits and the condition that tasks substitution depends on not only technological capability but also the relative task price. The latter, on the contrary, only assesses the technological capability, which is economically neither practicable nor feasible.

The criticism, however, motivated the researcher to transfer the study of Frey and Osborne to more countries than only the U.S. and was inspired by the discussions of a task approach to developing new methodologies to assess the computerization impact on jobs and human labor.

#### 2.2.4.3 *Advanced Studies*

Inspired by the susceptibility of jobs, which assesses on an occupational level the automation risk of U.S. occupations in one to two decades, several advanced studies based on the same or a similar approach have been conducted to contrast the 47 percent of high automation risk of Frey and Osborne (2013). For Finland, Pajarinen and Rouvinen (2014) employ the same U.S. data from 2012 (not 2010) and Statistics Finland data from 2011, recode them to ISCO data, and find, by using the same thresholds, that 49.2 percent of U.S. and 35.7 percent of Finland's employment is at high automation risk. The general decoding of data to ISCO is necessary to make data between the countries comparable, which the related authors nevertheless argue as the risk of wrong data translation. Bowles (2014) applies the same replication process for Europe and argues high automation risk of around 45 percent up to over 60 percent, where the Netherlands, Belgium, Germany, France, the UK, Ireland, and Sweden are similar to the U.S. labor market. Brzeski and Burk (2015) recode both U.S. and German occupational data to ISCO and conclude for Germany that computers could replace approximately 59 percent of the social security and marginally employed labor force within the next ten to twenty years. Second, arguing that the occupational-based approach neglects non-automatable tasks performed by human labor at high automation risk occupations (Bonin et al. 2015, 14; Arntz et al. 2016, 8) the so far conducted occupation-based approach was rebuilt in the form of a task-based approach for Germany, the U.S. and OECD countries (Bonin et al. 2015; Arntz et al. 2016; Arntz et al. 2017). By the application

of PIAAC data and an econometric model, they link probabilities of automation of the initial study to the individual tasks (Dengler and Matthes 2018b, 305) and present automation risks of 9 percent for the U.S., 12 percent for Germany and Austria and 6 percent for Korea and Estonia.

The significantly lower results of the task approach versus the occupation-based approach indicate the necessity to be as precise as possible in calculating a substitution or complementation effect of digital technologies and human labor.

#### 2.2.4.4 *Substitutional Potential*

The prominent critique on the occupational approach of Frey and Osborne (2013) led to a transfer of the study to other countries by assigning the data to ISCO and the further derivation to a task-based approach based on the original occupation-based approach, see the previous section.

Dengler and Matthes (2015b) developed a new approach by determining the share of tasks computers can replace today on a single occupation basis without predicting the automation risk in a few years.<sup>57</sup> However, their main intention was to overcome the transfer of the occupational classifications and the automation potential overestimation since experts only assessed jobs at this point (Dengler and Matthes 2018b, 310). With the share of tasks, which is replaceable, the substitutional potential delimits itself from previous studies, and the evaluation can immediately be performed with an assessment of the tasks level without the necessity to translate data from the occupation levels. The study builds on the initial task-based approach of Autor et al. (2003) and the further compiled job polarization research explaining the hollowing out of the occupational distribution through routine tasks to be replaced by technological progress. However, in their first assessment, they analyzed 2013 BERUFNET<sup>58</sup> data, which contained, at this point, approximately

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<sup>57</sup> They also published a slightly differentiating variant of the research paper in the Journal “Technological Forecasting and Social Change” (Dengler and Matthes 2018b), as brief report (Dengler and Matthes 2015a) as well as in a compilation (Dobischat et al. 2019) discussing the interaction between education and work 4.0 with the substitutional potential as subchapter (Dengler and Matthes 2019).

<sup>58</sup> German expert database of the Federal Employment Agency with an information level which similar to ONET (Dengler and Matthes 2015b, 7) which is mainly used in career

3,900 single occupations and 8,000 single job requirements incorporated in a so-called requirement matrix that is continuously updated (Dengler and Matthes 2015b, 10–11). Previous fundamental scientific groundwork of Dengler et al. (2014) allocated the 8.000 requirements to the five tasks composition (non-routine analytic, non-routine interactive, non-routine manual, routine cognitive, routine manual) of Spitz-Oener (2006), who is associated as the most common and cited author for task operationalization in Germany (Dengler et al. 2014, 8), based on a triple coding approach of three experts ensuring clear task assignments and coding rule compliance. Finally, the differentiation between the twofold approach, routine tasks ( $T_{j,i,t}^R$ ) versus non-routine tasks ( $T_{j,i,t}^{NR}$ ) in category  $k$ <sup>59</sup> performed by an individual ( $i$ ) at time  $t$  allows the calculation of the substitutional potential (SP), with the underlying assumption that machines could perform routine tasks.

Formula 15: Substitutional Potential

$$SP_{jit} = \frac{T_{k,i,t}^R}{T_{k,i,t}^{R+NR}} * 100$$

Source: in the style of Dengler et al. (2014, 8) based on the input of Dengler and Matthes (2015b, 11) and Dengler and Matthes (2018b, 307)

In their study, they furthermore employ a weighted approach reflecting the number of employees per occupation to create an aggregation on the total German labor market (Dengler and Matthes 2015b, 11), which is not further elaborated within the course of this dissertation.

According to this study, “tasks are activities that individuals have to perform in a specific occupation” (Dengler et al. 2014, 6; Dengler and Matthes 2018b, 305), which was in a previous section presented as “a unit of work activity that produces output (goods and services)” (Acemoglu and Autor 2011, 1045). The two understandings do not coincide but also do not indicate main diversities.

Besides the task differentiation and task allocation per occupation, they proceed with the data as follows. According to the requirement matrix from 2013 and the determination of the share of routine and non-routine tasks, the core

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guidance and job placement (Dengler et al. 2014, 10). It furthermore contains occupational information about tasks, work equipment used, required training or legal regulations (Dengler and Matthes 2018b, 307).

<sup>59</sup> Adjusted from category  $j$  to  $k$  to be stringent, see formulas in previous subchapters.

requirements have been assigned per occupation (8th-digit code KldB 2010). The differentiation was performed according to the main occupation group (2-digit code KldB 2010) and requirement level (5th-digit code KldB 2010) and the fourteen occupational segments. The requirement levels are defined into four educational groups (Dengler and Matthes 2018b, 306):

1. no vocational qualification: unskilled or semi-skilled
2. at least two years of vocational training: specialist
3. master craftsman, technician or equivalent technician school, college graduation, graduation from a professional academy or bachelor's degree: complex specialist
4. completed university degree of at least four years: highly complex

The study has also been conducted with a differentiation between the genders male and female applied on requirement level as well as the fourteen occupational segments, also to detail other German labor market-specific conditions concerning the substitutional potential (Dengler and Matthes 2016). Additionally, to capture the first development of the substitutional potential, the results from 2013 have been compared with data from 2016. It is argued that in the meantime, several new digital technologies have been launched with enhanced capabilities, such as collaborative robot lifting (e.g., tools) or service robots (e.g., driverless transport systems or transport robots, or self-learning computer software handling big data) (Dengler and Matthes 2018a, 2–3). In general, this somehow proves the argument that digitalization propels the labor market instead of thwarting its development (Neugebauer 2018, 4), which simultaneously counteracts Frey and Osborne's approach, neglecting the development of new tasks in their study. These changes are also revealed by, for example, plus 100 occupations (in total 4.000) in the BERUFNET database, as well as increased substitutional potential in 2016 versus 2013, reflected in an increase across all four requirement levels and twelve of fourteen occupational segments changing from 15 percent with a high potential to 25 percent. Lastly, results have already been presented in differentiating the substitutional potential between the German federal states (Dengler et al. 2018) to enlighten differences across a nation further.

Concluding the approach of the substitutional potential, they disregard substantial elements which delimitate the targeted research within this dissertation from the already provided concept through the task-based approach. The current

assessment is only about technical feasibility while legal and ethical obstacles are neglected, cost considerations and preferences are not included, and most importantly, the time spent per task is entirely ignored. This could lead to an over- or underestimation of the substitutional potential if less time is spent on routine or non-routine tasks (Dengler and Matthes 2018b, 308). See productivity literature (Siegel 1980; Sumanth 1998; Grifell-Tatjé et al. 2018) to operationalize human labor input with the coefficient of time or man-hours in section 2.1.2.

### **2.2.5 Task Approach Revisited: Automation as Driver**

Even if digital technologies are supposed to result in increased productivity, it is not necessarily the case. By explaining the relevance of current new technologies, the actual application scope and capabilities of digital technologies are enlightened with practical examples. Also, the initial task approach is deemed expired due to continuous newly emerging digital technologies, and a new approach is needed. Thus, this dissertation focuses on a transfer of the concept from the labor market (presented in 2.2.3 and 2.2.4) to the firm. It is the target to build upon the derived summary of applied measurement criteria for performance measurement in firms (presented in 2.1.5). This section leads the discussion from the intensively presented labor market approach to the final applicability in a firm, followed by section 2.3, the particular marketing and sales concentration within a firm.

#### *2.2.5.1 The Productivity Paradox Meets Automation*

“You can see the computer age everywhere but in the productivity statistics.”  
(Solow 1987)

This quote is often used as starting point in literature causing a stir, especially in information systems-related publications, to discuss the absent productivity growth after high information technology investments (see for example and besides others David 1990; Brynjolfsson 1993; Brynjolfsson and Hitt 1995; Brynjolfsson and Hitt 1998; Stratopoulos and Dehning 2000; Dewan and Kraemer 1998). The main reasons are measurement faults of input and output, time delays, profit redistribution, and the wrong way to deal with technology (Brynjolfsson 1993, 76). The mismanagement of technology can probably be referred to the

argument of Henderson and Venkatraman (1999, 472) that there has been no or only partial alignment between a firm's business and IT strategy (discussion in section 2.2.2.2). Additionally, by further improvement of technologies, computers became cheaper, enhanced business possibilities arose, technology investments have been seen as complementary, and productivity increased due to declining costs as well as increased output of new products (including intangible aspects such as the convenience of existing products, timeliness, and variety) (Brynjolfsson and Hitt 2000, 24). Organizational research even argues that the organizational and skill infrastructure is necessary to facilitate these large investments, which takes time to adjust, as "technology alone is not enough" (Caroli and van Reenen 2001, 1450). To fulfill these organizational changes, skilled and adaptable workers are a prerequisite (Piva et al. 2005), but both skilled and unskilled workers perform a broader range of tasks while simultaneously becoming more autonomous (Caroli et al. 2001).

Productivity due to technology experienced a further enhancement of variables from traditional factors of labor and capital towards a collection of intangible assets, skills, culture, processes, and others which became a prerequisite of productivity. They led to organizational changes and adjusted employees' skills as they were not invisible but challenging to measure (Brynjolfsson et al. 2002, 137–138). Advanced empirical studies on plant level (Bartel et al. 2007a, 1722) reveal positive correlations between IT investments and organizational performance, such as adjusted business strategies, creation of customized products, improved efficiency measured with the coefficient of time, and increased skill requirements.

At this time in literature, the productivity paradox seems to be weathered, but organizations are already confronted with new defiance of the machines. Contemporaneously to the 2003 introduced task approach, including its embeddedness in job polarization publications, initial productivity paradox literature integrated this approach by arguing a partner concept between machines and labor to win the race against these even smarter machines (Brynjolfsson and McAfee 2012a, 27; Brynjolfsson and McAfee 2012b, 53). Furthermore, the real value of gainful work is psychologically driven as "forced idleness is not the same as voluntary leisure" (Brynjolfsson and McAfee 2012a, 28), which meets the conditions of literature concerning new work in 2.2.2.3 and non-value-adding employment in 2.2.2.4. However, with increasing IT capabilities, questions like

“Return of the Solow Paradox?” incorporated in a productivity study in U.S. manufacturing arguing that “the race against the machine has already been run—and that workers have lost” (Acemoglu et al. 2014, 394), emphasizes the changing workplace requirements and decreasing role of human labor. Brynjolfsson and McAfee (2015) even ask if human labor will go the way of horses and disappears. From an organizational studies point of view, Fleming (2019, 31) discusses the current difficulty driven by organizational and socio-economic factors that limit otherwise unstoppable technological progress.

With the strong development of machines and their increasing capabilities, they are already also able to take over cognitive tasks such as fully autonomously driving cars (Brynjolfsson and McAfee 2011) as well as pattern recognition and complex communications, including physical tasks producing more output by applying the same level of input (Brynjolfsson and McAfee 2014) which Autor et al. (2003) with their task approach argue to be irreplaceable. Therefore, with the introduction of artificial intelligence, for example, predicting what consumers want to buy on an e-commerce platform while analyzing shopping behaviors, and big data translating data intelligence into business advantages, a new age of machines is born (McAfee and Brynjolfsson 2012, 62).

Consequently, and due to the rapid technological changes, the question arises whether the initial task differentiation between routine and non-routine is still the most accurate. Nevertheless, the conditions need to fulfill the requirements of measurable variables, as “you can’t manage what you can’t measure” (McAfee and Brynjolfsson 2012, 62).

#### 2.2.5.2 *The Relevance of New Technologies*

“... a Hong Kong venture-capital firm, has gone so far as to appoint a decision-making algorithm to its board of directors.” (Dewhurst and Willmott 2014).

The appointment of an algorithm to the board of directors is still an exception today but displays the infinite possibilities of digital technologies, which also challenges the inviolability of highly skilled labor (Chui et al. 2015; Acemoglu and Restrepo 2018a, 205). It raises the question of what tasks will be left for senior management. Dewhurst and Willmott (2014) especially highlight four tasks: asking questions, attacking exceptions, tolerating ambiguity, and employing soft skills to

move human labor from the edge back to the center. Focusing on the latest practice-orientated studies from the consulting firm McKinsey, this section scrutinizes the current interplay between tasks and new technologies. In 2011, a study about job creation and the labor economy in the U.S. based on employer interviews found that the workforce will be far more flexible within the next five years. The work will be disaggregated into tasks, and the virtualization to work anywhere at any time will increase, which is also comparable with offshoring (McKinsey 2011, 45–50). In 2013, a study about disruptive technologies emphasized the automation of knowledge work, commonly known within the task approach as cognitive task complemented by technologies, which includes machine learning and computing technology to perform complex analyses, creative problem solving, and subtle judgments (McKinsey 2013; McKinsey 2019). The fact, that some major occupations in the U.S. fell by more than 50 percent from 1972 until 2010, such as general clerks, bookkeeping, and secretaries, while typists and telephone operators achieved a level of around 80 percent due to routinization (McKinsey 2013, 43). Inspired by the job susceptibility study of Frey and Osborne (2013), McKinsey replicated the approach by analyzing approximately 800 jobs and 2,000 work activities within the five capabilities of i) sensory perception, ii) cognitive, iii) natural language processing, iv) social and emotional, and v) physical, to finally estimate an automation probability of 45 percent of all tasks while less than 5 percent can be fully automated and 60 percent could be automated by more than 30 percent (Chui et al. 2015; McKinsey 2017a, 5). Based on the three primary work activities of collecting data, processing data, and physical tasks within a predictable environment, the cumulated impact could unleash 51 percent of total employment, resulting in \$2.7 trillion of wage savings (McKinsey 2017a, 6). However, this development also underlies the limitation of the economy and society to be fully adopted: technical feasibility, cost of development and deployment, labor market dynamics, economic benefits, as well as regulatory and social acceptance (McKinsey 2017a, 10–12). Automation goes above and beyond the substitution of human labor and is supposed to yield performance increases as well (McKinsey 2018, 14).

With his book “Rise of the Robots,” Ford (2015) has created much attention by discussing the technological threat leading to joblessness in the future and the possibility of disrupting and pushing firms to the edge of a mandatory



restructuring. More importantly and relevant, he disputes the assumption that low-skilled labor is performing many routine tasks, which is in line with the wording of McKinsey (2017a) with „predictable environments.“ The proposal suggests that the term predictive can become proficient for specific tasks if enough training data are available. The borders of technologies, as implied by the introduction quote of the section, seem limitless and probably also pull non-routine tasks at some point into the routine and predictive tasks category (Ford 2015, 59). As robots gain ground, an international study with data from 2012 assesses the subjective fear of robots in work settings, revealing higher fear for less-educated and white-collar workers compared to manual workers (Dekker et al. 2017, 551). Evaluations of the relationship between robots and productivity even find that 15 percent of total growth between 1993 and 2007 in seventeen countries is already accounted to industrial robots (Graetz and Michaels 2018, 766).

McKinsey furthermore tested artificial intelligence as a strongly developing technology within several investigations. An artificial intelligence adoption and use analysis of 3,073 participants in fourteen sectors and ten countries revealed that only 20 percent adopted one or more artificial intelligence technologies at scale or in at least one core area and 10 percent more than two (McKinsey 2017b, 13). An additional sector case study analyzed four areas across the value chain, including promotion as an aspect of marketing and sales, which deals with the correct pricing for products and services and communicating the correct message employing suitable targets. Exemplary results in a retail case study showed a 50 percent assortment efficiency improvement, a 4-6 percent sales increase, and a 30 percent online sales increase (McKinsey 2017b, 23–24). Especially marketing and sales tend to use artificial intelligence applications such as customer service functions (McKinsey 2017b, 17) with the presented example of cognitive agents (McKinsey 2019, 65). Also, within a current artificial intelligence study in 2020 with 2,395 participants (McKinsey 2020), marketing and sales stay ahead with new technology adoption. It reveals that more than 50 percent of the participants stated artificial intelligence embeddedness in at least one business function, while marketing and sales function presents 17 percent in customer-service analytics and 14 percent in customer segmentation. Additionally, if marketing and sales functions would adopt artificial intelligence, 79 percent of the companies report 2019 a revenue increase, of which 36 percent increased by more than 6 percent or more, and 36

percent report 2019 a cost decrease, of which 15 percent decreased by 10 percent or more. Furthermore, and with regards to the beginning of the Covid-19 pandemic, with which remote working was highly fostered, 32 percent of artificial intelligence high performers, according to the above number in performance increase, state a failure of these technologies as soon as the change of work started (McKinsey 2020). Soon, the possibilities arise that firms are at least supported in decision-making by artificial intelligence, if not even entirely freed by decision-making by themselves (Wolff et al. 2019, 506). This view is accompanied by an estimated 50 million new technology-related jobs by 2030 (McKinsey 2017c, 7), which would highly affect the division of labor.

To summarize, the impact of new technologies is ongoingly crucial with the need to regularly put jobs and tasks to the test, also proposed by Autor and Handel (2013), to estimate the performance impact on firm-level.

#### 2.2.5.3 *The Initial Task Approach is Expired*

“... simply extrapolating past trends will be misleading, and a new framework is needed.” (Brynjolfsson and Mitchell 2017, 1533)

With this quote, Brynjolfsson and Mitchell (2017) endorse the initial task approach framework of routine versus non-routine tasks to justify the job polarization of middling jobs in skill and wage distribution and relate the “traditional view” (Acemoglu and Restrepo 2018a, 204) as main workforce implication due to digitalization. Simultaneously, they demand a new, more accurate approach. A comparable argument is found by Acemoglu and Restrepo (2018a, 204), who identify the high-skilled workers as “shielded” from automation due to complex task specialization such as human judgment, analytics, soft skills, and problem-solving, as legitimate doubt reasoned by artificial intelligence. Within the initial task approach, these tasks also refer not to be sufficiently understood to be specified in automatable codes, labeled as non-routine, based on Polanyi (1966, 4): “We know more than we can tell” (Autor et al. 2003, 1283).<sup>60</sup> These tasks are defined by what Autor (2015, 22) calls “Polanyi’s paradox” and explains as vexed

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<sup>60</sup> In organization science Kogut and Zander (1992, 383) base their theory of the firm also on Polanyi (1966) arguing “what organizations are should be grounded in the understanding of what they know how to do.”

to automate only understandable tacitly. In the same paper, he asks whether Polanyi's paradox will soon be overcome as almost all tasks will be automated. The last section's literature review strongly supports this question's validity. However, by the evidence, he suggests otherwise. Labeled as environmental control, the inflexibility of machines leads only to semi-autonomously performed tasks, while machine learning inverts the paradox by self-learning what human labor cannot tell machines (Autor 2015, 23–26). Nevertheless, current frameworks (Acemoglu and Restrepo 2018c) still propose the differentiation between labor task substitution and task complementation through automation. Klotz (2018, 12–13) supports this view with a comparison of the automation scenario, automation of the technical processes replacing human resources, and the tool scenario, supporting human capital with digital technologies, which, in both scenarios, indicate a reduction of jobs. However, especially emphasized are new tasks for which human labor holds a comparative advantage as they can do more and even more tasks compared to the analogy of the disappearing need for horses (Acemoglu and Restrepo 2018c, 1489). This results in two different types of technological change for firms: automation allows capital substitution for human labor tasks (low-skilled labor), and the newly created tasks replace old tasks with advanced variants in which human labor (high-skilled labor) generate higher productivity by having a comparative advantage (Acemoglu and Restrepo 2018c, 1490). Furthermore, and important to mention is the accompanying bottleneck of the educational system, which is, in practice, unable to adapt to the rapidly-increasing requirements of newly created tasks and therefore hinders the abolition of low-skilled labor (Acemoglu and Restrepo 2018c, 1527). This approach also refers to the dynamic capabilities literature (see 2.1.4). Technological change leads to capability transformations “in which some routines are modified, others are discarded, and new ones are acquired, resulting in a transformed capability, which incorporates both existing and new know-how” (Lavie 2006, 158–159). Summarized in task dimensions and a disjoint set of tasks performed by capital, it is called low-skill automation, which has been seen as routine and manual in the traditional view, and high-skill automation due to advanced artificial intelligence, machine learning, and big data previously argued as indispensable capability of only human labor (Acemoglu and Restrepo 2018a, 205). This approach delimits, for example, the irreplaceable low-skilled service occupation, according to Autor and Dorn (2013).

With the publication of McAfee and Brynjolfsson (2017) describing a machine platform crowd emphasizing progressing machine learning capabilities, the task composition until this point of time seems expired:

1. human judgments can possibly be biased and replaced by neutrally set algorithms
2. machine learning can design software systems, detect a pattern, formulate strategies, access big data, and create algorithms
3. digital technologies come close to today's definition of creativity.

However, digital technology capabilities also experience restrictions:

1. no understanding of human conditions
2. no satisfaction with social characteristics: empathy, leadership, teamwork, coaching.

McAfee and Brynjolfsson (2017) ultimately propose the ultimate solution for future task execution. With advancing technologies, social skills have become more valuable than quantitative skills, and the ability to combine them will be the most valuable capability.

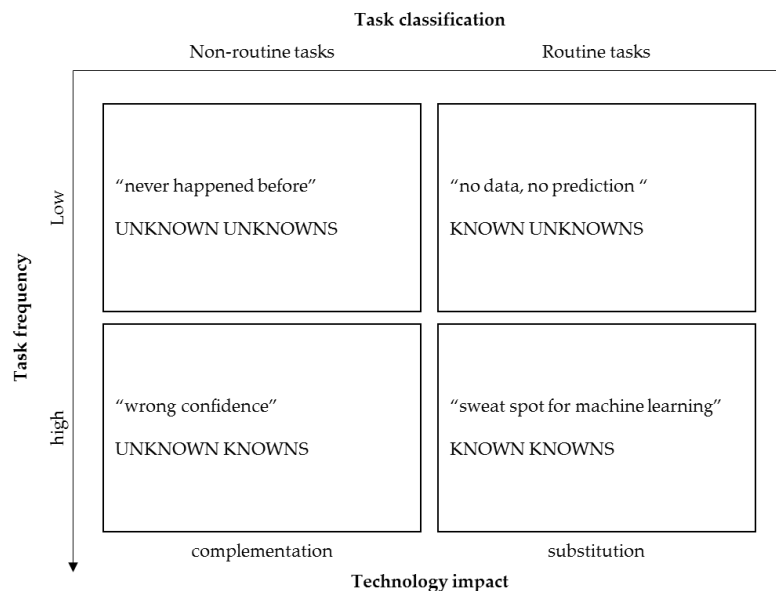
Analogous to the criticism related to the susceptibility of jobs in 2.2.4.2, the implementation pace of machine learning applications also depends on legal and compliance dimensions and consumer preferences. Autonomous driving hinges on traffic laws, insurance regulations, and traffic flow, while virtual sales assistants require only little process redesigns but need to be accepted by consumers (Brynjolfsson and Mitchell 2017, 1534).

As most current revisiting of a task approach model, Acemoglu and Restrepo (2019b) connect the interaction between new automation possibilities to study the effect on the labor market. They build upon Acemoglu and Restrepo (2018a; 2018c) as the latest publication, as well as on Acemoglu and Autor (2011) and Autor et al. (2003). The basic model concentrates on a changed task content of production, which requires tasks allocated to capital and labor impacted by new technologies. These shifts within the task content can significantly impact labor demand and productivity (Acemoglu and Restrepo 2019b, 3). The task content of production can, based on the described automation possibilities, be subject to the following effects: i) displacement effect – capital substitutes labor tasks and reduces the value-added of human labor, especially for low-value activities (Dosi and Mohnen 2019,

45), ii) productivity effect – automation technology increases productivity due to a more flexible assignment of tasks to factors and iii) reinstatement effect – counterbalances the displacement effect and contributes positively to the productivity effect through technologies that create new tasks in which human labor has comparative advantages (Acemoglu and Restrepo 2019b, 4).

Additionally, literature elaborating on artificial intelligence focuses on prediction instead of rule-based decisions and bases the classification of routine versus non-routine on the amount of data<sup>61</sup> gathered. While “prediction is the process of filling in missing information” (Agrawal et al. 2018, 24), a new division of labor based on data density is proposed.

Figure 5: Division of Labor based on Data Density



Source: own illustration based on the information of Agrawal et al. (2018, 59–61)

Lastly, more recent publications also compile omissions from the task approach literature (2.2.3) and propose a taxonomy of tasks differentiating between

<sup>61</sup> The possession of data as well as its use even goes back to Hayek (1945) discussing the use of knowledge in society, and therewith, the use of data in a price system. The argument of falling prices and the correlating as well as immediate reactions of economy fits the point of Autor et al. (2003) and Agrawal et al. (2018): as soon as prices fall, investments on latest technologies will increase, especially in sectors strong in human labor tasks being able to be substituted by technologies.

work content, methods, and tools (Fernández-Macías and Bisello 2020) building upon earlier articles (Fernández-Macías et al. 2016; Fernandez-Macias and Bisello 2017; Fernández-Macías et al. 2018; Bisello et al. 2019). They criticize the initial task approach according to certain concept omissions. First, there is no perfect substitute between human labor and digital technologies for routine tasks, since human labor must always be behind for controlling, designing, and maintenance purpose to solve unforeseen issues. Second, the aspect of real human agency in the input process of work required active cooperation leveraged by the firm's organization. This results in further supervisory, managerial, and controlling personnel which monitors the appropriate cooperation. Third, they argue that tasks do not exist in isolation but in task bundles in form of jobs. But jobs are also not only bundles of tasks but represent the social structure and their positions. Referring to both, aspect two and three, Deming (2017) follows this argumentation by developing a model of team production in which social skills result in reduced coordination effort, and to work together more efficiently as cooperation due to increasing relevance of social task. Fourth, tasks in general can strongly vary and change concerning their character driven by the consumer preferences and their consumption. Therefore, it is difficult to strictly determine tasks within a fixed framework.

Fernández-Macías and Bisello (2020, 7–11) propose an advanced model to build upon the task approach to overcome their identified obstacle. They differentiate between content as well as methods and tools of work. Content refers to physical (strength, dexterity, navigation), intellectual (information processing, problem-solving), and social tasks (serving/attending, teaching/training/coaching, selling/influencing, managing/coordinating, caring) and is defined as "what": "The contents axis would refer to the object of work activity, understanding work as a transformative process, which is applied to things, ideas or social relations." (Fernández-Macías et al. 2016, 37). Methods refer to autonomy, teamwork, and routine and are defined as how: "The methods axis would refer to the ways in which work is organised and to the physical objects used for aiding the production process" (Fernández-Macías et al. 2016, 37). Tools refer to non-digital machinery (analog) and digitally enabled machinery. It is important to note that routine tasks in this framework describe how production processes occur more than the content. Even if this approach is supposedly the most current, the most detailed, and enabled by various publications throughout the years, it still concentrates on

integrating all jobs. Also, this task approach novelty is solely derived from a literature review. Literature is only busy with analyzing “how technological change drives changes in the labour market structure (in terms of job creation and destruction) by applying task indices to employment” (Bisello et al. 2019, 5).

Therefore, the existing approaches are deemed inappropriate for specific business units, and it is proposed to scrutinize complex concepts according to their applicability intensively. Hence, this dissertation develops a new detailed model within the field of marketing and sales.

#### 2.2.5.4 *From the Labor Market to the Firm*

“Why analyze jobs rather than individuals?” (Fernández-Macías 2012, 162)

This question was raised through the original job polarization research based on the task approach. It was argued that technology does not equally affect all task types at this time. Therefore, the job-level dimension for labor market analysis satisfies the research demands (Fernández-Macías 2012, 162). However, as already briefly touched on in the introduction, the transfer from the labor market to the firm must not be confused with the theory of internal labor markets (ILM) and related manpower analyses. The targeted transfer refers to the task-approach-based concept (used in the external labor market environment) of job operationalization and its embedding in performance management measures on task-level for individuals.

With theoretical modeling and evidence from the last sections, automation affects all tasks performed by human labor. Either substitutional or complementary by developing new tasks without shielding any skill group (Acemoglu and Restrepo 2018a; 2018c; 2019b). An exemplary case study paper answers the question, “with what skills are computers a complement?” (Levy and Murnane 1996). However, it is important to mention that current literature dealing with the task approach still mainly tries to analyze certain labor market developments impacted by technological progress and innovation (see for example and besides others Karabarbounis and Neiman 2014; Autor and Salomons 2018; Barbieri et al. 2020; Calvino and Virgillito 2018; Dosi and Mohnen 2019). The attempt to transfer the task approach from labor market analyses towards the firm and correlated internal performance measurements such as efficiency measurements remain vague and untested.

The applied databases from the initial task approach (DOT, ONET, PDII, BIBB and IAB, EWCS, and ESS), the susceptibility of jobs as well as the substitutional potential (ONET, PIAAC, ISCO, BERUFNET) only allow high-level task allocation to jobs, to assess the technological impact on job-level (see also in 2.2.3.3 table 7: “Criticism of Used Data Sources for Task Indexes Measurement” as a summary and table 5: “Research Approaches to Overcome Task Measurement Issues” summarizing practicable possibilities). Literature proves the feasibility of applying the results to the labor market, evaluating certain occupations, and argues for improved productivity and efficiency of the input factors of human labor and capital (see for example Acemoglu and Restrepo 2019b). Nevertheless, there is no detailed evidence through an empirical attempt to determine specific firm performance indicators such as efficiency employing the task approach or a related methodology. To deepen the argument and to be as precise as possible with this statement, the technological impact on a firm’s labor input varies between occupational sectors. Therefore, the research proposal goes beyond the pure transfer from the labor market towards a firm’s performance measurement within a particular field of work, namely marketing and sales. The already rendered research within this field is presented in the following chapter to consider all relevant aspects and variables, to reinforce the selected occupational field, to prove the relevance, and to detect the research need for the targeted empirical methodology.



### 2.3 TRANSFORMING MARKETING AND SALES TO ACHIEVE EFFICIENCY

Digitalization and digital transformation in marketing and sales have enjoyed active attention in recent literature (Kumar 2018; Reinartz et al. 2019; Verhoef and Bijmolt 2019). Also, as a business function, it is especially highlighted concerning digitalization (Harwardt 2019, 3; Ritter and Pedersen 2020, 188; Vadana et al. 2020, 472). Therefore, within the context of a firm's digital transformation to achieve value-added through internal resource optimization and task efficiency, marketing and sales is deemed a relevant business function to conduct targeted empirical research. The following two sections display a brief description of the origin of marketing and sales, the conceptual understanding today, the interplay between the two functions, and present relevant performance measurement indicators. With the completion of this third sub-chapter of the theory framework definition, the research gap is narrowed down to the necessary degree of finally determining which variables are sufficiently compiled in literature and to what extent qualitative research will be a prerequisite to designing the targeted empirical model.

#### 2.3.1 The Business Function of Marketing and Sales

Philip Kotler's textbook about marketing management (Kotler 1967) became the most relevant in the 1970s (Vargo and Lusch 2004, 1). In one of his definitions, he argues that marketing is "a social and managerial process by which individuals and groups obtain what they need and want through creating, offering, and exchanging products of value with others" (Kotler 1997, 9). A more traditional perspective defines marketing "as the task of finding and stimulating buyers for the firm's output" (Kotler and Levy 1969, 10), classified as a function within firms while also being defined as business activity. However, both definitions argue that a selling process takes place. The related output is described as a product that can have the form of either physical products, services, persons, ideas (Kotler and Levy 1969, 12; Kotler 1997, 10), or organizations themselves (Barich and Kotler 1991, 94) for which the consumer is put in the center. This approach goes back to the psychological analysis of the human hierarchy of needs and motivation according to Maslow (1943). Marketing was initially only a distribution function in the 1950s

until it developed into digital value-added marketing today (Meffert et al. 2019, 12–17). In this way, it was also only seen as a trade and selling-related view that concentrated on an exchange process between goods or services and money (Kotler and Zaltman 1971, 4–5). A further period was shaped by marketing as an individual and multi-optimal network paradigm of the economy (Achrol 1997, 57; Achrol and Kotler 1999, 146) before digital marketing was introduced (Meffert et al. 2019, 8). Additionally, globalization and digitalization are no novelty, forcing firms to pursue sustainable marketing practices to satisfy the requirements of the environmental imperative (Kotler 2011, 132). This change affects how marketing is performed and follows adjusted consumer demands. From just being functional, it has developed to be social while adjusting the four P's<sup>62</sup> respectively by, for example, products are created digitally, environmental-friendly prices are higher, distribution enjoys the favor of online selling, and digitalization propels promotion (Kotler 2011, 133). The focus shifts from tangible to intangible such as skills, information, and knowledge, from producer to consumer, and from exchanging products to the exchanging process already years ago (Vargo and Lusch 2004, 15). Therefore, current definitions are distinct from the traditional understanding, which classify marketing in the overall context as external and internal corporate activities with consequent customer orientation. External corporate activities target the conception and execution of market-related activities between supply and demand. Internal corporate activities focus on effective and efficient execution, but aspects find application in the sense of customer orientation to achieve corporate sales goals (Bruhn 2019, 14; Homburg 2017, 10). On the contrary, the American Marketing Association summarizes as follows: “Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large” (AMA 2017) introduced in 2007 and still up-to-date versus the predecessor in 2004 (Meffert et al. 2019, 12). Within the dissertation, marketing and sales are considered one business function, while the definition of AMA is used as a working definition.

Aiming to achieve the mentioned sales goals, according to Bruhn (2019) and Homburg (2017), the marketing department is often long-term orientated, setting

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<sup>62</sup> Product, price, place, promotion.

strategic frames, while the “strongly interdependent” (Dewsnap and Jobber 2000, 109) sales department, on the contrary, propels the achievement of selling targets (Kotler et al. 2006, 70; Homburg and Jensen 2007, 126). Kotler et al. (2006) argue with their publication about the “war” between these two departments that corporate performance suffers from not working as one unit. The different consideration of marketing, which is a broad strategy to position a firm in the market following the four P’s, and sales, which means effectively selling the product to the end customer, often refers to economic and cultural frictions. The former concentrates on costs, while the latter argues educational differences between more skilled marketers and less skilled salesforce employees (Kotler et al. 2006, 70–71). Homburg et al. (2008a, 133) provide an overview from the literature of the differences: customer versus product, short-term versus long-term, differences in structures, information sharing, and knowledge. Moorman and Day (2016, 6) argue that this knowledge, especially in marketing, does not keep up with the digitization of marketing activities, which consequently affects how marketers work. However, current studies have proved the critical interdependency between marketing and sales by evaluating job transitions' organizational upsides and downsides within these two business functions (Johnson and Matthes 2018).

### 2.3.2 Performance Measurement in Marketing and Sales

“The firm should have a business model that tracks how marketing expenditures influence what customers know, believe, and feel, and ultimately how they behave.” (Rust et al. 2004, 76)

This view supports the value-added perspective of the consumer and is undoubtedly the most common in marketing and sales. However, as already derived, the focus stays on the internal resource efficiency perspective within the marketing and sales department as a business function, which experiences, from a controlling perspective, a different measure. Marketing controlling has evolved from a simple surveillance and monitoring function to a holistic performance measurement system (Bruhn 2019, 301). The liquid relationship and coalesce of marketing and sales are revealed when analyzing the related controls. While Homburg (2017, 1205) focuses on marketing and sales controlling as information, planning, and control functions, Bruhn (2019, 302) describes only marketing

controlling and adds adding a coordination function, accompanied by Meffert et al. (2019, 927), who only emphasize the function of information and control. However, marketing value itself remains difficult to assess, which Hanssens and Pauwels (2016, 173) present only from the term perspective: the understanding today varies between marketing as a management philosophy for customer centricity, as a set of activities within the marketing mix, and as a business function within the organization. The “chain of marketing productivity” (Rust et al. 2004, 77) stimulates consumer demand and ultimately ends with a stronger market position and increased financial value. Kumar and Reinartz (2016, 36) emphasize the key role of marketing as the responsibility to create and communicate value to consumers. One aspect of creating such value is the automation of tasks which frees the resources of consumers by saving time (Leung et al. 2018, 818) and is supposed to be transferred to the internal analysis of resource utilization.

From a productivity measurement point of view, there has already been a variety of investigations published for marketing and sales but not necessarily in combination with technology or for the analysis of internal resource utilization. Salesforce-related studies, for example, discussed: smarter work (Sujan et al. 1988), higher motivation (Hohenberg and Homburg 2016), applied learned optimism and motivation instead of relying on talent (Schulman 1999), sales growth through different bonus and incentive systems (Chung et al. 2014; Bommaraju and Hohenberg 2018; Patil and Syam 2018), and the transfer of knowledge between salespeople describing it as learning from peers (Chan et al. 2014). Marketing productivity is mainly discussed from two different perspectives distinguished between effectiveness and efficiency concerning customer satisfaction, market share, revenue, conversion rates budget, costs, personnel expenditures for office service and salesforce, and more (Sheth and Sisodia 2002b, 352; Bruhn 2019, 306–309; Ambler and Kokkinaki 1997, 672; Rust et al. 2004, 77), while still considering the primary differentiation of Drucker (1963, 54): Effectiveness is doing the rights things, and efficiency is doing the things right. Through literature analysis, Morgan et al. (2002, 364) explain that performance measurement in marketing is also affected by difficulties in aligning the respective input and output measures. Furthermore, it is significantly impeded due to the production of intangible goods and unjustifiable market conditions of growing market share driven by subsiding competitors' performance or economic changes (Sheth and Sisodia 2002b, 351).

Meffert et al. (2019, 935) even propose the holistic embedding in performance measurement systems following the balanced scorecard from Kaplan and Norton (1996), reinforced by former literature (Homburg et al. 2012a). Homburg (2017, 1205) refers to market-related activity steering, only scarcely considering a resourced-based analysis in marketing and sales which reveals the dearth of relevant literature and the necessity to translate the task approach in even more detail to business functions. The introduction statement of the section supports the view of non-resource-based emphasis in marketing performance management. Further literature, highlighted by Homburg (2017, 1205), emphasizes productivity potentials especially in the field of marketing and sales employing resource optimization (Weber and Jensen 2009; Homburg et al. 2012b), leading to a special consideration of effective and efficient resource utilization in this field. To follow these findings and to expand the research of internal resource utilization combined with the task approach, the forthcoming emphasis focuses on the internal resource-based view. Efficiency analysis is put to the center and the market-related view is neglected, as value-added for the consumer is argued as granted (see also section 2.1.4 for a more detailed explanation and derivation of value-added).

These perspectives summarize the starting position for the aimed empirical research in the following main chapter. Also, the entirely derived theoretical framework for efficiency potential calculations is a basis for building the empirical research upon the presented findings and discussions.



## **III – EMPIRICAL RESEARCH**





### 3 EMPIRICAL RESEARCH

This third main chapter aims to tackle the research gap and answer the research questions through empirical social research. The definition of empirical social research is described as a combination of methods, instruments, and techniques to conduct studies in a scientifically correct manner to evaluate human behavior or other social phenomena (Häder 2019, 13). Since several scientific fields perform empirical social science, it is a cross-sectional discipline aiming to assess human behavior or other social phenomena to achieve the most reliable knowledge possible. Social elements are a perceptible reality of experience based on the systematic collection, preparation, and analysis of empirical data (Döring and Bortz 2016, 5). Social science is deemed reality sciences, meaning that statements and hypotheses must withstand empirical evaluation employing methods (Baur and Blasius 2019, 41). Häder (2019, 13) describes methods as a system of rules and instructions to realize, e.g., targeted findings or collect specific data. Methods primarily represent formal rules since they are a priori and not bound to specific content. A related term, the methodology, on the other hand, contains meta-scientific discussions about science and examines whether the chosen method is appropriate to the presupposed purpose of scientific research (Häder 2019, 14).

The compiled theoretical content is a starting point to proceed with qualitative and quantitative research approaches using the empirical methods of social science. The following chapter is distributed into six subchapters to frame the empirical research section. First, the research design and methodologies of the study are presented. Second, the first research study in the form of qualitative content analysis is conducted based on Goldmann and Knoerzer (2022). Third, and building upon the first study in the form of a sequential approach, the second study is performed through quantitative research. Fourth, the quantitative study is analyzed two-folded. The first analysis approach is executed with descriptive statistics to describe the data set. Fifth, the second analysis approach is a structural equation model to test the model holistically. Sixth, the study limitations are presented. Seventh and lastly, the central findings of the dissertation are summarized.

### 3.1 RESEARCH DESIGN & RESEARCH QUESTIONS OF THE STUDY

This sub-chapter is differentiated between the research design and how it is supposed to answer the research questions. The research or study design characterizes the methodological approach. Döring and Bortz (2016, 182) propose criteria to define research design containing different sample types and data collection and analysis methods, as explained in the following section.

#### 3.1.1 Research Design & Methods

Based on the state of the research as well as the theoretical background, the research design and methodology are created to answer the research questions accordingly. The following table of the nine classification criteria for research designs from Döring and Bortz (2016) guides the decision process to identify the most appropriate design for his study.

Table 9: The 9 Classification Criteria for Research Designs

Classification Criteria	Design Variants
1. scientific theoretical approach of the study	quantitative, qualitative, or mixed methods study
2. knowledge objective of the study	- basic research study - applied research study a) independent research study (non-commercial) b) contract research study (commercial)
3. subject of the study	- empirical study a) original study b) replication study - methodological study - theoretical study, research/literature review a) review of research b) meta-analysis
4. data basis for empirical studies	primary, secondary, or meta-analysis
5. epistemological interest in empirical studies	exploratory, population descriptive, or explanatory study
6. formation and treatment of study groups in explanatory studies.	- experimental study ("experimental study," "true experiment") or randomized controlled trial ("RCT") - quasi-experimental study or non-randomized controlled trial (NRCT) - non-experimental study
7. place of investigation in empirical studies	laboratory or field study

8. number of study time points for empirical studies.	<ul style="list-style-type: none"> <li>- (quasi-)experimental studies with and without repeated measures</li> <li>a) (quasi-)experimental study without repeated measures</li> <li>b) (quasi-)experimental study with repeated measures</li> <li>- non-experimental studies with and without repeated measures</li> <li>a) cross-sectional study</li> <li>b) trend study</li> <li>c) longitudinal study</li> </ul>
9. number of subjects in empirical studies	<ul style="list-style-type: none"> <li>- group study</li> <li>a) sample study</li> <li>b) population study</li> <li>- single participant study</li> </ul>

Source: own illustration but in the style of Döring and Bortz (2016, 183)

By referring to Döring and Bortz (2016, 184–216), the nine characteristics are presented, and the applied design variant in this dissertation is discussed.

First, a mixed-methods approach is applied as a pre-study model, which means that a qualitative method precedes a quantitative method. Thus, results from the first partial study can, for example, be statistically tested with a bigger sample size in the second partial study. Therefore, the qualitative approach aims to develop an efficiency determination model. In contrast, the quantitative approach is deemed to test the developed model and hypotheses and determine an efficiency potential benchmark across the data sample of employees in marketing and sales. The following table provides an overview of the differentiations between qualitative, quantitative, and mixed-methods approaches.

Table 10: Qualitative, Quantitative and Mixed-Methods Approach

	<b>Examination Subject</b>	<b>Data Collection</b>	<b>Sample Size</b>	<b>Data Analysis</b>
<b>Qualitative</b>	open research questions	unstructured or semi-structured method	low	interpretative
<b>Quantitative</b>	theoretical research hypotheses	structured method	high	statistical
<b>Mixed-Methods</b>	Combination of both qualitative and quantitative, which are based on each other			

Source: own illustration based on the information of Döring and Bortz (2016, 184–185)

Second, there is a differentiation between basic and applied research studies. While the former targets scientific knowledge production, the latter fosters problem solutions with practical relevance. This dissertation focuses on providing a practical model for effective application in non-commercially driven companies and an independent study of the researcher. Third, it is an empirical study to solve a research problem regarding content based on new data collection and analysis in the form of an original study. Fourth, the data basis refers to the primary analysis. Due to economic research reasons, the sample size is typically not very big since the data must be collected new. An advantage of this approach, which is also the driving factor in this study, is that individual and specific hypotheses can be tested in the context of task automation, also proposed by Autor (2013), already presented in 2.2.3.3. Fifth, empirical studies can be distinguished between three groups, explorative, explanative, and descriptive, according to the desired gain in knowledge. Since the target of the qualitative study is to develop new knowledge regarding an efficiency determination model and correlating hypotheses, the epistemological interest is an explorative study. They are often interpreted as less structured qualitative studies, such as interview studies, as this approach is open to unexpected findings. Nevertheless, since the research design is embedded in a mixed-methods approach, the quantitative study should examine the created theory and hypotheses according to their validity, which is described as an explanative study. Sixth, and regarding the quantitative explanatory study, the formation and treatment of study groups are conducted as non-experimental studies without repeated measures. Non-experimental studies compare groups according to their differences in the dependent variables. There is no randomization and no active experimental manipulation. Therefore, non-experimental studies refer to *ex post facto* studies because effects are only observed (or analyzed in this context) after data collection. Seventh, the qualitative and quantitative methods are conducted as field studies, characterized as a place of investigation when interviewing respondents in the domestic environment. There are no disruptive factors that potentially must be eliminated, such as in, e.g., a laboratory study. Eighth, the number of time points for empirical studies is focused on a single point in time in which the qualitative method is applied, the respective efficiency potential calculation model developed, and the quantitative study in the form of a sample group built upon this model. With a cross-sectional study, the

sample is evaluated at a specific point in time and compares cohort groups of the variables which are causality-wise difficult to interpretate. With regards to the targeted efficiency determination model with human labor and digital technologies as work input factor, the capabilities of digital technologies can be further developed in one or two years leading to a possible expiration of the model in this study. Also, the efficiency benchmark derived from the model as result from the quantitative study, is only valid for the time of the data collection. Ninth and ultimately, and already briefly touched through point eight, the number of subjects in empirical studies is determined as group study with a sample from the population. Since the target group for the qualitative study are managers and decision-makers in the field of marketing and sales, and the target group for the quantitative study are employees from the same field, the total population is impossible to fully cover within the scope of this study.

### **3.1.2 Research Questions**

As presented in the framework conditions to identify and calculate efficiency potentials (main chapter 2), several models from existing literature referring to the task approach are tailored and focused on certain labor market developments. A lack of exploration is revealed when focusing on individual business units and attempting to calculate firm performance measurements. Derived and according to the theoretical considerations from the previous chapter, the mixed-methods design is utilized to answer the three research questions. Table 11 allocates the individual research methods (qualitative and quantitative) to the research questions, including the dissertation's respective chapter, which is conducted as the stressed mixed-methods approach.

Table 11: Research Method Allocation to Research Question

No.	Research questions	Research Method to answer the research question	Chapter reference
RQ1	To what extent can efficiency potentials be quantitatively calculated by empirical modeling and low-value activities conceptually identified and delimited?	Qualitative	3.2
RQ2	How far does digital transformation propel companies to fully exploit their efficiency potential to fulfill the requirements of new value propositions?	Quantitative	3.3 – 3.5
RQ3	Which tasks in marketing and sales are determined as low-value activities causing efficiency potentials?	Quantitative	3.3 – 3.5

Source: own illustration

While the research questions are supposed to be answered in different chapters, they are also embedded in different research methods. Research question 1 follows the target to counteract the research gap of missing task model details by applying a qualitative method. Research questions 2 and 3 are tackled with a quantitative method which builds upon the developed qualitative model. The following sub-chapters enlighten the qualitative and quantitative research procedures.

## 3.2 QUALITATIVE CONTENT ANALYSIS

The existing literature and theories strongly tailor their models to certain labor market developments, and it also reveals a lack of focus and exploration regarding task modeling within business units. Concentrating on, e.g., solely one specific business unit could allow a very detailed approach and analysis on a single task level. Also, the current approaches in the literature refer to labor market developments and always try to analyze an entire labor market universe, which, therefore, might be an indication that the applied task indices are not detailed enough or even not applicable when transferring a similar idea of concept to performance measurements. The qualitative study aims to develop an efficiency model on task level tailored to marketing and sales.

The following presentation of the qualitative study has already been conducted by Goldmann and Knoerzer (2022) and is presented in more detail within this dissertation.

### 3.2.1 The Method

The applied qualitative content analysis follows the procedure of Mayring and is utilized to answer research question 1.<sup>63</sup> According to Mayring (2015, 61), the strength of the qualitative content analysis against other interpretative methods is shaped by a process model and the disassembly of the single interpretation steps.<sup>64</sup> That makes the whole approach comprehensible, intersubjective verifiable, therefore transferable to different objects, and usable for others, resulting in a scientific method. The applied procedure is in the style of Mayrings' proposed general content analysis process model, which respectively requires an adjustment to the research material and research question (Mayring 2015, 61–62). The following table illustrates the process model, which is adjusted to the dissertation goal and serves as a guide to steer through this chapter. The explanation of why the

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<sup>63</sup> RQ1: To what extent can efficiency potentials be quantitatively calculated by empirical modeling and low-value activities conceptually identified and delimited?

<sup>64</sup> For further related international references see also Mayring (2014) and Mayring (2022).

procedure follows an inductive category development procedure is stressed in the following sections.

Table 12: Adjusted General Content Analytical Process Model

No.	Sub-steps of the process model	Chapter reference
1	Determination of the material	3.2.2
2	Analysis of the situation of origin	3.2.2
3	Formal characteristics of the material	3.2.2
4	Direction of the analysis	3.2.2
5	Theoretical differentiation of the question	3.2.2
6	Determination of the appropriate analysis technique, determination of the concrete process model, determination and definition of the categories/category system	3.2.2
7	Definition of the units of analysis	3.2.2
8	Application of the selected process model and analysis process (inductive: Mayring (2015, 86)) Analysis step 1: Determination of the material and target of the analysis Analysis step 2: Determination of the selection criterion and abstraction level Analysis step 3: Material processing, category formulation, subsumption, or new category formation Analysis Step 4: Interpretation and analysis	3.2.3
9	Compilation of the results and interpretation in the direction of the research question	3.2.4
10	Application of the content analysis quality criteria	3.2.5

Source: own illustration but in the style of Mayring (2015, 62)

In this dissertation, the analysis steps for inductive content analysis are summarized in total four steps. Within the category development procedure, Mayring integrates two further analysis steps after analysis step three. First, the “revision of the categories after about 10-50 percent of the material”, and second, the “final material processing.” In this dissertation, these two analysis steps are covered by analysis step three and are not individually listed. The following describes the individual steps of the conducted qualitative content analysis.



### 3.2.2 Data Material Determination and Analysis Definition

#### Step 1: Determination of the material

According to Mayring, a qualitative content analysis starts with the determination of the material, followed by the description of the material, and is ultimately completed with the formulation of the questions (Mayring 2015, 54–62). This dissertation follows the proposed process model. In order to meet the requirements to answer the research questions and contribute to the state of the research, the study concentrates on expert interviews as a single source. Gläser and Laudel (2010, 111) recommend this data collection method if several different topics need to be covered, determined through the goal of the research and not the statements of the interviewees, or if certain information must be collected. The reasonability to meet this argumentation is explained more in detail in step 5, which composes the determination of the material and the research questions. Based on the theoretical considerations from the task approach and the business unit of marketing and sales, it is necessary to focus on professional experts from the respective field. Managers from marketing and sales deal daily with the digital transformation impacts and possibilities of their firms which are deemed the most relevant aspects. The combination of several aspects from leading personnel in this field can create an actual state-of-the-art model to determine efficiency potentials caused by digital transformations while also evaluating the individual tasks and putting them to the test. Therefore, senior managers in the field of marketing and sales are targeted for the aim of the study. Mayring (2015, 55) defines a model of coincidence, which requires the definition of the population, the sample size evaluation, and the sample selection. Senior managers in the field of marketing and sales describe the population, the sample size procedure is chosen according to the theoretical saturation of the provided content, and the sample selection is conducted randomly according to their job description and occupational title. After the participation agreement of the interviewees and to ensure their current proximity to a digital transformation in their work environment, it was referred to the derived definition of a digital transformation in 2.2.1.2.<sup>65</sup> Furthermore, the

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<sup>65</sup> Working definition of Digital Transformations from sub-section 2.2.1.2: “Digital transformation is concerned with the changes digital technologies can cause within a

defined entirety does not reveal any accessible information about quotas regarding, for example, age, gender, or professional experience in this field, which is therefore neglected in this sampling process.

In total, thirteen senior managers with an intense business reference to marketing and sales, including a digitalization focus, were recruited until the desired theoretical saturation was deemed achieved which resulted in a data collection period from July to November 2021. The following table provides an overview of the research participants, their branch for transparency purposes, and their current occupational title.

Table 13: Overview of Qualitative Research Participants

No.	Company Branch	Occupational Title
RP 1	Liquor Industry	Head of Marketing
RP 2	Tobacco Industry	Sales Director
RP 3	Discount Retail Trade	Director HR, Finance & Procurement
RP 4	Food & Beverage Trade	Director of Sales, Convenience
RP 5	IT Consulting	Head of Marketing
RP 6	Liquor Industry	Head of Sales
RP 7	Recruiting Agency (focus: technology)	Regional Director
RP 8	Tobacco Industry	Manager Brand Marketing & Content
RP 9	Pharma Industry	Sales Director Mass Market & Expert DACH
RP 10	Diversified Conglomerate	Head of Promotion Factory Automation
RP 11	Software Service	Regional Sales Director
RP 12	Pharma Industry	Area Marketing Director DACH
RP 13	Brand Experience Agency	Head of Digital Transformation & Processes

Source: own illustration

The data collection with a semi-structured interview guideline covers the topics of human labor and digital technology tasks, which tasks are performed in marketing and sales, quantification possibilities of the tasks as well as possible performance impacts by digital technologies (see a detailed description of the interview guideline in step four and the complete interview guideline in appendix 6). Consequently, the agenda of the guideline dominates the procedure of conservation, which also influences the content analysis (Kuckartz 2010, 49). The

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company's business model, which result in changed products or organizational structures or in the automation of processes."

sole emphasis is on the business unit of marketing and sales, while the companies' branches have been neglected. The only evidence known about the impact of the branch which might be relevant referring to the analyzed literature is the manufacturing industry arguing that "measurement is the easiest" (Berman et al. 1998, 1273) concerning SBTC related to human labor and digital technology input, already presented in 2.2.3.1. However, a leading motivation concerning the research in this dissertation follows the approach that only if something is difficult to measure should it not remain untried.

### **Step 2: Analysis of the situation of origin**

The data material consists of the statements from the interview partners. The data collection was performed through the thirteen expert interviews who were pre-informed about the research project with the declaration of consent (regulates issues concerning data protection, the voluntariness of participation, recording of the interview, transcription of the interview, interview analysis, private storing of the interviews, and the publication of the results according to Schaar (2017)) including a description of the research (annex 4). The interviews have been executed remotely via video call, while only the spoken word has been recorded. The general approach of how potential research participants have been contacted can be found in appendix 3.

### **Step 3: Formal characteristics of the material**

After conducting the thirteen interviews, the transcription was performed via the recorded audio files, and the spoken word was transformed into written content in the Microsoft Office software "Word." Furthermore, the transcripts have been adjusted grammatically and according to the sense of purpose to be able to analyze the content. The analysis has been conducted with the software MAXQDA for qualitative data analysis. Also, the protocol rules must be defined. The transcription in this dissertation follows the rules of a "clean read or smooth verbatim transcript," according to Mayring (2015). The transcription of the interviews is done word by word, but potential utterances are cleared following a coherent and easily understandable text, which nevertheless represents the original wording without dialect or shortcut articulation. To counteract the risk of possible misinterpretation of the interviewees' sometimes informal language, the researcher made the transcriptions himself.

**Step 4: Direction of the analysis**

The experts were interviewed about the five main categories of the interview guideline (annex 5):

1. Tasks in the field of marketing and sales (2 questions)
2. Low-value versus high-value tasks (2 questions)
3. Impact of digital technologies on tasks and human labor (6 questions)
4. Performance measurement calculations (2 questions)
5. Full potential exploitation (2 questions)

The approach of a semi-structured guideline was used to be able to flexibly intensify the conversation if the interviewee emphasized relevant aspects of the study. After the first two interviews, two questions of the initial semi-structured interview guideline became obsolete since either those questions had already been answered within the course of other questions or did not make sense to ask anymore within the course of the conversation. Therefore, questions 3a and 3b from interview guideline 1 have been merged to only one question and moved from category three to category one. Consequently, within interview guideline 2 (annex 6), category one has three questions instead of two, and category three has four questions instead of six. The analysis's general direction, however, follows the motivation to capture the treated subject of the text. The next step describes the theoretically derived research question, representing the text's main subject to be analyzed.

**Step 5: Theoretical differentiation of the question**

The goal of the data analysis question is based on the research questions that instructed the analysis process. The main concern is creating a tailored marketing and sales model to detect efficiency potentials caused by low-value activities driven by digitalization possibilities within a digital transformation. Mayring (2015, 59–60) emphasizes the necessity to derive the question of the analysis from theoretical considerations of existing literature. He also argues that this approach is often questioned caused of the fact that mental proximity to theories distorts the researcher's point of view, but theory-based only means to progress in knowledge.

**Step 6: Determination of the appropriate analysis technique, determination of the concrete process model, determination and definition of the categories/category system**

Determining categories in qualitative content analysis is one of the most important aspects since the material should be evaluated systematically (Mayring 2015, 51). Kuckartz (2010, 58) argues that there is no consistent definition that regulates the creation of categories, and he defines it as a word, several words, or a short sentence that the text editor determines. The qualitative analysis in this dissertation contains an inductive approach, which means that the categories are only created within the course of the analysis without any reference to existing theories (Mayring 2015, 85). The transcribed text serves as the basis to further develop and improve the category system (Kuckartz 2010, 60). Literature, however, has disunity about several different qualitative research methods, even if all approaches follow a similar process scheme but only differ regarding category creation (Schreier 2014). The approach, according to Mayring, allows an unbiased inductive data analysis while being shielded from distortion from the related literature. The sole consolidation of codes from raw material enables the research to leverage marketing and sales characteristics specifically since the existing models in the literature are built upon the urge to explain the labor market developments.

Consequently, a deductive approach would distort the category creation and miss the opportunity to create a customized model for performance management focusing on efficiency potentials in a single business unit. Mayring also distinguishes between three primary forms of interpretation and data analysis, summary, explication, and structuration (Mayring 2015, 68). The former refers to inductive category creation and finds application in this dissertation by summarizing the essence of the transcripts. The analysis of the material consists of only one step, the analysis of the content. In each case, the entire text is considered. The inductive category creation is preferred in this dissertation since the presumptions and subjectivity of the researcher could distort the analysis procedure (Mayring 2015, 86). Mayring furthermore refers to the approach of grounded theory where the analysis procedure is described as open coding (Strauss 1987; Strauss and Corbin 1990).

**Step 7: Definition of the units of analysis**

To ensure a consistent coding procedure, Mayring proposes the determination of a coding, context, and analysis unit (Mayring 2015, 61). The coding unit determines the smallest material component for a category, the context unit regulates the biggest material component, and the analysis unit specifies which text parts can be analyzed, respectively, since all thirteen interviews are evaluated with that approach. For this study, the following units are determined:

- Coding unit: one word
- Context unit: One or more sentences in one paragraph
- Analysis unit: the entire material, since inductive category creation is based on all interviews (Mayring 2015, 88)

According to the process model of Mayring, paraphrases with the same meaning are discarded, which is not applied during the research analysis. It is assumed that important information might get lost, and the transparency decreases if the origin of each statement is not ensured. Consequently, the selected approach starts with reviewing the material, followed by the inductive category creation, and is completed by merging the same paraphrases in one category.

**3.2.3 Analysis and Inductive Category Creation****Step 8: Application of the selected process model and analysis process**

The process model (defined in step 6) emphasizes the inductive category creation and follows the analysis technique of summarizing the material. The application of the model requires four analysis steps described as follows.

*Analysis step 1: Determination of the material and target of the analysis*

According to the general content analytical process model of inductive category creation, the first five steps compiled the determination of the material, the analysis of the situation of origin, the formal characteristics of the material, the direction of the analysis, and the theoretical differentiation of the question (chapter 3.2.2) which represent analysis step 1 for inductive category creation.

*Analysis step 2: Determination of the selection criterion and abstraction level*

Based on analysis step 1, the first and general direction of the qualitative content analysis is already introduced. The semi-structured interview guideline

was instructed based on research question 1, the theory-based differentiation, and the selection of the research instruments. Within the course of inductive category creation, Mayring (2015, 86) describes the mandatory definition of a theory-based selection criterion that follows the direction of the analysis. This criterion regulates that only those parts of the text are considered relevant to the research question.

After the first review of the material conducted simultaneously with the first category creation, the categories require an abstraction level, and it regulates the understanding of a category and the definition of a category in its formulation (Mayring 2015, 88). Developing an inductively created analysis grid of the selection criteria and categories ensures the proper application of the categories' allocated selection criteria to review the data material further. This coding guide is enlightened and referred to in more detail within this section. With the ongoing research process, the category system is tested according to practicability and further developed once new findings are identified (Kuckartz 2010, 87).

*Analysis step 3: Material processing, category formulation, subsumption or new category formation*

The analysis of the entire material is conducted according to the analysis step 1 and 2, while the first review and the analysis (inductive category creation) are performed simultaneously. Every relevant text passage for the analysis is allocated to a category. Since the already existing literature (see 2.2.3 – 2.2.5) based on the ALM hypothesis is intensively leveraging task categories to operationalize their models, one of the main targets of the analysis is to identify the most relevant categories in the field of marketing and sales, which are tailored to the performed tasks. Also, as already briefly introduced, the two analysis steps of revising the categories after about 10-50 percent of the material, followed by the final material processing, are included in this analysis step and not listed individually.

*Analysis step 4: Interpretation and analysis*

In the last analysis step, the inductive categories are interpreted, analyzed according to their intentional meaning, and ultimately reasonably sorted and arranged to create value for the analysis. Therefore, the following two tables illustrate the final presentation of the inductively created categories to develop an efficiency computation model and how to organize them in relation to each other.

Table 14: Qualitative Analysis – Inductive Category Development 1

Category (level 1)	No. of statements	Category (level 2)	No. of statements	Category (level 3)	No. of statements
Office Work	2	Manual	5	Input System processing Output generation Output control	5
		Cognitive	6		8
		Digital	2		5
Customer Interaction	5	Physical	7	Output application	2
		Remote	6		3
		Digital	9		4

Source: Goldmann and Knoerzer (2022, 4)

Table 15: Qualitative Analysis – Inductive Category Development 2

Category (Level A)	No. of statements	Category (Level B)	No. of statements	Category (Level 2)	No. of statements
Complementation	7	Amplification	4	Physical, Remote, Digital	3
				Manual	4
				Cognitive	5
				Digital	12
		Acceleration (shortened intervals of task delivery)	6	Physical	3
				Remote	0
				Digital	3
				Manual	3
Elimination	3	Automation	4	Cognitive	11
				Digital	9
				Physical	2
				Remote	1
				Digital	2
		Outsourcing/ self-service	1	Physical	6
				Remote	4
				Digital	10
				Manual	0
				Cognitive	1
		Digital	0		

Source: Goldmann and Knoerzer (2022, 5)



In the following, each analysis step leading to the arrangement of the categories is explained in detail, including exemplary paraphrases from the data material. This presentation also represents the coding rules and analysis grid of the categories. Verbatims are only used if the exact wording is either already very precise or influences the meaning. The inductive categories' interpretation and analysis are always presented using the same logic. First, the category level is explained according to the intended meaning. Second, the categories within the respective category levels are listed and presented individually. Third, each category is described according to the understanding and definition within the dissertation (coding rule). Fourth, an exemplary research statement (anchor example) is chosen from annex 7 (overview of the extracted statements of the interviews) representing the category. Fifth, the chosen research statement is interpreted and integrated into the overall context of the dissertation and the analysis. Also, references to further research statements from appendix 7 are added to provide a holistic picture of the individual-created categories.

### **Category Level 1**

The data material allows the determination of two superordinated categories, which generally distribute all tasks performed in marketing and sales between office work<sup>66</sup> and customer interaction.

#### Office Work

The first superordinated category, office work, defines all efforts which are performed administratively without direct customer orientation.

*Marketing and sales must be considered differently because it is two areas. Marketing is directed inwards, preparatory. (Interview statement no. 1)*

This statement already indicates the creation of two superordinate categories, while, nevertheless, in this dissertation, office work does not necessarily mean marketing. Although the research participants refer to marketing as a preparatory effort<sup>67</sup> for sales activities, it remains a matter of defining where to draw the line between clearly defined marketing and sales tasks.

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<sup>66</sup> Exemplary literature refers mainly to white collar jobs for office work.

<sup>67</sup> Interview statement no. 2

### Customer Interaction

The second superordinated category, customer interaction, defines all tasks in marketing and sales which are orientated toward the customer

*Customer interaction can be seen as a ripple effect from throwing a stone into water. The created ripples are provided by technology to have an impact on a more lasting basis. (Interview statement no. 5)*

With this statement, the research participant refers to the ongoing and ever-increasing customer penetration with different efforts complemented by digital technologies to strengthen the effects on a lasting basis.<sup>68</sup> Nevertheless, the research participants emphasize that it is about the correct orchestration of tasks toward customers and not just replacing every single task.<sup>69</sup> They even propose three possible disciplines that must work as an interplay or hybrid model to maximize the effect on the customer, physical, remote, and digital tasks.<sup>70</sup>

### **Category Level 2**

Since the tasks have been generally distinguished between office work and customer interaction, the execution of the tasks must be defined according to the actual performing force, which is considered differently for both superordinate categories. Therefore, six different subcategories could be found in category level 2, three each for office work and customer interaction.

### Manual

Manual tasks refer to the superordinated category of office work and are defined by a physical task deployment by human labor.

*Preparatory work before getting in touch with the customer is performed differently by many companies, which is still manual labor at the moment. If the human factor is involved, it is time-consuming work, and the error rate increases. (Interview statement no. 10)*

The statement refers in its intentional meaning to all efforts human labor is performing by using their hands, whether creating content with or without the help of digital technologies. However, it is allocated to the context of office work. Furthermore, manual work can also be seen as mandatory basis tasks on which

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<sup>68</sup> Interview statement no. 4

<sup>69</sup> Interview statement no. 3

<sup>70</sup> Interview statement no. 6, 7

more strategic tasks follow.<sup>71</sup> Once a particular topic is understood, data can be inputted into digital interpretative tools.<sup>72</sup>

### Cognitive

Cognitive tasks are also allocated to office work and are defined as creative work tasks by human labor.

*The main characteristic of marketing is the aspect of creativity. (Interview statement no. 15)*

The research participant formulates the principal task execution in marketing as being especially creative<sup>73</sup> in the form of strategic tasks<sup>74</sup>. Also, cognitive tasks cover the required flexibility of human labor to put the customer at the center, depending on the current demands and needs.<sup>75</sup> For the dissertation, it is understood as all tasks which do not capture manual efforts but are still performed by human labor. This category strongly refers to one of four aspects concerning partial productivity from Sumanth (1998), as presented in 2.1.2. It emphasizes measurement difficulties for non-direct labor such as clerical and professional white-collar occupations who perform tasks intensive in thinking and creativity, especially when the created output is difficult to operationalize, accompanied by a time-lapse between the input and output.

### Digital

The last subcategory of office work is defined as digital tasks, and the understanding is summarized as automated task part completion by digital technologies without any human labor-related input.

*The human factor still dominates the sales department, but particular tasks can already be automated in marketing. (Interview statement no. 19)*

Again, in this statement, the respective research participant strongly differentiates between marketing and sales, but the primary outcome from this category is a possible automated execution of certain tasks or parts of a task without any human

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<sup>71</sup> Interview statement no. 8

<sup>72</sup> Interview statement no. 9, 11

<sup>73</sup> Interview statement no. 14

<sup>74</sup> Interview statement no. 17

<sup>75</sup> Interview statement no. 12, 13, 16

labor input. Automated output is emphasized once input can be provided in a digital environment.<sup>76</sup>

### Physical

Physical tasks can be allocated to the superordinated category of customer interaction and are defined as one-to-one interaction on-site at the customer performed by human labor.

*One possibility to define a task is a physical visit to the retailer. (Interview statement no. 20)*

The interview partner listed this subcategory as one of the possibilities for engaging with a customer. Additionally, the research participants mention that the first<sup>77</sup> but also lasting contact points with customers should be personally and on-site to steer agreements.<sup>78</sup> Exemplarily, negotiation and customer contracting are excluded from the possibility of digitalization because of the required personal contact,<sup>79</sup> but especially in sales, the conversation must be tailored to the person in front of somebody.<sup>80</sup> However, for such task deployments, it is also possible to determine the return on investment in case of task digitalization, and the time invested by human labor disappears.<sup>81</sup>

### Remote

The subcategory of remote tasks is a further possibility to engage with the customer by performing the one-to-one interaction off-site besides the subcategory of physical tasks.

*Much face-to-face conversation is being shifted to the virtual space, which must be handled differently. (Interview statement no. 27)*

The research participants, in this case, refer mainly to the most current crisis of Covid-19, which acted as a booster to shift many of the physical on-site interactions to the virtual space enabled through digital technologies.<sup>82</sup> One research participant

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<sup>76</sup> Interview statement no. 18

<sup>77</sup> Interview statement no. 22

<sup>78</sup> Interview statement no. 23

<sup>79</sup> Interview statement no. 24

<sup>80</sup> Interview statement no. 25

<sup>81</sup> Interview statement no. 21

<sup>82</sup> Interview statement no. 28, 31

argues that a physical interaction must always proceed with a remote interaction,<sup>83</sup> while another firmly believes that the first point of contact should be via phone.<sup>84</sup> Important to mention is that different branches and objectives require different procedures, but as already stated, physical tasks in the sales context also depend on the individual in front of somebody when conducting a remote task.<sup>85</sup>

### Digital

Lastly, the subcategory digital also finds application in the superordinated category of customer interaction besides office work. It is described as tasks being executed in a digital environment. Even if this subcategory is named the same in both categories, it serves a different purpose for task deployments in marketing and sales since customer interactions solely emphasize engagement towards the customer. At the same time, office work can already contain the digitization of data.

*Digital technologies help to follow-up on particular topics with the customer. (Interview statement no. 35)*

The special emphasis in this context is described as the ever-increasing customer and market penetration. The utilization of digital technologies enhances the communication and engagement possibilities with the customer without being either physically or remotely present.<sup>86</sup> One research participant limits the orchestration of tasks to salesforce-related tasks, excluding headquarter related tasks.<sup>87</sup> An example of digitally engaging with a customer is the provision of a digital platform. Specific simple tasks are outsourced to the customer who can perform them digitally, provide proof of performance with, for example, a picture, and get remunerated.<sup>88</sup> It also contains automatically generated offers, social media content, or emails.<sup>89</sup> Ultimately, the benefit of digitalized interactions with the customer allows a simple quantification of the effort and individual customer penetration.<sup>90</sup>

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<sup>83</sup> Interview statement no. 26

<sup>84</sup> Interview statement no. 30

<sup>85</sup> Interview statement no. 29

<sup>86</sup> Interview statement no. 32, 36

<sup>87</sup> Interview statement no. 34

<sup>88</sup> Interview statement no. 37

<sup>89</sup> Interview statement no. 38, 39, 40

<sup>90</sup> Interview statement no. 33

### Category level 3

This other category level helps to slice an entire activity in marketing and sales into single tasks, which, in turn, can be allocated to the subcategories of category level 2 of manual, cognitive, and digital for office work and physical, remote, and again digital for customer interaction.

#### Input

The first task in an entire marketing and sales activity is always input. The provision of information allows the creation of output, or if digitized, proceeds with processing information. Therefore, the input can be distinguished between system input and non-system input. System input is defined as feeding a system with data, and non-system input as working with analog data.

*For every task, it is crucial to understand what the input is. Concerning digitalization, it is important to understand what kind of data is fed to the program. (Interview statement no. 41)*

As already mentioned in the previous paragraph, the research participants emphasize that it is essential to understand what is required as input or, in terms of digitized information, what data must be fed to the system to receive the desired outcome.<sup>91</sup> Examples of input digitalization are tools to plan, monitor, and execute marketing campaigns, administer customer inquiries,<sup>92</sup> and manage order processes.<sup>93</sup> Once data is fed to the program, certain digital technology capabilities can also perform predictions to a certain extent.<sup>94</sup>

#### Input Processing

If the data are digitized and fed to a system, the respective digital technologies, depending on their capacity, can process data, defined as managing available mass data to reduce complexity.

*Interconnected digital data processing allows a better understanding and utilization of information. (Interview statement no. 52)*

This statement emphasizes the interconnection of digital systems and a better understanding of information, which in the context of marketing and sales, further

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<sup>91</sup> Interview statement no. 42

<sup>92</sup> Interview statement no. 43

<sup>93</sup> Interview statement no. 44

<sup>94</sup> Interview statement no. 45

research participants also referred to the more profound understanding of customer profiles.<sup>95</sup> It also increases the pace of data mining to approach the customer early in the research phase.<sup>96</sup> Also, the digitized processing of data allows a reduction of the ever-increasing level of complexity of data.<sup>97</sup> It can be seen as entirely digitized data maintenance previously done manually.<sup>98</sup>

### Output Generation

Once the input has been provided (and if digitized input, the data processing is completed), the next task in an activity in marketing and sales is the generation of output, defined as information made actionable through decisions or information which is actionable itself to draw conclusions.

*Information is created digitally but still handled manually, assessed, and combined with further information to draw conclusions and make decisions. (Interview statement no. 56)*

The research participant emphasizes with the upper statement a particular categorization of tasks that input is always provided digitally and implies that output development is performed cognitively. However, in case the input is managed manually without feeding any system with information but working with analog data, the output must not solely be a cognitive task but also digitally or manually developed. All in all, it results in information translated into output which is made actionable by decisions or actionable by itself.<sup>99</sup> No matter whether the data input is provided manually or digitally, once a system is fed, it is argued that output such as automated advertising support can be drawn.<sup>100</sup> It is also assumed that possibilities will increase in the future.<sup>101</sup>

### Output Control

As soon as the output is generated, it must be controlled either cognitively by human labor or digitally, if applicable, which is defined as the verification of the actionable information or decisions drawn.

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<sup>95</sup> Interview statement no. 46, 52

<sup>96</sup> Interview statement no. 50

<sup>97</sup> Interview statement no. 48, 49, 53

<sup>98</sup> Interview statement no. 47, 51

<sup>99</sup> Interview statement no. 54, 58

<sup>100</sup> Interview statement no. 55

<sup>101</sup> Interview statement no. 57

*Digital systems should not decide on their own. Certain tasks could be omitted, and they could be valuable for support or recommendations. (Interview Statement no. 59)*

As this statement implies, digital systems might not be ready to decide on generated output but are valuable to support human labor or formulate recommendations. An example is the further qualification of generated leads.<sup>102</sup> Nevertheless, the extent to which digital technologies are allowed to decide on their own is subject to be decided by the individual responsible decision-maker, but the control of the output is mandatory.<sup>103</sup> This aspect is also emphasized by Fernández-Macías and Bisello (2020) and in one of their four critiques on the initial task approach that there is no perfect substitute between human labor and digital technologies for routine tasks. They argue that there must always be human labor behind those technologies for controlling, designing, and maintaining purpose to solve unforeseen issues. The aspect of designing can also refer to input.

#### Output Application

At this point in the activity procedure, the generated and ultimately controlled output is ready to engage with the customer, which is called the output application, defined as the implementation of an action and application of content toward customers.

*Marketing prepares content, and sales utilize this content to make sales. (Interview statement no. 63)*

The differentiation of again marketing and sales as preparatory tasks for marketing and the utilization of content for sales is an option to distinguish between the two terminologies. The output application solely concentrates on the engagement with the customer, no matter whether human labor is involved or digital technologies take over the engagement process.<sup>104</sup>

#### **Category level A**

The presented three category levels 1 to 3 majorly cover the task execution within activities in marketing and sales. To enlarge the inductive category development, the following category level A discusses the two superordinated impacts of digital technologies on the performed tasks.

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<sup>102</sup> Interview statement no. 60

<sup>103</sup> Interview statement no. 61

<sup>104</sup> Interview statement no. 62



### Complementation

In the case of digital technology applications, the first effect is described by complementation, which either means that the quality is improved or that the input of human labor decreases through the support of digital technologies. It is deemed support for human labor to simplify the work and free up resources.

*"I do not believe that we can completely replace humans. There will be certain tasks that we can certainly replace, but I believe that technology should always be complementary, a linkage of both."* (Interview statement no. 70)

As this statement emphasizes, besides complementation,<sup>105</sup> there is also the effect of eliminating certain human labor efforts. Used synonyms are support<sup>106</sup> or make life easier if applied correctly.<sup>107</sup> However, the complete elimination of human labor input is not desired, but an effective application of digital technology combined with human labor work creates a valuable combination of resources to increase efficiency.<sup>108</sup>

### Elimination

The second superordinated effect of digital technology application leads to eliminating human labor input resulting in no input.

*"It is a mixture of both. Clearly, the continued and accelerated use of digital technologies is to some extent making certain labor work redundant."* (Interview statement no. 74)

As already described for the effect of complementation, the research participants' remark also emphasizes the elimination of a healthy mixture of both, complementing human labor and eliminating specific human labor tasks to a certain extent.<sup>109</sup> One research participant also clearly underlines that it is not about eliminating low-value tasks because they are no-value tasks if they can be eliminated.<sup>110</sup>

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<sup>105</sup> Interview statement no. 66

<sup>106</sup> Interview statement no. 65, 67, 68

<sup>107</sup> Interview statement no. 64

<sup>108</sup> Interview statement no. 69

<sup>109</sup> Interview statement no. 72

<sup>110</sup> Interview statement no. 71

**Category level B**

This category section represents a subordinated group of categories next to the superordinated categories again. Complementation consists of the two possibilities of amplification and acceleration, while elimination can be distinguished between automation and outsourcing.

Amplification

As a complementary performance effect, the impact of amplification does not serve the desired increase of efficiency but effectiveness. Defined by an increase in quality, the output stays at least the same. It is nevertheless stressed in the category analysis to provide a complete picture of digitalization effects concerning an adjustment of the input, as elaborated in efficiency determination calculations.

*The application of digital technologies leads to more output over time. (Interview statement no. 78)*

In this statement, the research participant concentrates on the output by emphasizing effectiveness but not efficiency. By enhancing,<sup>111</sup> amplifying,<sup>112</sup> and supporting the business,<sup>113</sup> digital technologies successfully complement human labor work. Since this effect refers to effectiveness, it is not further detailed concerning the model development but still included.

Acceleration

The digital technology effect of acceleration targets a reduced input by human labor driven by shorter intervals of task delivery.<sup>114</sup> Consequently, human labor must employ less working time to achieve at least the same output.

*"Intervals of task delivery are shortened." (Interview statement no. 81)*

This statement underlines the increase in work pace<sup>115</sup> by achieving at least the same results but faster.<sup>116</sup> It also allows the allocation of high-value activities to the best-educated people because of freed-up resources.<sup>117</sup>

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<sup>111</sup> Interview statement no. 75

<sup>112</sup> Interview statement no. 76

<sup>113</sup> Interview statement no. 77

<sup>114</sup> Interview statement no. 83

<sup>115</sup> Interview statement no. 79

<sup>116</sup> Interview statement no. 82, 84

<sup>117</sup> Interview statement no. 80

### Automation

The digital technology effect of automation is one of the two effects of eliminating human labor input entirely. Automation describes a fully digitalized task completion without any human labor input required.

*"... technology will eliminate many tasks, and therefore jobs. So, the bigger challenge in the future will be not to find a new workforce, which is currently rather scarce, but rather to occupy the society." (Interview statement 85)*

This statement emphasizes the difficulty of occupying society because of the rapid substitution of tasks by digital technologies. Besides the effect of human labor complementation, digital technologies already take over some tasks or will in the future.<sup>118</sup> Replaceable tasks are determined as low-value tasks that save human resources, resulting in cost savings.<sup>119</sup>

### Outsourcing

Since the effect of automation concentrates on the digitalization of tasks, outsourcing is also deemed an elimination effect but is described as enabling task outsourcing towards the customer through digital technologies.

*Customer self-checkouts lead to a lower number of employees rostered for a shift to get a job done but would not increase the total number of customers. (Interview statement no. 89)*

This effect enables the customer to take over tasks and is, for example, described by self-checkouts which can replace cashiers. Such digital technologies result in fewer employees necessary because the task is taken over by the customer enabled through digital technologies. Important to mention is that this effect solely contributes to the performance-driving effect of an efficiency increase since such initiatives must not lead to an increased customer base. Also, as stressed by Brynjolfsson and Mitchell (2017), with the example of virtual sales assistants, the customer must accept task outsourcing since otherwise the task is not performed at all (see 2.2.5.3)

### **Category Level C**

This additional category level merges the digital technology effects from category B with the six subcategories of category level 2 of how tasks are

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<sup>118</sup> Interview statement no. 86

<sup>119</sup> Interview statement no. 87, 88

performed, henceforth referred to as task indices. Consequently, all six task indices are individually allocated to the four subordinated digital technology effects of amplification, acceleration, automation, and outsourcing. An exception is made for amplification since it does not refer to increasing efficiency but effectiveness. Therefore, the three task indices for customer interaction are summarized as one category to describe the digital technology effect of amplification merged with the task indices of physical, remote, and digital.

#### Amplification – Physical, Remote, Digital

Physical, remote, and digital tasks function as efforts to interact with a customer to increase the quality of the task delivery by being applied as a task orchestration.

*Face-to-face interactions with a customer are supported or facilitated by digital technologies. (Interview statement no. 92)*

This research statement summarizes physical and remote interactions as face-to-face interactions. The research participants describe that digital tasks amplify face-to-face interaction<sup>120</sup> by providing the following practical example. A business-to-business customer is expected to transfer brand-related messages on behalf of the business partner, for which education is mandatory to transmit the messages successfully. This training is not solely provided by a sales force employee of the respective company but also enhanced by self-education through digital platforms to achieve results on a longer-lasting basis, called digital tasks.<sup>121</sup>

#### Amplification – Manual

Concerning office work tasks, digital technologies improve the quality of previously solely human labor performed tasks.

*Digital technologies reduce the failure rate of human labor executed tasks. (Interview statement no. 93)*

The primary benefit of utilizing digital technologies is stressed as minimizing or eliminating the failure rate of human labor-performed tasks<sup>122</sup> or, in general, the error vulnerability of tasks if they are executed manually by human labor.<sup>123</sup>

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<sup>120</sup> Interview statement no. 90

<sup>121</sup> Interview statement no. 91

<sup>122</sup> Interview statement no. 94, 95

<sup>123</sup> Interview statement no. 96

### Amplification – Cognitive

Creative tasks are simplified by the facilitation of data and, ultimately, the provision of information digitally.

*"The ideal scenario is that the work is made much easier with tools, databases, and digital resources to support human labor." (Interview statement no. 99)*

The amplification effect not only simplifies work<sup>124</sup> but also increases the knowledge base with immediate data access<sup>125</sup> and supports the expression of ideas and the development of concepts.<sup>126</sup>

### Amplification – Digital

Besides the sole digitization of tasks, a valuable digitalization of activities increases the task quality and enhances the application scope.

*The use of machine learning and artificial intelligence allows us to anticipate and forecast certain human behavior by instantly learning which activities work the best in which segments. (Interview statement no. 103)*

It is emphasized that digital technologies make things better,<sup>127</sup> with better decisions, and to go with a more specified approach into niches<sup>128</sup> by being supported in strategic situational assessments.<sup>129</sup> As also argued by the anchoring example, the decision to apply the most successful activities also contains personalized advertisements<sup>130</sup>, an increase in the quality of predictions<sup>131</sup>, and the digital presentation of concepts to customers.<sup>132</sup>

### Acceleration – Physical

Performing physical tasks on-site at the customers requires traveling to the respective locations, which underlies a digital technology effect to increase efficiency.

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<sup>124</sup> Interview statement no. 97, 100

<sup>125</sup> Interview statement no. 98

<sup>126</sup> Interview statement no. 101

<sup>127</sup> Interview statement no. 102

<sup>128</sup> Interview statement no. 105

<sup>129</sup> Interview statement no. 110

<sup>130</sup> Interview statement no. 104, 107, 108, 109

<sup>131</sup> Interview statement no. 106, 111

<sup>132</sup> Interview statement no. 112

*Traveling to the customer can be completely substituted by making an online appointment. (Interview statement no. 115)*

Simply engaging with the customers remotely with an online appointment can eliminate the entire travel time to gain efficiency.<sup>133</sup> The Covid-19 crisis has sensitized customer acceptance towards such interaction possibilities.<sup>134</sup>

#### Acceleration – Remote

The qualitative data analysis did not allow the allocation of any statement to the category combination of acceleration and remote, which is interpreted as missing efficiency potential.

#### Acceleration – Digital

The task movement from the categories physical or remote into digital is, in the context of this dissertation, labeled as impossible since any digitalization of physical or remote tasks is either allocated to the digital technology effects of automation or outsourcing. Details are provided in the upcoming descriptions.

#### Acceleration – Manual

The increase in work pace by means of manual tasks refers to the digitalization of the manual task performance itself. The entire task must not change, but the initially provided effort can be fully digitized.

*Digital technologies allow a digital communication. (Interview statement no. 117)*

The acceleration of manual tasks can be understood as digitized communication and information sharing via digital platforms.<sup>135</sup> A further example is the digital scanning of products in retail stores.<sup>136</sup> The tasks stay in their execution exactly the same, capturing information on the sold products, but the pace is tremendously increased.

#### Acceleration – Cognitive

Expediting cognitive tasks is emphasized by knowledge management and having all information immediately at hand.

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<sup>133</sup> Interview statement no. 114

<sup>134</sup> Interview statement no. 116

<sup>135</sup> Interview statement no. 119

<sup>136</sup> Interview statement no. 118

*Digital technologies support knowledge management. The availability of a management dashboard summarizes information at an accelerated time to support human labor. (Interview statement no. 121)*

Nowadays, management dashboards summarize several digitally collected information concerning the market and customers.<sup>137</sup> At the same time, they also enable qualified personnel to draw conclusions faster<sup>138</sup> A further example is the ability to run more marketing campaigns because of the digitalized environment in which customers receive brand information.<sup>139</sup>

#### Acceleration – Digital

To achieve the efficiency potential of acceleration for office tasks, manual and cognitive tasks must be moved to this task category.

*Digitalization may further enable the conduction of more simple activities at large scale in no time. (Interview statement no. 131).*

The benefit of task acceleration through digital technologies is defined by having a higher stroke rate in the task execution driven by shortened intervals of task delivery.

#### Automation – Physical, Remote

The two human labor-related categories of physical and remote task deployments result in an efficiency potential driven by task automation.

*The corresponding return on investments can measure the change of task orchestration from physical to digital. (Interview statement no. 132).*

The relocation of physical and remote tasks in terms of full task automation and eliminating human labor input should lead to the same results measured by input versus output over two different periods, before and after task automation. It is not the idea to reduce the number of employees but to eliminate low-value tasks to increase performance.<sup>140</sup>

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<sup>137</sup> Interview statement no. 120, 122, 124, 127, 128, 129

<sup>138</sup> Interview statement no. 123, 128

<sup>139</sup> Interview statement no. 130

<sup>140</sup> Interview statement no. 133, 134

### Automation – Digital

As initially described in the previous paragraph, tasks must be moved from physical and remote to digital to profit from the digital technology effect, in this case, from the automation potential of customer interaction tasks.

*Digital platforms can be used to engage with customers at large scale permanently. (Interview statement no. 135)*

If previously performed one-to-one tasks are once prepared in digitized form and integrated into digital platforms, the customers can engage with the brand and products at any time to their full convenience. Examples are prepared forms for email send-outs<sup>141</sup>, social media channel communication, banner advertisements, and online videos<sup>142</sup>. Consequently, the time effort from the personnel who directly interacted with the customers can be entirely eliminated.

### Automation – Manual

Automating manual tasks nowadays focuses on repetitive tasks, and the task character and scope are predictable and can therefore be digitized.

*"I think people will spend less time on manual repetitive tasks and focus more on high-value or quality tasks." (Interview statement no. 104)*

Examples of repetitive tasks with a simple task structure are budget management,<sup>143</sup> shelf screening for product identification,<sup>144</sup> email send-outs, social media marketing,<sup>145</sup> ordering, and stock replenishment,<sup>146</sup> providing a recommendation about the likelihood of successfully performing a sale,<sup>147</sup> and the cleansing of databases.<sup>148</sup> An additional proposal for further capabilities is stressed as the collection of publicly accessible information.<sup>149</sup> It is generally possible to

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<sup>141</sup> Interview statement no. 136

<sup>142</sup> Interview statement no. 137

<sup>143</sup> Interview statement no. 138, 143, 151

<sup>144</sup> Interview statement no. 139, 142, 144

<sup>145</sup> Interview statement no. 140, 146

<sup>146</sup> Interview statement no. 141

<sup>147</sup> Interview statement no. 145

<sup>148</sup> Interview statement no. 147, 152

<sup>149</sup> Interview statement no. 148



define it as “tasks that do not just have a physical character are outperformed by computers.”<sup>150</sup>

#### Automation – Cognitive

Automating cognitive tasks underlies a more detailed discussion and profound development process than manual tasks. Cognitive tasks are defined as creative work tasks, which are argued as almost impossible to digitalize nowadays. *Digital technologies cannot eliminate tasks that require human interaction or creativity. (Interview statement no. 154)*

Such tasks are emphasized as strongly individual<sup>151</sup> with a focus on problem-solving.<sup>152</sup> One research participant leverages that digital technologies still require creative input by human labor<sup>153</sup>, defined as office work in this dissertation. For customer interaction tasks, negotiation, and customer contracting are deemed irreplaceable.<sup>154</sup> Basically, the creative<sup>155</sup> and strategic<sup>156</sup> aspect remains.

#### Automation – Digital

As already touched on in the description of the two previous category combinations, the transition of tasks from manual and cognitive to digital under the umbrella of task automation requires a repetitive task character, which in the end, creates an efficiency increase through the elimination of human labor input, if applicable.

*Digital technologies can automatize reoccurring reports. (Interview statement no. 165)*

This statement stresses data reports as exemplary presentations of automatable tasks. Further examples are that digital technologies can provide real customer behavior data derived from digital platforms,<sup>157</sup> analyzing pictures to capture the agreed share of shelf with the customer,<sup>158</sup> repetitive volume planning processes,<sup>159</sup>

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<sup>150</sup> Interview statement no. 150

<sup>151</sup> Interview statement no. 153

<sup>152</sup> Interview statement no. 155

<sup>153</sup> Interview statement no. 156

<sup>154</sup> Interview statement no. 158

<sup>155</sup> Interview statement no. 157, 160, 161, 162

<sup>156</sup> Interview statement no. 159, 163

<sup>157</sup> Interview statement no. 166, 169

<sup>158</sup> Interview statement no. 167

<sup>159</sup> Interview statement no. 169

data preparation through dashboard solutions,<sup>160</sup> and data mining<sup>161</sup>. Another research statement nevertheless emphasizes that their entire organization still strongly depends on personal contact and interaction,<sup>162</sup> which must be considered carefully when striving for maximized efficiency.

#### Outsourcing – Physical, Remote

Outsourcing combined with a task category mainly targets customer interaction tasks since the customers are already involved, which is not something entirely new for them to understand and learn. Also, office work tasks often cover company internal information that is not shared with customers to increase performance, such as efficiency.

*"It is becoming more and more popular and important to use every digital help you can get to outsource those low-level tasks which in the end will end up in the fact that there is not that much labor needed." (Interview statement no. 178)*

Research participants familiar with task outsourcing emphasize self-service solutions<sup>163</sup> and mention a change from push to pull.<sup>164</sup> From push to pull describes the transition from companies being eager to provide customers with information to customers requesting it themselves.<sup>165</sup> It is becoming more popular to use the help of digital technologies,<sup>166</sup> and the customer must do more parts of the job.<sup>167</sup> The ease of outsourcing simple tasks also offers freedom for the customers and good digital experiences.<sup>168</sup>

#### Outsourcing – Digital

Again, the task categories requiring human labor must be moved to the digital category to profit from the positive effect of digital technologies.

*Customers can take over the task of taking and uploading a picture which saves time for the human labor force. (Interview statement no. 184)*

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<sup>160</sup> Interview statement no. 171, 172

<sup>161</sup> Interview statement no. 173

<sup>162</sup> Interview statement no. 165

<sup>163</sup> Interview statement no. 173, 174, 175, 176

<sup>164</sup> Interview statement no. 177

<sup>165</sup> Interview statement no. 181

<sup>166</sup> Interview statement no. 178, 182

<sup>167</sup> Interview statement no. 179

<sup>168</sup> Interview statement no. 180

This statement again describes the situation of shelf agreements in retail stores. The compliance check is captured with a picture which is now performed by the customer and uploaded onto a digital platform for automated analysis.<sup>169</sup> Another option is highlighted as Radio-Frequency Identification technology to determine the product location.<sup>170</sup> Furthermore, product availability or order requests from customers can be automated via mobile applications,<sup>171</sup> chatbots can cover questions,<sup>172</sup> and data gathering in the form of lead generation is also performed by the customer.<sup>173</sup>

#### Outsourcing – Manual, Cognitive, Digital

As stated, outsourcing office work tasks is not identified as having an efficiency potential because of the task character. No reference for manual and cognitive tasks could be found, which is deemed a missing opportunity to drive efficiency. Nevertheless, cognitive tasks are strictly labeled as complicated, for example, to become automatized in the context of the other digital technology effects. Thus, the question of how far such strongly individual and creative tasks should ever be outsourced to a customer for efficiency purposes might be valid.

### **3.2.4 Summary and Interpretation of the Results**

#### **Step 9: Compilation of the results and interpretation in the direction of the research question**

Once the analysis is completed, the results are set into relation to the theoretical basis, and the empirical data material is interpreted to be able to answer the research questions. The qualitative content analysis yields in total three main findings: i) an anatomy model of a task in the field of marketing and sales, ii) a coherent efficiency determination model which incorporates the digitalization impacts of digital technologies on human labor and tasks, and iii) an efficiency computation model which originates from the first two models. The following

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<sup>169</sup> Interview statement no. 186

<sup>170</sup> Interview statement no. 189

<sup>171</sup> Interview statement no. 183, 188, 190

<sup>172</sup> Interview statement no. 185, 187, 191, 193

<sup>173</sup> Interview statement no. 192

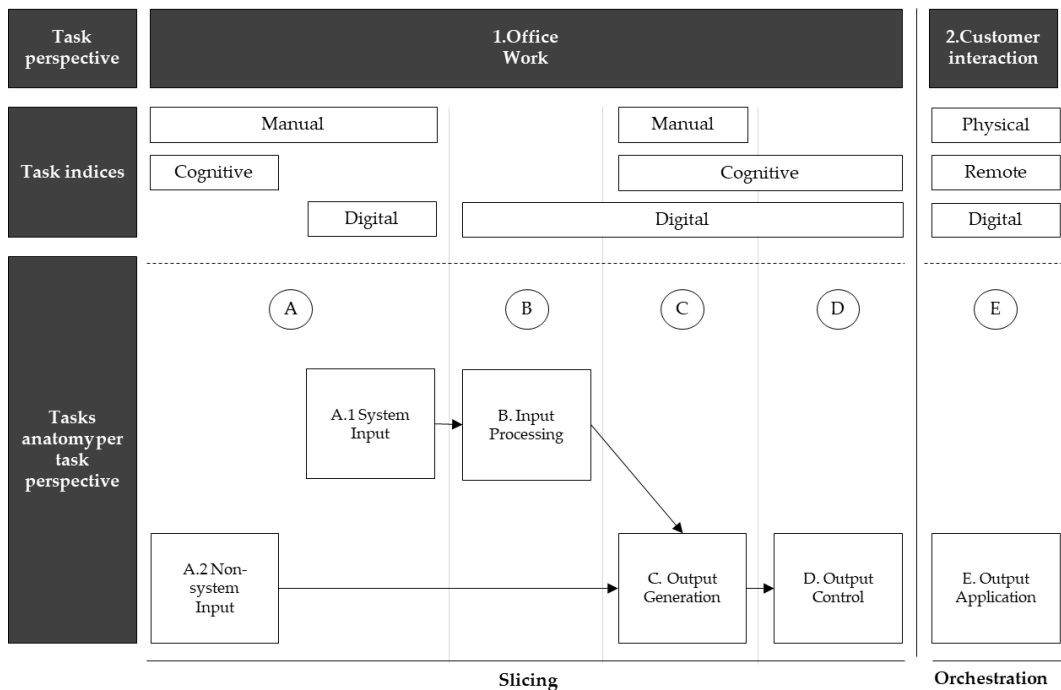
three sub-sections describe the three models, enlighten their interconnectivity, and ultimately present how to calculate efficiency potentials.

#### 3.2.4.1 *Anatomy Model of a Task*

The first main finding is the derivation of an anatomy model of a task which is illustrated in figure 6. Motivated by the work of Agrawal et al. (2018), who describe the data processing procedure of prediction machines, the anatomy model of a task follows a similar process scheme. Their model argues that digitized input is first provided, judged, and evaluated, followed by training input of the prediction process. Further on, based on the input, a prediction is made, which follows in action. Lastly, the outcome refers again to the training of the prediction machine to steadily improve the prediction process.

The anatomy model of a task represents an entire activity in marketing and sales, while the individual task anatomy steps represent single tasks. It is tailored to marketing and sales and is differentiated between three structuring elements: the task perspective, the task indices, and the task anatomy per task perspective. The first structuring element, the task perspective, distinguishes between office work tasks and customer interaction tasks (category level 1). Office work tasks are defined in their anatomy by having a chronological order described by a “slicing” of the task in different tasks anatomy steps. Customer interaction tasks are defined by being replaceable in their execution by other task indices of the customer interaction category, which serve the same task anatomy step. For office work and customer interaction, three task indices could be found: manual, cognitive, and digital for office work, and physical, remote, and digital for direct customer interaction, which represents the second structuring element of the model. Furthermore, the task indices are allocated according to their effective practicability to the third structuring element, the task anatomy per task perspective.

Figure 6: Anatomy Model of a Task



Source: Goldmann and Knoerzer (2022, 6)

The task indices are defined according to the following definitions from the data material and corresponding to Goldmann and Knoerzer (2022, 5). Office work is distinguished between manual, cognitive, and digital.

1. "Manual: administrative tasks using one's hand (e.g., data gathering and recording information);
2. Cognitive: creative strategic tasks (e.g., conceptual thinking and customer strategy development); and
3. Digital: tasks in a digital system environment (performing tasks without or less human labor required, which have previously been performed manually or cognitively)."

The task indices for customer interaction are distinguished between physical, remote, and digital.

1. "Physical: face-to-face on-site customer visit (e.g., direct human interaction);
2. Remote: virtual off-site customer interaction (e.g., direct human interaction); and

3. Digital: automated task part completion (performing tasks without or less human labor required, which have previously been performed physically or remotely)."

The task anatomy per task perspective offers five individual task perspectives to perform an entire activity. It represents the order and procedure of how a task in marketing and sales is conducted: providing input, input processing, output generation, output control, and finally, output application towards the customer. The task perspective of input is further distinguished between system input and non-system input. Unlike the referred prediction model, the input is still partially performed by human labor in the field of marketing and sales and unable to become fully digitized. The task anatomy steps are defined as follows according to the developed categories from the previous section (Goldmann and Knoerzer 2022, 6):

1. "System input: feeding a system with data (e.g., manual: data gathering and recording information);
2. Nonsystem input: working with analog data (e.g., cognitive: conceptual thinking);
3. Input processing: managing available mass data to reduce complexity (only digitally);
4. Output generation: information made actionable through decisions or information which is actionable itself to draw conclusions (e.g., analyzing data; customer strategy development);
5. Output control: verification of the actionable information/draw conclusions (e.g., controlling data and strategy validation); and
6. Output application: implementation of actions and application of content toward customers (e.g., the interaction with the customer)."

The entire model is utilized to decide whether a task is an office work task or a customer interaction task, which is possible through a task anatomy step (task operationalization (presented in section 3.3.1)). The task indices are allocated to the respective task anatomy steps A, B, C, D, and E, according to, as already mentioned, their effective practicability, which is similar to the anatomy of a task of Agrawal et al. (2018). Effective practicability is justified with the example of output control. According to its definition, it is the "verification of the actionable information/draw conclusions (e.g., controlling data, strategy validation)," which, for example,

cannot be performed manually by human labor (administrative tasks using one's hand). Output control, regarding the task completion by human labor, refers only to the possibility of cognitively performing a task anatomy step. Goldmann and Knoerzer (2022, 6) define the possible task indices allocation to the task anatomy steps as follows:

A2: "Nonsystem input can be performed manually or cognitively;

A1: System input can be performed manually or digitally;

B: Input processing can be solely performed digitally;

C: Output generation can be performed manually, cognitively, or digitally;

D: Output control can be performed cognitively or digitally; and

E: Output application can be performed physically, remotely, or digitally."

The model is illustrated in the form of a matrix. The left column refers to the three overarching structural elements, the task perspective in line one, the task indices in line two, and the task anatomy per task perspective in line three. The task perspective in line one is distinguished between office work and customer interaction. Both perspectives are presented as vertical columns and built of the different task indices in line two. The individual tasks anatomy steps (tasks in marketing and sales) are horizontally listed in line three, the task anatomy per task perspective. The tasks are therefore allocated to steps A, B, C, D, or E as single steps of an entire activity.

To summarize, an entire activity in the field of marketing and sales is represented by the anatomy model of a task. The individual task anatomy steps per task perspective represent single tasks that are distinguished between either office work or customer interaction resulting in different execution possibilities per task. To further add value to this initial effort, the second model of the qualitative research approach, the efficiency determination model, is directly built upon the anatomy model of a task, which is presented in the following. This model assigns efficiency potentials to individual tasks based on the capabilities of newly emerging technologies (digital technology impacts). In principle, an identification scheme, whether the current task execution fully exploits the efficiency potentials. If not, the conditions of the technological impacts are presented under which a single task must change to achieve a more digital character.

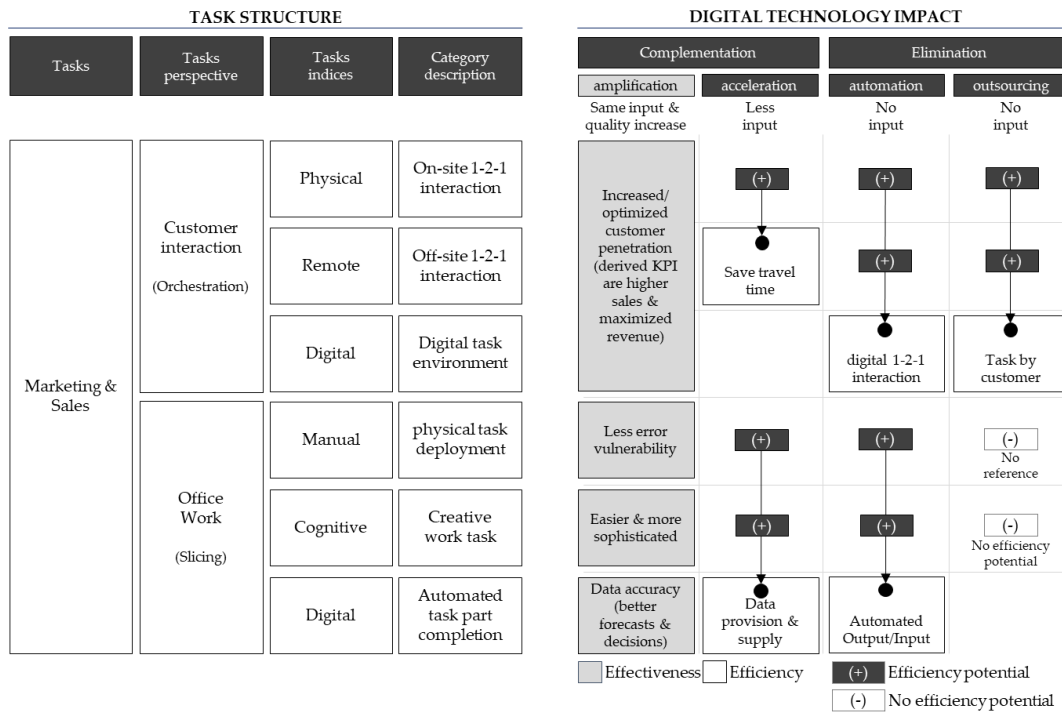
#### 3.2.4.2 *Efficiency Determination Model*

Digital technologies affect the individual task anatomy steps and influence human labor's work input. Research indicates corresponding digital technology effects which affect the task anatomy steps by influencing the human labor input. The four identified digital technology impacts (category level B: amplification, acceleration for complementation and automation, outsourcing for elimination) correspond with the task anatomy steps and can be allocated to the task indices.

According to figure 7, an efficiency potential is indicated by the symbol "plus" and the corresponding effect. The symbol "minus" represents a missing efficiency potential possibility and refers to either "no reference" (no reference found in literature and qualitative research) or "no efficiency potential" (identification as missing efficiency potential possibility through qualitative research). The arrows show into which field of the matrix the task indices must move to achieve greater efficiency. The development of the efficiency determination model is based on the created inductive categories (3.2.3) and the interview statements. Through a creative modeling approach, the following effects could be identified, also considering the effective practicability, analog to the development of the anatomy model of a task. The task structure is represented by the left part of the matrix, which is equivalent to the anatomy model of a task but in a vertical instead of a horizontal position. Solely column one is added newly and represents the effective tasks in marketing and sales. The right part of the matrix represents the digital technology impacts, which distinguishes between the two major impacts of complementation and elimination in columns. The corresponding subcategories of amplification, acceleration, automation, and outsourcing are allocated respectively. The individual task indices (column three of the left part) underly the premise to be subject to the individual digital technology impacts. For example, a customer interaction task labeled as physical is subject to hold an efficiency effect for the impacts of acceleration, automation, or outsourcing. If the task can also be performed remotely but not fully outsourced to the customer, the digital technology impact of acceleration is valid. An identical logic applies to the entire matrix. However, to determine efficiency potentials on task level, the stressed effective single tasks (column one of the left part of the matrix) must first be assigned to the task indices. As already introduced, the respective operationalization of the model is presented in section 3.3.1.



Figure 7: Efficiency Determination Model



Source: Goldmann and Knoerzer (2022, 7)

To summarize, the efficiency determination model allows the allotment of digital technology impacts to single tasks according to the anatomy model of a task, if available. Building upon the first two models, the following efficiency computation model represents the basis for classifying task anatomy steps as either subject to contain an efficiency potential or not, and if yes, which digital technology impact causes the potential.

### 3.2.4.3 Efficiency Computation Model

The efficiency computation model enables an efficiency potential calculation per individual worker in marketing and sales. By accumulating the two previously introduced models, an identified potential from the efficiency determination model is allocated to the anatomy model of a task and the corresponding task anatomy step. An identified potential is labeled with the symbol “plus,” and the absence of potentials with the symbol “minus.” In case a field in the matrix is labeled with

“N/A,” the respective task anatomy step combined with the available task indices is not applicable according to the emphasized effective practicability.

The application of digital technologies is governed by four implementation conditions based on the qualitative research results and effective practicability. The conditions of i) physical presence, ii) human interaction, iii) digital customer acceptance, and iv) repetitive and predictable task characteristics restrict the achievement of greater efficiency. They were identified by the development of the following inductive categories.<sup>174</sup>

Table 16: Qualitative Analysis – Inductive Category Development 3

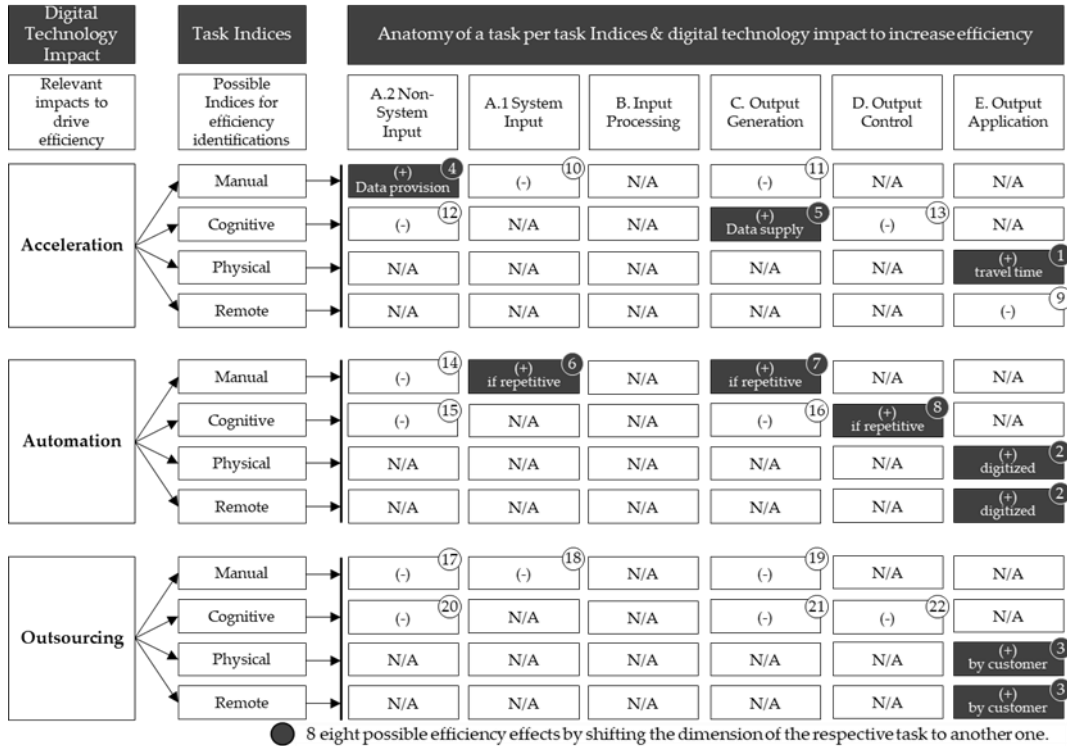
Category (level 1)	Category (level B)	Category (level 2)	Category (level 3)	Implementation Conditions
Customer Interaction	Acceleration	Physical	Output Application	Physical Presence
	Automation	Physical		Human Interaction
		Remote		Acceptance of the Customer
	Outsourcing	Physical		
Remote				
Office Work	Automation	Manual	System Input	Repetitive and Predictable
			Output Generation	
		Cognitive	Output Control	

Source: own illustration

Physical presence is defined by the imperative of being at a certain location to complete a task successfully. Human interaction is necessary to demonstrate a direct interaction between two or more individuals. Digital customer acceptance must be fulfilled to outsource a task to the customer. If a customer denies the respective shift of task indices, greater efficiency is impeded by the waiver of the task by simply not completing the tasks at all. A repetitive and predictable task characteristic describes task automation according to programmable rules (see literature building upon Autor et al. (2003) and the task approach) with the current technological capabilities.

<sup>174</sup> The reasonability to only present these four categories subsequently in the results section is justified by their purpose. The categories emphasized in section 3.2.3 serve the intention first to create the models while further narrowing and limiting them once the general understanding has been created.

Figure 8: Efficiency Computation Model



Source: Goldmann and Knoerzer (2022, 9)

By shifting the respective task dimensions, the model reveals eight possible efficiency effects in total. The four implementation conditions facilitate some of the efficiency effects, and they are only deemed as valid if the affected effects comply with them (physical presence needed: 1x effect 1, no human interaction needed: 2x effect 2, the acceptance of the customer: 2x effect 3, repetitive and predictable task characteristic: 1x effect 6, 7, 8). For example, manual system input is solely deemed as efficiency potential for the digital technology effect of automation if the task characteristic is labeled as repetitive and predictable. The model incorporates the assumption that an increase in efficiency can be achieved once the respective tasks are allotted to one of the eight efficiency potentials resulting in accelerated, automated, or outsourced input by enforcing the application of digital technologies. Therewith, the three digital technology impacts serve in the overall equation as further itemization elements. The task dimensions are distinguished between tasks representing an efficiency potential (EPT) or not representing an efficiency potential (NEPT). EPT refers to the numbered efficiency potentials from

1 to 8, and NEPT to the non-efficiency potentials numbered from 9 to 22. The mentioned task labeling as task indices solely illuminates how the tasks are conducted. The tasks need to be connected to the available task anatomy steps of the anatomy model of a task to provide a basis for task operationalization. As presented in section 2.1.3, efficiency is preferably associated with the coefficient of time (Globerson, 1985). Therefore, the efficiency effects in this model calculate the delta of the remaining input time once the shifts to more efficient task indices have been successfully conducted. Since the model's target is the presentation of a percentual value, the remaining input time must be divided by the previously invested time. The eight following presented efficiency potentials effects are distinguished between customer interaction (EP1-EP3) and office work (EP4-EP8) according to the understanding of Goldmann and Knoerzer (2022, 10):

**“Customer Interaction:**

EP1 - Acceleration: shift from physical to remote to reduce the input of human labor by saving travel time. Only possible if the respective task doesn't necessarily require physical presence.

EP2 - Automation: shift from physical or remote to digital to eliminate the input of human labor by automatically providing services and products to the customer. Only possible if the respective task doesn't necessarily require human interaction.

EP3 - Outsourcing: shift from physical or remote to digital to eliminate the input of human labor by assigning the task to the customer. Only possible if the customer accepts the conduction of the respective task himself or herself in a digital environment.

**Office Work:**

EP4 - Acceleration: shift from manual nonsystem input to digital system input to reduce the input of human labor by digitally transferring and providing data and information to several recipients. Since the efficiency potential effect refers to accelerated input (less time spend for performing tasks within an entire activity in marketing and sales), the efficiency gain can't directly be associated with the worker input of time. It requires the determination of an acceleration effect about how much the worker input can be reduced. Therefore, the acceleration is deemed as  $x \dots$  and must be defined individually (see also EP5).

EP5 - Acceleration: shift from cognitive output generation to digital output generation to reduce the input of human labor by ensuring relevant digital data supply including data processing for tailored data preparation, for example, decision-making. (As elaborated in EP4, the acceleration effect is deemed as x.)

EP6 - Automation: shift from manual system input to digital system input to eliminate the input of human labor by automatically translating previously generated output into new input. Only possible under the condition of repetitive and predictable task characteristics.

EP7 - Automation: shift from manual output generation to digital output generation to eliminate the input of human labor by automatically translating the previously generated output into new input. Only possible under the condition of repetitive and predictable task characteristics.

EP8 - Automation: shift from cognitive output control to digital output control to eliminate the input of human labor by automatically translating the previously generated output into new input. Only possible under the condition of repetitive and predictable task characteristics.”

As argued, the remaining input time represents the coefficient of time of human labor input within the final efficiency computation equation, which is subject to be substitutable by digital technology adoption. The following efficiency computation equation reveals the total efficiency potential by dividing the efficiency potential dimensions (EPT) by the sum of all tasks performed (EPT + NEPT). If the efficiency increase (EI) value results in a positive number at t+1, an effective efficiency increase has been achieved.

Formula 16: Efficiency Potential Computation

$$EP = 1 - \frac{EPT}{EPT + NEPT}$$

Source: Goldmann and Knoerzer (2022, 10)

If  $EI \neq 0$  at t+1, there is no efficiency potential identified.

Formula 17: Efficiency Increase Computation

$$EI = \frac{EPT_{t+1}}{(EPT + NEPT)_{t+1}} - \frac{EPT_t}{(EPT + NEPT)_t}$$

Source: Goldmann and Knoerzer (2022, 11)

To summarize, the efficiency computation model allows detailed efficiency potential allocation and effective efficiency potential calculation by accumulating the anatomy model of a task and the efficiency determination model.

### 3.2.5 Critical Reflection and Application of the Quality Criteria

This chapter defines the utilized quality criteria according to qualitative research standards and explains its application in the research process. Furthermore, there is a discussion about the limitations resulting from the chosen method and what must be considered when interpreting the results.

This dissertation follows the six developed quality criteria of qualitative research according to Mayring (2016, 144–148), which is explained in the following: i) procedure documentation, ii) argumentative interpretation hedging, iii) rule-governed approach, iv) appropriateness to the subject matter, v) communicative validation, vi) triangulation.<sup>175</sup>

The procedure documentation captures how the researcher has processed during the evaluation process. Required information is the preconception, selection of the methodology, execution of the data collection, and analysis of the data to achieve intersubjective comprehensibility. Argumentative interpretation hedging is the rule that no interpretation is applied, but argumentative explained. The presentation of the preconception, a comprehensible and step-by-step argumentation of the interpretation, and the demonstration of alternative interpretations are required. The rule-governed approach in qualitative research demands clear and systematic procedure steps. The appropriateness to the subject matter emphasizes a research execution in a trusted environment for the research participants accompanied by an approach of interest, which proves that the research is tailored to the research participants and finds application according to their interests. Communicative validation serves the purpose of validating the results with the research participants to ensure coherence with the research participants' perspectives. Triangulation is a method that tries to generate the answers to the questions through various solutions for comparison to detect strengths and weaknesses of the approaches.

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<sup>175</sup> See also Flick (2020) for a current summary of discussions for appropriate quality criteria in qualitative research.

**Step 10: Application of the content analysis quality criteria**

In social science, it is mandatory to fulfill the requirements of quality criteria within the course of qualitative content analysis to prove the suitability of the methodology. It is mandatory to ensure the quality of research employing respective criteria for qualitative research since applying quantitative criteria is inappropriate for the target of qualitative research. Therefore, the quality criteria must fit the research and not vice versa. Consequently, the six presented quality criteria have been applied to match the objective of the study (Mayring 2016, 140). This procedure represents the last step within the qualitative content analysis, according to Mayring. Even if this process step is called the application of the quality criteria, it solely discusses the proper execution of the research process instead of applying the just-defined criteria.

The first reviewed quality criterion covers the procedure documentation, conducted to the best of the author's knowledge and belief. The dissertation contains a pre-understanding of the topic and argumentation of choosing this methodology as appropriate to answer the determined research question (sub-chapter 3.1) as well as the execution and analysis process of the data gathering to consider this quality criterion as fulfilled.

The argumentative interpretation hedging represents the second quality criterion and can be achieved by presenting the pre-understanding, a step-by-step argumentation, and possible alternative interpretations. The successful pre-understanding of how to possibly derive an efficiency computation model is argued by the presented literature (chapter 2). By providing transparency about the procedure of how the qualitative research is conducted (section 3.1.1), a step-by-step argumentation is not only proposed but also conducted. Also, by consulting technical literature, several perspectives are integrated into the argumentation process by continuously evincing the limitation of each understanding. Thus, the quality criterion of argumentative interpretation hedging is deemed as fulfilled.

Third, the rule-governed approach is interpreted as successfully applied because of process adherence, according to Mayring. The procedure is clearly defined and followed accordingly (section 3.2.1).

The fourth quality criterion is represented by the appropriateness of the subject matter and contains certain limitations. The chosen research participants

are senior managers in the field of marketing and sales who are asked, besides others (see annex 6 for complete questionnaire), about the digital advancement in their companies as well as their knowledge capabilities concerning digitalization in marketing and sales-related areas. Therefore, the appropriateness of the subject matter referring to marketing and sales knowledge can be seen as fully achieved. However, since it is assumed that they are not entirely familiar with all current digital technologies, including their capabilities, the research participants could have omitted certain aspects. Consequently, the efficiency computation model is vulnerable to inadvertently excluding certain information concerning digital technology capabilities. Nevertheless, through the theoretical saturation, extensive coverage of digital technology capabilities, including the modeling possibility to determine efficiency potentials in marketing and sales, is assumed to be sufficiently close to the object.

Fifth, the quality criterion of the communicative validation must be considered critically. As elaborated in the section on determining the data material (section 3.2.2), the research participants are senior marketing and sales managers, including those representing the C-level suite. Thus, even the acquisition of the thirteen research participants from those experience and responsibility levels could only work with a broad request distribution to gain volunteers accompanied by an intensive argumentation effort with those who agreed to provide input. The communicative qualification validation, therefore, did not find an application after the data analysis period caused of the characteristic of the research participants' audience.

The triangulation represents the sixth quality criterion. Methodically, the qualitative content analysis is the only utilized data source. Therefore, there are not several methodological approaches to compare and enrich the utilized data. The only triangulation finds application by individually analyzing the thirteen transcriptions accompanied by the same requirements on every dataset. Afterward, the data are summarized, and the same or different statements are emphasized. Thus, there is a triangulation between the research participants' inputs by applying the same method. The analyzed data material of the qualitative content analysis solely consists of provided information of thirteen senior managers from the field of marketing and sales as answers on a semi-standardized questionnaire. The input partially varies enormously concerning the participant's experience and



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perspectives, branches, and company size. Also, the interpretation and understanding of the questions concerning, e.g., digitalization, digital technologies, and possible classification possibilities of tasks must be distinguished and treated carefully between the research participants' inputs.

### 3.3 QUANTITATIVE RESEARCH

Within the sequential mixed methods approach, qualitative research precedes quantitative research. As a result of the qualitative content analysis, the efficiency computation model argues to determine efficiency potentials. Additionally, five variables could be identified from the content analysis as well as from relevant literature: age, educational degree, professional experience, annual salary, and digital technology knowledge.<sup>176</sup> They reflect the compilation of latent exogenous (independent) variables, while the efficiency potential consisting of the effects of acceleration, automation, and outsourcing represent the latent endogenous (dependent) variables. The quantitative research chapter is supposed to validate the relationship between these five variables and the developed conditions of the efficiency computation model, as well as detailed task performance in marketing and sales with the help of structural equation modeling. Also, an efficiency potential benchmark in marketing and sales is supposed to be created to set a resulting efficiency potential in relation to the market average. Therefore, the efficiency computation model is operationalized, and individual data from employees in marketing and sales are collected.

#### 3.3.1 Integration of the Qualitative Research Results

The efficiency computation model must be translated into a logical decision tree to capture the required data sequentially, making the model actionable for the application during a quantitative investigation. This approach underlines the decision and the necessity to collect the data firsthand through a new survey motivated by Matthes et al. (2014). They present a newly developed task operationalization combined with collecting new data. The argumentation is based on the possibility of detailing the approach on task and individual worker level and not on aggregated occupations which meets the stressed research gap in this dissertation. Also, an emphasized weakness is asking job incumbents about highly

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<sup>176</sup> Comparable to the inductive categories of the implementation conditions, the five exogenous variables do not serve the purpose to explain or create the efficiency computation model and are therefore only presented at this point of the dissertation.

complex task concepts, which is “far from trivial” (Matthes et al. 2014, 274). Nevertheless, they argue that this very time-consuming approach, if done properly, is compensated by the conceptual advantages of the study design. This thesis follows this argumentation to achieve the most valuable results possible while minimizing weaknesses and risks of possible concept difficulties. This view is supported by the stressed solutions to overcome task measurement issues from Autor (2013) by reducing subjectivity in the task categorization and collecting data from new survey respondents directly (see 2.2.3.3 table 8). Therefore, the decision tree according to the efficiency computation model is developed based on the utilization of the detailed task data set from the ONET database, which constitutes the tasks to be evaluated within the second study of the thesis. This chapter first presents the five exogenous and the three endogenous variables. Second, the data set used to derive the efficiency potentials is explained. Third, the final conceptualization of the efficiency computation model, including the decision tree as a logical subject to collect and classify the data, is emphasized.

#### *3.3.1.1 Endogenous and Exogenous Variables*

The variables are differentiated between latent endogenous and latent exogenous variables. While the three digital technology impacts of acceleration, automation, and outsourcing represent the endogenous variables, age, educational degree, professional experience, annual salary, and digital technology knowledge represent the exogenous variables. All variables are either developed by the qualitative content analysis or literature, for which the following table provides an overview.

Table 17: Development of the Endogenous and Exogenous Variables

Variables	Source: Qualitative Content Analysis/Literature
<b>Exogenous Variables</b>	
Age	Qualitative Content Analysis (1 statement)
Educational Degree	Literature (Dengler and Matthes 2018b) & Qualitative Content Analysis (3 statements)
Professional Experience	Qualitative Content Analysis (6 statements)
Annual Salary	Literature (Autor et al. 2003; Spitz-Oener 2006; Goos and Manning 2007; Acemoglu and Autor 2011; Michaels et al. 2014; Autor et al. 2006; Autor et al. 2008; Autor and Dorn 2013; Autor and Handel 2013; Goos et al. 2009; Goos et al. 2014; Beaudry et al. 2016; Fernández-Macías and Hurley 2017)
Digital Technology Knowledge	Qualitative Content Analysis
Openness	4 statements
Comfort	5 statements
Readiness	9 statements
<b>Endogenous Variables</b>	
Efficiency Potential (Acceleration)	Based on the Efficiency Computation Model
Efficiency Potential (Automation)	
Efficiency Potential (Outsourcing)	

Source: own illustration

Comparable to the presentation of the categories in section 3.2.3, the following paragraphs provide details about the development of the five exogenous variables and their character. A detailed overview of the research statements can be found in annex 7.

### Age

As identified within the qualitative content analysis, the age of an employee in the field of marketing and sales might correlate with the efficiency potential. It was found that mental abilities decrease with age, but “technology is becoming faster and faster.”<sup>177</sup> Thus, the assumption is made that the efficiency potential increases with an increase since tasks currently performed by human labor fall victim to the substitutability or complementary effect of digital technologies.

<sup>177</sup> Interview Statement 194

### **Educational Degree**

Besides applying an educational degree in the study from Dengler and Matthes (2018b) to identify correlations with the substitutability of tasks, the content analysis also indicates a possible effect. The interview partner argues that they demand a certain level of education from their employees,<sup>178</sup> completed studies,<sup>179</sup> or even only employ so-called high-skill employees determined by a master's degree.<sup>180</sup> Consequently, the educational degree might indicate whether an employee in marketing in sales performs tasks that underly the defined digital technology effects.

### **Professional Experience**

Furthermore, the expert interviews also allow the derivation of the variable of professional experience in the form of work or practical experience.<sup>181</sup> If specific sectors require tailored knowledge, only employees from this concrete industry or with the respective experience are hired.<sup>182</sup> Also, the assessment of the capability competencies can support the decision of rather employing a candidate or not. Ultimately, the assumption is made that professional work experience might impact the efficiency potential.

### **Annual Salary**

Based on the already presented literature, which refers to the task approach, the annual wage scale serves as a possible skill-level determination of employees. Since this method enjoyed intense attention in research, it is included in this study to validate its truthiness and applicability to the model, even if the interview did not reveal similar results.

### **Digital Technology Knowledge**

Lastly, the knowledge of employees about digital technology implies a possible relation to efficiency potentials. The variable of digital technology knowledge is assumed to have a significant impact. It is further divided into three variables: openness towards digital technologies, the comfort of handling complex

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<sup>178</sup> Interview Statement 196

<sup>179</sup> Interview Statement 197

<sup>180</sup> Interview Statement 195

<sup>181</sup> Interview Statement 198, 200, 201, 202

<sup>182</sup> Interview Statement 199

data structures in a digital system, and readiness or digital savviness to operate digital systems.

### Openness

Depending on the analyzed job profile,<sup>183</sup> people must be especially open and willing towards those digital solutions to educate themselves<sup>184</sup> and interested and curious to discover new possibilities to drive business.<sup>185</sup>

### Comfort

Also, the more comfortable people feel about using respective digital technologies in the specific field of expertise and understanding them,<sup>186</sup> the greater the effect of their introduction. "In the past, it was more people-driven such as connecting with people, and today it is more data-driven such as understanding and analyzing data, and finally making decisions."<sup>187</sup> The analysis and structuring of data combined with the ability to interconnect various topics become increasingly relevant.<sup>188</sup>

### Readiness

When it comes to the readiness to use digital technologies in general, employees must be familiar with specific tools,<sup>189</sup> while, for example, laptops and mobile phones,<sup>190</sup> as well as software from Microsoft, are already seen as standard and common knowledge.<sup>191</sup> This is relevant for all employees and not for single experts, especially in industries with complex products.<sup>192</sup> For particular software in marketing, not all colleagues must be able to replace those experts.<sup>193</sup> Respective employees should be affine and ready to use them, which must not refer to technology-related skills.<sup>194</sup>

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<sup>183</sup> Interview Statement 205

<sup>184</sup> Interview Statement 204, 205, 206

<sup>185</sup> Interview Statement 207

<sup>186</sup> Interview Statement 208, 209, 212

<sup>187</sup> Interview Statement 210

<sup>188</sup> Interview Statement 211

<sup>189</sup> Interview Statement 213

<sup>190</sup> Interview Statement 214

<sup>191</sup> Interview Statement 215, 220

<sup>192</sup> Interview Statement 216

<sup>193</sup> Interview Statement 217, 218, 219

<sup>194</sup> Interview Statement 221

The endogenous variables, on the contrary, do not directly refer to interview statements and the developed categories but to the developed efficiency computation model, which has been presented in section 3.2.4.3. The further quantitative analysis evaluates, besides others, the correlation between the exogenous and endogenous variables with the help of the pre-defined dataset of the occupational database ONET, which contains detailed data on task level.

#### *3.3.1.2 Description of the Dataset*

The ONET data are deemed the most appropriate for the goal of the dissertation since it is criticized as the most detailed (see 2.2.3.3 table 7). As job incumbents are required to provide information in the upcoming quantitative data collection, a detailed data set helps already to provide a pre-selection of jobs and tasks to ensure data quality. Browsing by career cluster, the database provides the possibility to choose marketing. The career cluster marketing further allows the differentiation between career pathways of marketing communication, marketing management, marketing research, merchandising, and professional sales. The career pathways contain 31 individual occupations which cover the entire field of marketing and sales. 26 of the 31 occupations include detailed information about 214 detailed work activities representing the tasks of marketing and sales employees in this dissertation and are utilized for further research purposes. The following table summarizes the 26 occupations, including their career pathway.

Table 18: Career Cluster Marketing from ONET

No.	Career Pathway	Occupational Title
1	Marketing Communications	Public Relations Specialists
2	Marketing Management	Advertising and Promotions Managers
3		Marketing Managers
4		Property, Real Estate, and Community Association Managers
5		Sales Managers
6		Market Research Analysts and Marketing Specialists
7		Merchandising
8	Wholesale and Retail Buyers, Except Farm Products	
9	Professional Sales	Advertising Sales Agents
10		Cashiers
11		Counter and Rental Clerks
12		Demonstrators and Product Promoters
13		Door-to-Door Sales Workers, News and Street Vendors, and Related Workers
14		Driver/Sales Workers
15		First-Line Supervisors of Non-Retail Sales Workers
16		First-Line Supervisors of Retail Sales Workers
17		Parts Salespersons
18		Real Estate Brokers
19		Real Estate Sales Agents
20		Retail Salespersons
21		Sales Engineers
22		Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products
23		Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products
24		Securities, Commodities, and Financial Services Sales Agents
25		Solar Sales Representatives and Assessors
26		Telemarketers

Source: own illustration based on the information of U.S. Department of Labor (2022)

Each occupation is further detailed in its description by several attributes. The following occupational and worker requirements have been analyzed, including the information on how much different information exists per attribute



to determine efficiency potentials: work activities (41), skills (35), and knowledge (33). Furthermore, ONET assigns scores from 0 to 100 to these attributes, and a score greater than or equal to 50 is deemed a very relevant attribute. Annexes 8, 9, and 10 provide a detailed overview per attribute, including the average scores within the career cluster marketing. The average scores are not directly accessible at ONET but must be calculated individually by dividing the sum of the score of one attribute by the number of scores. The utilization of these attributes and the 214 tasks are presented in the following section.

### 3.3.1.3 *Conceptualization of the Qualitative Model*

Based on the anatomy model of a task, the general activity in marketing and sales consists of steps A to E and is performed according to the developed task indices (see anatomy model of a task in 3.2.4.1). These two pieces of information can also be organized in a matrix to operationalize the model and enable a task allocation. For this purpose, the findings from qualitative research have been calibrated with the work activities, skills, and knowledge from ONET, which have an average score of at least 50, to provide a tailored approach for marketing and sales. Regarding the labeling procedure: whenever a work activity, skill, or knowledge from appendix 8, 9, or 10 matched the description of a matrix field of the x-axis and the y-axis, the attribute was allocated to the respective operationalization field within the matrix. For identification purposes, annexes 8, 9, and 10 mark the chosen attributes with the respective operationalization in the columns "work activity," "skills," or "knowledge." For example, worker skill number 10, "Judgment and Decision Making" from annex 9, is one of the used attributes and appears in the appendix as "Judgment and Decision Making [draw conclusions/make decisions]" because it refers to one of the origins of the operationalization for cognitive output generation. Consequently, more than only one attribute may lead to one operationalization aspect within a field in the dimension matrix. Also, since the anatomy model of a task divides an activity into single steps, which represents the individual tasks, it is possible that one attribute was used to develop different operationalization aspect in different field of the dimension matrix and contains, therefore, more than one operationalization aspect label. Also, the wording of the attributes has been adjusted to narrow the definition down to the essence. Thus, the black boxes on the x-axis and y-axis correspond to

the derived results from section 3.2.4.1, and the white boxes represent the task operationalization based on the anatomy model of a task and ONET database. The following figure represents the task anatomy model operationalization as a dimension matrix.

Figure 9: Task Anatomy Model Operationalization

<b>Dimension Matrix</b>	<b>Non-System Input</b> Working with analog data (reverse coded from "system input")	<b>System Input</b> Feeding a system with data	<b>Input Processing</b> Managing available mass data to reduce complexity	<b>Output Generation</b> Information made actionable through decisions or information which is actionable itself to draw conclusions	<b>Output Control</b> verification of the actionable information/draw conclusions	<b>Output Application</b> Implementation of actions and application of content towards customers
<b>Manual</b> administrative task using one's hand	(Reverse coded from "manual system input")	- communication - sharing information - recording information - data gathering	N/A	- analyzing data - data forecasting - content creation - strategy presentation	N/A	N/A
<b>Cognitive</b> creative and strategic tasks	- conceptual thinking/creativity - analyzing/ solving business problems - prioritizing work	N/A	N/A	- customer strategy development - draw conclusions/ make decisions - customer insights	- controlling data/ resources - strategy validation - monitoring actions/ decisions	N/A
<b>Physical</b> face-to-face on-site customer visits	N/A	N/A	N/A	N/A	N/A	- customer education - contracting - negotiation - customer interaction - selling
<b>Remote</b> virtual off-site customer interactions	N/A	N/A	N/A	N/A	N/A	(Reverse coded from "physical output application")

Source: Goldmann and Knoerzer (2022, 8)

The operationalization per dimension enables the task allocation into the available fields of the matrix based on the 214 detailed work activities of ONET in the field of marketing and sales. Therefore, in the first step, each task has been classified as either office work or customer interaction. In the case of an office work task, the available classification in the matrix according to the anatomy model of a task are manual system input, manual non-system input, cognitive non-system input, manual output generation, cognitive output generation, and cognitive output control. In the case of a customer interaction task, the available classification is only physical or, respectively, remote, which are at this point not differentiable. During the task labeling process, the operationalization revealed conspicuities for individual tasks, which could not be classified accordingly. In total, nine overarching categories were identified, described in detail in annex 11. The task anatomy model operationalization was adjusted accordingly since not all tasks could be properly allocated based on the initial operationalization.

The adjusted task anatomy model operationalization is presented in the following figure, including four additional items to label all tasks according to available task dimensions. The newly added items are underlined for comprehensibility purposes.

Figure 10: Adjusted Task Anatomy Model Operationalization

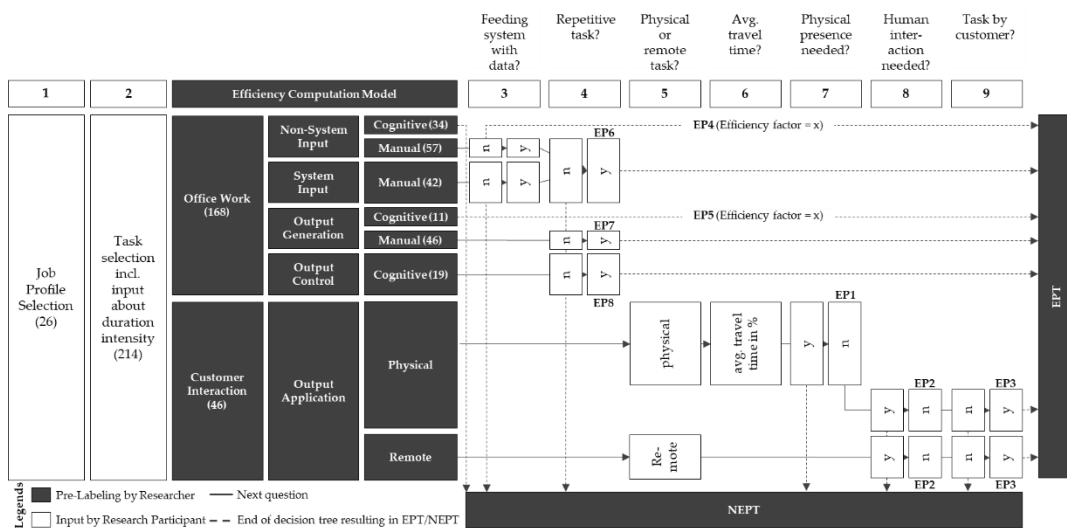
Dimension Matrix	Non-System Input Working with analog data (reverse coded from "system input")	System Input Feeding a system with data	Input Processing Managing available mass data to reduce complexity	Output Generation Information made actionable through decisions or information which is actionable itself to draw conclusions	Output Control verification of the actionable information/draw conclusions	Output Application Implementation of actions and application of content towards customers
Manual administrative task using one's hand	(Reverse coded from "manual system input")	- communication - sharing information - recording information - data gathering	N/A	- analyzing data - data forecasting - content creation - strategy presentation - implement processes	N/A	N/A
Cognitive creative and strategic tasks	- conceptual thinking - analyzing/ solving business problems - prioritizing work - coordinate work - Updating knowledge - Discuss/ confer	N/A	N/A	- customer strategy development - draw conclusions/ make decisions - customer insights	- controlling data/ resources - strategy validation - monitoring actions/ decisions	N/A
Physical face-to-face on-site customer visits	N/A	N/A	N/A	N/A	N/A	- customer education - contracting - negotiation - customer interaction - selling
Remote virtual off-site customer interactions	N/A	N/A	N/A	N/A	N/A	(Reverse coded from "physical output application")

Source: own illustration but in the style of Goldmann and Knoerzer (2022, 8)

The final labeling of the 214 tasks is available in annex 12. The 214 tasks and 26 occupations reveal 512 combinations (annex 13). The following figure provides an overview of the total number of tasks allocated to the individual task dimensions. Furthermore, it represents the developed decision tree to identify tasks as either efficiency potential or not. The decision tree reflects the eight efficiency potentials of the efficiency computation model and how the quantitative research approach targets to determine them. On the transversal line, the decision tree reveals eight steps that must be conducted in this sequence. The white boxes in the figure refer to a decision required from the research participant, and the dark boxes refer to the pre-labeling effort of the task anatomy model operationalization and the developed efficiency computation model for efficiency potential determinations. A solid line means that the decision tree must be finalized and points to the next step. A dotted line ultimately points to EPT (efficiency potential

task) or NEPT (non-efficiency potential task), which is the end of the decision tree. Every decision is represented with the answer possibilities of “n” for no and “y” for yes according to the questions above the process numbers. The allocation of the efficiency potentials (EP 1-8) to the respective question in the decision tree reveals at which point the individual potentials can be identified in the questionnaire. Exceptions are the efficiency potential of non-system input (no potential) and cognitive output generation (EP5) since both directly refer to either NEPT or EPT because their mere task pre-labeling already indicates a potential or not. However, EP4 and EP5 enjoy the peculiarity that the efficiency factor is “x” since they refer to acceleration in the efficiency computation model, which must be determined individually. The assumptions of “x” is not performed by the individual participants in the research process since vague estimations about a task performance acceleration could distort the potential identification process.

Figure 11: Decision Tree According to the Efficiency Computation Model



Source: own illustration

The first two steps refer to the individual selection of the research participant:

1. First, one of the 26 jobs from ONET must be selected
2. Second, the tasks from the chosen job must be selected, including the duration intensity

The following steps, which are in the decision tree figure marked in a dark color, refer to the task pre-labeling process of the researcher according to the

adjusted task anatomy model operationalization in figure 10. The task is either office or customer interaction work, allocated to the respective dimension matrix field. This pre-labeling is not available or visible to the participants.

Steps three and four refer to the office work tasks:

3. Third, the input must be evaluated, whether it is system input or non-system input. In case of no, EPT or NEPT is indicated. In the case of yes, those tasks proceed to question step 4.
4. Fourth, once the system input data has been evaluated, manual system input, manual output generation, and cognitive output control are evaluated about their repetitive task character. In case of no, NEPT is indicated. In case of yes, EPT is indicated.

Steps five to nine refer to the customer interaction tasks:

5. Fifth, the output application is evaluated whether the task is currently performed remotely or physically.
6. Sixth, in the case of physical, the average travel time is requested. This question is mandatory to determine the travel time of a physical task as possible efficiency potential.
7. Seventh, the physical tasks are evaluated to determine whether physical presence is required. In case of yes, NEPT is indicated. In case of no, the remaining physical tasks are joined with the remote tasks.
8. Eighth, the remaining physical and remote tasks are evaluated about whether human interaction is required. In case of yes, NEPT is indicated, and in case of no, the tasks proceed to the next step.
9. Ninth and last, the tasks are evaluated to determine whether the task can be outsourced to the customer (self-service by the customer). If no, NEPT is indicated. If yes, EPT is indicated.

With this procedure, the tasks follow a clearly defined decision tree where every decision results in either NEPT, EPT, or proceeding to the next question. Furthermore, the respective efficiency potential according to the efficiency computation model can be identified in the case of EPT.

### 3.3.2 Conduction of the Study

At this point of the dissertation, the questionnaire design is presented based on the developed content (3.3.1). It targets examining the hypotheses and determination of the efficiency potentials within the field of marketing and sales. It also covers the procedure of how the study was introduced and ultimately conducted. By differentiating between two phases, the first phase treats the pretest, and the second phase the actual data collection. During the pretest period, the questionnaire is subject to quality assurance ex-ante, thus, before the actual data collection. The main reason to perform a pretest is that after the beginning of the field phase, no changes are possible without jeopardizing the standardization of the data collection (Weichbold 2019, 349). The data collection period finally captures the data gathering through the online questionnaire to validate the hypotheses and calculate the efficiency potentials.

#### 3.3.2.1 Questionnaire

Since the quantitative study builds upon the model of the first study in this thesis, the gathered data are novel results. The target group of this study is employees in the field of marketing and sales who are asked about the task performed in their daily business. As presented, the tasks represent the data from ONET in the career cluster of marketing, which covers both professional fields, marketing and sales. According to the results of the qualitative model, the tasks are labeled according to the task anatomy model operationalization and employing the dimension matrix. Dependent on which tasks the participants select as part of their daily business and what answers they provide within the questionnaire, the individual tasks either result in an efficiency potential or not. The participants are separated into 26 groups which reflect the division of marketing and sales labor according to the ONET database.

For the data collection, an electronic questionnaire has been developed with the online tool [www.umfrageonline.com](http://www.umfrageonline.com). The questionnaire consists of 17 mandatory questions, of which eight refer to the person of the participant and nine refer to the job and the tasks performed in the respective job. The following table shows an overview of the questionnaire structure, the number of items, and the measurement method of the items.

Table 19: Structure and Items of the Questionnaire

No.	Structure	No. of Items	Measurement Scale
1	Age	1	Metric
2	Educational Degree	1	Ordinal
3	Experience	1	Metric
4	Income	1	Ordinal
5	Digital Technology Knowledge	3	5-Points Likert Scale
6	Weekly Working Hours	1	Metric
7	Efficiency Potential (Acceleration)	3	Decision Tree according to the Efficiency Computation Model
8	Efficiency Potential (Automation)	4	
9	Efficiency Potential (Outsourcing)	1	

Source: own illustration

The questionnaire is divided into two main sections. The first main section covers numbers 1-6 of the structure, and the second covers numbers 7-9. The questionnaire is introduced with a welcome and general information page about the study, the responsible institution, anonymity declaration, and data protection consent, which has been developed according to the recommendations from the literature (Schaar 2017).

The first main section covers the collection of the latent exogenous variables (numbers 1-5), except the weekly working hours (number 6). The weekly working hours are not defined as part of the latent variables, but it is required to calculate the efficiency potential according to the weight of time (details follow in the data analysis section).

The second main section covers the latent endogenous variables (numbers 7-9), determined according to the efficiency determination model due to qualitative research. The research participants are first asked about the job title which fits their current occupation the most. For decision support, ONET provides a job description and samples of further reported job titles for the individual occupations (annex 14). This information is available for the research participants within the questionnaire since they must choose the most appropriate occupation to proceed in the questionnaire, which is presented in the following section. The additional job title description and samples of further reported job titles ensure a more accurate individual job selection per research participant, resulting in a more precise fit into reality. Second, each occupation from ONET database has clearly assigned

individual job tasks, which the research participants must evaluate by determining the respective task intensity in their daily business. The answer possibilities range from “not at all,” “rarely,” “sometimes,” “often,” to “intensively.” Third and final, once they have chosen at least “rarely” for the individual tasks, the decision tree, according to the efficiency computation model, finds application since they invest at least a minimum of time in this task.

Although there is a variety of online providers offering similar functionalities, the selected provider is one of the few with whom the targeted questionnaire design could be realized. The peculiarity of the questionnaire is that almost every participant will most likely face a different questionnaire, dependent on the answers of the participants on task level and the initial job selection. Consequently, skip logic must be applied only to display the tasks belonging to the occupations and to follow the decision tree according to the efficiency computation model to determine the eight efficiency potentials. To be able to apply this required functionality, a business rate was purchased with the possibility of reproducing the extensive task dataset in the form of a questionnaire. Also, even the integration in one questionnaire was not applicable due to the vast number of combination possibilities of tasks. Therefore, the 26 jobs must be distributed into four questionnaires with focus areas. The division of jobs is presented in the following table. The only specialty is assigned to the job “First-Line Supervisors of Non-Retail Sales Workers” since it appears in questionnaires two and four and cannot logic-wise and semantically be allocated into only one category. Nevertheless, the introduction page of all questionnaires is built according to the same structure and only differs in the description of the four job categories while also referring to the remaining three categories, including the descriptions. With this information provided, the research participants can also change the questionnaire if they should have clicked on the link of one questionnaire that is not fitting the most to their current occupation. The only disadvantage of this procedure is that the completion rate of the questionnaires is not representative for analysis purposes.



Table 20: Distribution of the 26 Occupations into 4 Focus Areas

No.	Questionnaire Title	Questionnaire Jobs
1	Marketing & Sales Management (incl. Communications, Market Research, Merchandising)	Public Relations Specialists Advertising and Promotions Managers Marketing Managers Sales Managers Market Research Analysts and Marketing Specialists Merchandise Displayers and Window Trimmers Wholesale and Retail Buyers, Except Farm Products
2	Professional Sales (incl. Sales Representatives)	Advertising Sales Agents, Demonstrators and Product Promoters Door-to-Door Sales Workers, News and Street Vendors, and Related Workers Driver/Sales Workers First-Line Supervisors of Non-Retail Sales Workers Sales Engineers, Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products Securities, Commodities, and Financial Services Sales Agents Solar Sales Representatives and Assessors Telemarketers
3	Professional Sales: Focus Retail	Cashiers Counter and Rental Clerks First-Line Supervisors of Retail Sales Workers Parts Salespersons Retail Salespersons
4	Marketing Management & Professional Sales: Focus Real Estate	Property, Real Estate, and Community Association Managers First-Line Supervisors of Non-Retail Sales Workers Real Estate Brokers Real Estate Sales Agents

Source: own illustration based on the information of U.S. Department of Labor (2022)

The explanation of how the questionnaire is built and analyzed concerning the efficiency potential calculation is described in section 3.4.2.

### 3.3.2.2 *Pretest*

During the pretest, the online questionnaire was validated with a small sample of the target group. It is recommended that the pretest's environmental

conditions meet the same survey condition. The data collection method was verified according to the following targets:

- Duration of the participation in the study
- Spelling and wording of the questions
- Comprehensibility of the actual meaning
- User-friendliness of the survey tool (primarily because of the division into four questionnaires)

According to Weichbold (2019, 352), at least 25 persons should be involved in the pretest to ensure the maximal possible quality standard, which was followed in this study. The pretest revealed an average participation time of 5.50 minutes for the first questionnaire, 6.55 minutes for the second, 4.45 minutes for the third, and 5.10 minutes for the fourth. To further improve the correct choice of the respective jobs, the already mentioned job descriptions and the job title synonyms from ONET have been included since the pretest revealed that the participants had difficulties choosing the suitable occupation only according to the main title. Furthermore, if no task remained in the decision tree, the following pages, according to the decision tree logic, are still shown to the research participant but without any tasks left, which led to confusion among the participants. Therefore, the description "If no task is remaining, just continue the survey on the next page" was added on each page. Also, the variable of human interaction demanded a more detailed specification of what it actually meant. For this purpose, the description "social interaction, where empathy counts, e.g., physical meeting, video call, phone call" was added. The adjusted questionnaire was again provided to the participants having understanding difficulties who confirmed the utilization of the final questionnaire. Ultimately, the pretest also disclosed that the participants partially switched questionnaires in case of doubt about the job titles, which led to the already mentioned uselessness of the survey completion rate.

### 3.3.2.3 *Data Collection*

The survey was distributed through several channels to ensure the required number of participants. The approach covered the qualitative research participants who were individually contacted to spread the survey in their companies which have been majorly international companies. Therefore, the participation likelihood of marketing and sales employees from different countries increased significantly.

Furthermore, various universities with part-time students have been contacted with the inquiry to publish the doctoral survey on their blackboard or similar distribution channels. The German institution FOM University of Economics and Management confirmed the request and published the study on 02.06.2022, which was available for approximately 50.000 part-time students who are mainly also pursuing a full-time job. The study was also published on the international career platform LinkedIn with a precise address to marketing and sales employees. The general communication of the study is available in annex 15, and the unique communication of the university is available in annex 16. Since the University is in Germany, the communication was in German, but the questionnaire was only offered in English. The data collection period reached from 25.05.2022 to 25.07.2022.

#### *3.3.2.4 Description of the Applied Data Analysis*

The data analysis with the collected data from the questionnaire is separated into two approaches: structural equation modeling and descriptive statistics. The structural equation modeling targets validating the raised hypotheses (section 3.5.2) and the total model quality (3.5.4). Descriptive statistics describe the sample and the absolute and relative frequency of the given answers, such as the tasks performed according to the intensity and the composition of the efficiency potentials. Both statistical methods are individually explained in chapters 3.4 and 3.5. The following table also provides an overview of both method applications, including their respective relevance to answering the research questions.

Table 21: Overview Applied Quantitative Statistical Methods

<b>Overview Quantitative Analysis</b>	<b>Descriptive Analysis</b>	<b>Structural Equation Modeling</b>
Target	Performed tasks incl. intensity, and composition of efficiency potentials	Hypotheses validation
Program	Microsoft Excel	SmartPLS
<b>Relevance to answer the research questions</b>		
RQ1: To what extent can efficiency potentials be quantitatively calculated by empirical modeling and low-value activities conceptually identified and delimited?	no	no
RQ2: How far does digital transformation propel companies to fully exploit their efficiency potential to fulfill the requirements of new value propositions?	yes	yes
RQ3: Which tasks in marketing and sales are determined as low-value activities causing efficiency potentials?	yes	no

Source: own illustration

By beginning with the presentation of the descriptive statistics in sub-chapter 3.4, research question two is partially covered, and research question three is fully answered.

### 3.4 DESCRIPTIVE STATISTICS

The target of descriptive statistics is collecting, preparing, and analyzing attributes of a defined entirety of feature carriers (Eckstein 2014, 1). The statistically collected and analyzed data always only count for the determined entirety. While descriptive statistics solely concentrates on the pure description of data, inductive statistics transfer the available data of the sample to the unknown total population utilizing probability calculations (Eckstein 2014, 2).

This study especially emphasizes the statistical method of determining the arithmetic mean. It is the most common measure of a central tendency of a distribution (Benninghaus 2007, 45; Dodge 2008, 15). "It allows us to characterize the center of the frequency distribution of a quantitative variable by considering all the observations with the same weight afforded to each" (Dodge 2008, 15). It is calculated by the sum of the measurement values divided by the number of observations" (Benninghaus 2007, 45; Dodge 2008, 15). Thus, the arithmetic means for the cumulated efficiency potential and the three partial efficiency potentials of acceleration, automation, and outsourcing can be determined for every job category in marketing and sales and the complete survey.

While the central tendency of the arithmetic mean informs which value represents the centermost properly, dimensions of variability inform about the diversity of the values (Bortz and Schuster 2010, 29). The empirical variance and standard deviation as dimensions of variability are determined to assess the quality of the arithmetic mean. According to Benninghaus (2007, 58 et. seqq.), the standard deviation is the most common dispersion measure defined as the square root of the variance. The variance, in turn, is calculated by the squared deviation of all measured values of their arithmetic mean divided by the total number of values and is an important dimension to determine the variability of measures (Bortz and Schuster 2010, 30). Generally, for descriptive statistics purposes, the standard deviation is favored because it is a characteristic value in the form of the actual collected empirical data and not a squared value (Bortz and Schuster 2010, 31). However, standard deviation and variance can also be interpreted as equivalent dispersion measures since they positively correlate (Benninghaus 2007, 61).

To summarize, descriptive statistics are complementarily used in structural equation modeling. First, the presentation of the data sample of all research participants provides an answer to the following:

- Number of completed questionnaires
- Absolute frequency of the exogenous variables (age, educational degree, experience, income, and digital technology knowledge)
- Arithmetic mean and standard variation for the items of the latent variable digital technology knowledge
- Frequency distribution of the selected job categories
- Absolute and weighted frequency of tasks selected

Second, the performed tasks, including their intensity, allow an efficiency potential analysis by employing the decision tree of the efficiency computation model, which provides information about the following:

- Efficiency potential determination per observation
- Efficiency potential determination on task level
- Determination of the standard deviation and arithmetic mean for the total efficiency potentials

Both steps are explained in detail in the following two sections to describe the data sample and present the descriptive results of the efficiency computation model with the help of the software program Microsoft Excel

### **3.4.1 Presentation of the Data Sample**

This section entails the first step of descriptive statistics. It describes the data sample of all research participants, including an analysis of the relevant information concerning their frequency distribution, arithmetic mean, and standard deviation.

#### **Number of completed questionnaires**

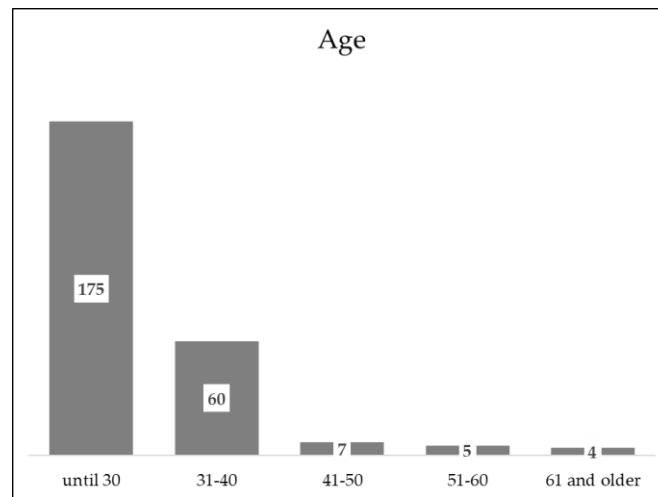
In total, 251 research participants completed one of the four questionnaires. Fifty-four people could not find a job category or profile that fits their current occupation after they initially decided, based on the questionnaire description, that they work in the field of marketing and sales. Forty-five people did not complete the questionnaire. Consequently, this research has a participation rate of 71 percent, which could be, as already presented, distorted through the employment of in total

four questionnaires. Suppose the participants did not find a proper job category in the initially selected questionnaire. In that case, the research participants might have switched the questionnaire to select a more appropriate job category which could not be tracked because of the anonymity regulation of the data-gathering procedure. Also, four datasets could be identified as conspicuous due to the interaction of age, educational degree, and professional experience. Two dataset verifications have been integrated to ensure general data quality. First, suppose one observation shows an age younger than 18 and a completed university bachelor's degree, an age younger than 23 and a completed university master's degree, or an age younger than 30 and a completed doctoral degree. In that case, the observation is classified as conspicuous and removed from the dataset. This verification procedure identified three observations as conspicuous (2x a master's degree at the age of 22 years and 1x a master's degree at the age of 21 years). Second, if one observation shows that a person started to work at an age younger than 16, the observation is also classified as conspicuous (1x an age of 26 with a professional experience of 22 years).

#### **Absolute frequency of the exogenous variables**

The following paragraphs describe how the five exogenous variables have been analyzed to determine their frequencies. The first analyzed variable is age. Since the answers for the age are provided on a metric scale, the data are converted into an interval scale and aggregated into five groups.

Figure 12: Frequency Distribution of "Age"



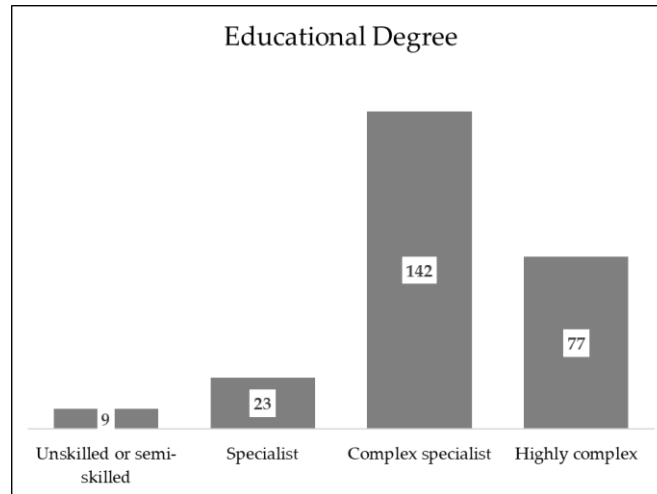
Source: own illustration

The second analyzed variable is the educational degree. This variable mainly refers to the work of Dengler and Matthes (2018b), who present four educational groups: no vocational qualification (unskilled or semi-skilled), at least two years of vocational training (specialist), master craftsman, technician or equivalent technician school, college graduation, graduation from a professional academy or bachelor's degree (complex specialist), completed university degree of at least four years (highly complex). These groups' operationalization is deemed difficult to assess within a questionnaire directly and is therefore expanded into six answer possibilities. Afterward, the six answer possibilities were allocated to the initial four groups according to their operationalization which is presented as follows:

- no vocational qualification → unskilled or semi-skilled
- at least two years of vocational training → specialist
- master craftsman/technician (or equivalent) → complex specialist
- University bachelor's degree → complex specialist
- University master's degree → highly complex
- University doctoral degree → highly complex



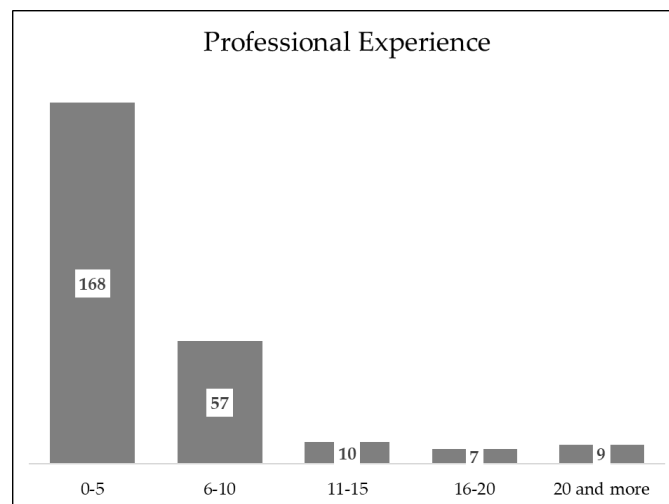
Figure 13: Frequency Distribution of “Educational Degree”



Source: own illustration

The third analyzed variable is professional experience. Analogous to the variable age, the raw data material is provided on a metric scale. Therefore, the data are also converted into an interval scale and aggregated into five groups.

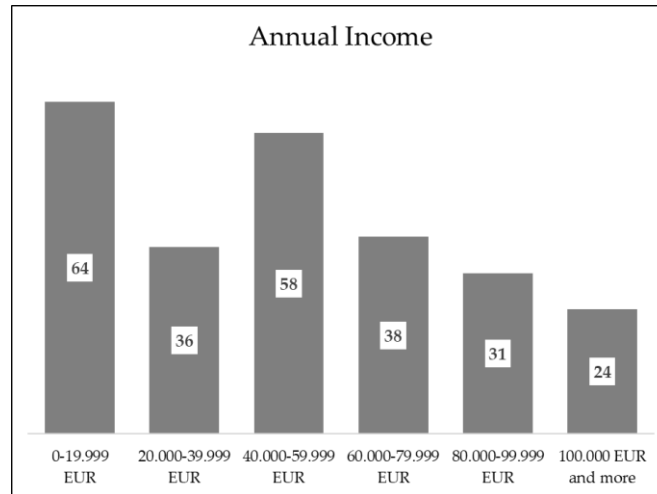
Figure 14: Frequency Distribution of “Professional Experience”



Source: own illustration

The fourth analyzed variable is the annual income. Since the answer possibilities are already divided into six groups, they present an interval scale adopted in the following figure.

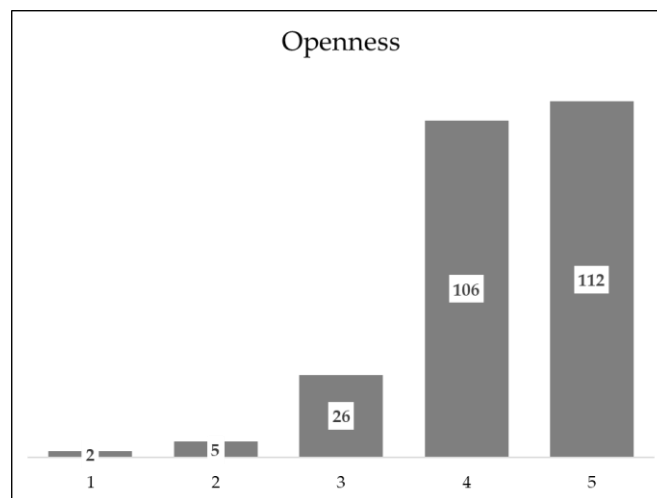
Figure 15: Frequency Distribution of "Annual Income"



Source: own illustration

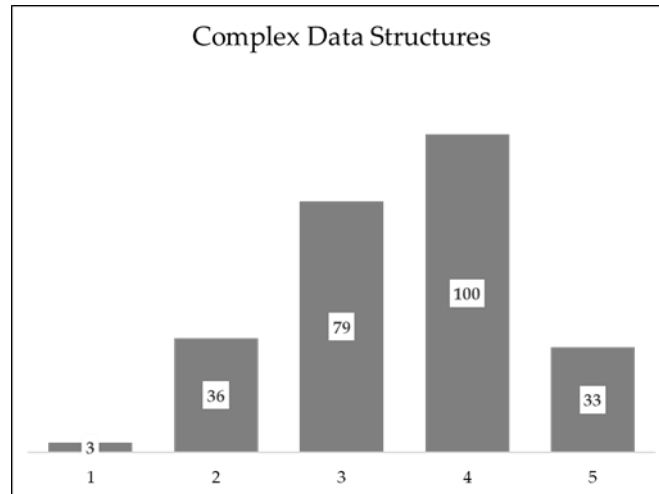
The fifth analyzed variable is digital technology knowledge. The variable consists of three items (openness, complex data structure, and digital readiness), measured on a five-point Likert scale.

Figure 16: Frequency Distribution of "Openness"



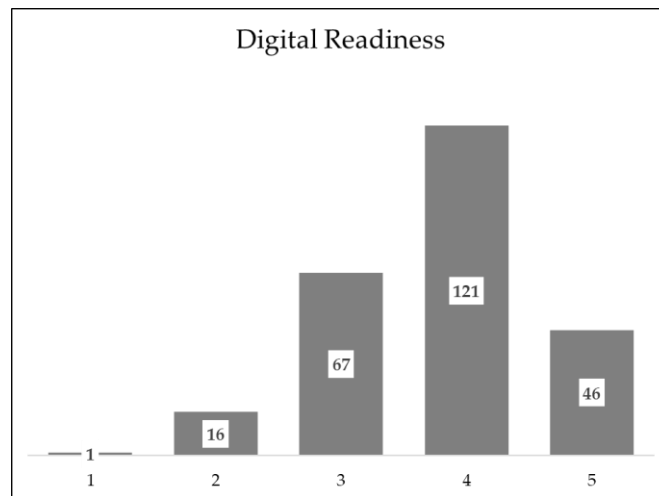
Source: own illustration

Figure 17: Frequency Distribution of "Complex Data Structures"



Source: own illustration

Figure 18: Frequency Distribution of "Digital Readiness"



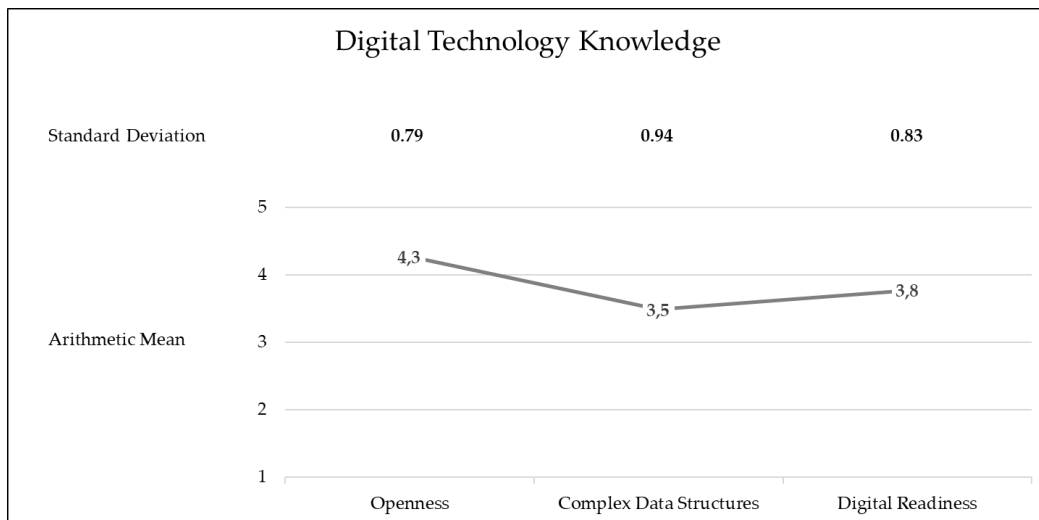
Source: own illustration

### **Arithmetic mean and standard variation for the items of the latent variable digital technology knowledge**

Since the latent exogenous variable of digital technology knowledge with the three items openness, complex data structure, and digital readiness are determined with a Likert scale, the arithmetic mean and standard variation can be calculated. For calculating the standard deviation in Microsoft Excel, it is crucial to use the formula STDEV.S when employing a specific sample size instead of, e.g., STDEV.P.

with which the standard deviation for an entire population is calculated. The following figure illustrates the arithmetic mean of the three items of the latent exogenous variable of digital technology knowledge, including their respective standard deviation.

Figure 19: Arithmetic Mean of "Digital Technology Knowledge"



Source: own illustration

### Frequency distribution of the selected job categories

The research participants had to choose between the available job titles according to the ONET database. The ONET database serves in this research framework more as reasonable task bundling than as a significant analysis aspect. The reason is justified by the variety of possible job titles, the difficulty in choosing the correct job title and its corresponding tasks across the entire sample, and the limited time research participants are willing to invest in filling out the questionnaire. Therefore, the focus lies on the individual job tasks and the accumulated result of all tasks regarding efficiency potential determinations. For transparency reasons, the detailed results of the 26 job categories are presented in the following but are neglected for interpretation purposes. Thus, the job categories are a means to an end for selecting individual work tasks.

Figure 20: Frequency Distribution of Job Categories



Source: own illustration

### Absolute and weighted frequency of tasks selected

The detailed work tasks, including the applied descriptive statistics results, are presented in annex 17. The overview also entails the absolute frequency per work task in the task bundles of the 26 job categories, the absolute frequency per task in the data sample, and the weighted frequency calculated with the individual task intensity. The weighted frequency is therefore presented as a percentual value and represents the average time a single task occupies in the daily schedule of marketing and sales employees. This summary provides transparency about the most frequently performed tasks in marketing and sales under the initial exercise of the research participants to choose between the 26 job categories, which comprise certain task bundles.

#### 3.4.2 Presentation of the Efficiency Potential Results

The second step of descriptive statistics describes a step-by-step approach to determine the targeted efficiency potentials. Regarding the results presentation of the qualitative research, according to the efficiency computation model, the

decision tree guides the research participants through the questionnaire on task level.

### **Efficiency potential determination per observation**

Once the questionnaire is completed, the raw data contains either-or information about every branching from the decision tree. With this foundation, every task can, according to its intensity, be allocated to either EPT or NEPT. The intensity is determined by either selecting “intensively” (4 points), “often” (3 points), “sometimes” (2 points), “rarely” (1 point), “or not at all” (0 points). The accumulation of these points determines the total work points of one research participant. Thus, the individual task with the selected intensity divided by the total points provides information about the weighted intensity of one specific task in the daily business of this worker. For example, if task 1 is performed intensively (4 points), and the accumulation of all points results in a total of 34 points, the weighted intensity of this specific task equals 12 percent. Consequently, this individual worker spends 12 percent of his or her weekly working time performing this task. Furthermore, by asking for the average weekly working time in the questionnaire, the gathered points can be converted into minutes and hours to calculate the absolute time. Once the individual answers per task are available, the effective efficiency potential per worker can be determined by dividing the total EPT qualified time or points through the respective total. Ultimately, it is not only the target to calculate the total efficiency potential but also to provide an answer about the EPT or NEPT driver or root causes. Every branching within the decision tree is allocated to only one efficiency potential. Hence, the individual efficiency potential from one to eight can be calculated. These eight efficiency potentials are allocated to the three digital technology impacts acceleration, automation, and outsourcing. The individual steps in calculating the efficiency potential are presented in the following.<sup>195</sup> Also, since the tasks are first evaluated according to their intensity, only those tasks proceed in the evaluation process, labeled with at least “rarely” (1 point) according to the intensity. Otherwise, the task is of no importance to the respective research participant.

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<sup>195</sup> The efficiency potentials are not explained in a chronological order from 1 to 8, but in the order of how they are timely determined within the course of the questionnaire which is not visible for the research participant while filling out the questionnaire.

The following individual paragraphs to describe the detailed process are always built with the same modules to explain the reasonability of the model profoundly: first, the explanation of the parameter in the efficiency computation model and the anatomy model of a task (model relevance), second, the question in the questionnaire (question), third, the answer options and which option leads to an efficiency potential (efficiency potential option), and fourth and lastly, possible exceptions within the data set, which have already been mentioned in 3.3.1.2 and annex 11 but are now emphasized to provide transparency about the procedure and the applied data set (exceptions).

#### Efficiency potential 4

1. Model relevance: EP4 refers to the manual input in the task anatomy step A and the digital technology impact of acceleration for office work tasks where it is mandatory to distinguish between system input and non-system input.
2. Question: "Please indicate whether you are feeding a system (e.g., computers, databases) with data or not when performing these tasks."
3. Efficiency potential option: The answer options are either "system" or "no system," while the answer option "no system" implies an efficiency potential.
4. Exceptions: sixteen manual input tasks have been pre-defined as manual non-system input without efficiency potentials due to their physical characteristics in their initial task description. One manual input task has been pre-defined as manual system input without efficiency potentials due to its literal description of entering data in a system.

#### Efficiency potential 6

1. Model relevance: EP6 refers to the manual input in the task anatomy step A and the digital technology impact of automation for office work tasks that require system input. Therefore, every task in the previous question for EP4 labeled as "no system" or part of the sixteen-task exceptions does not proceed to this question since they are already allocated to EP4 and do not fulfill the requirement of being a manual system input. Because of the digitalization of these tasks, these steps ask for a repetitive character which implies possible

substitutability by digital technologies, according to literature and the results of qualitative research.

2. Question: "Please indicate whether the tasks are repetitive and predictable in their execution or not."
3. Efficiency potential option: The answer options are either "yes, repetitive & predictable" or "no, not repetitive & predictable," while the answer option "yes, repetitive & predictable" implies an efficiency potential.
4. Exceptions: sixteen manual input tasks have been pre-defined as manual non-system input without efficiency potentials due to their physical characteristics in their initial description (see also the exception for EP 4)

#### Efficiency potential 5

1. Model relevance: EP5 refers to the manual output generation in task anatomy step C and the digital technology impact of acceleration for office work tasks. It automatically counts as efficiency potential with the factor  $x$  once the task is pre-labeled as manual output generation and characterized as having a repetitive character from the previous question in the questionnaire. This efficiency potential is not created by eliminating a task but complements human work by achieving an acceleration of, e.g., faster decision-making through digitalized information
2. Question: Not part of the questionnaire, but pre-labeling in the data backend
3. Efficiency potential option: not applicable
4. Exceptions: none

#### Efficiency potential 7

1. Model relevance: EP7 refers to the cognitive output control in task anatomy step D and the digital technology impact of automation for office work tasks. It automatically counts as efficiency potential once the task is pre-labeled as cognitive output control and characterized as having a repetitive character from the previous question in the questionnaire. This efficiency potential is created by eliminating a



task and is therefore valid with the full-time invested as being replaceable by digital technologies.

2. Question: Not part of the questionnaire, but pre-labeling in the data backend
3. Efficiency potential option: not applicable
4. Exceptions: none

#### Efficiency potential 1

1. Model relevance: EP1 refers to the physical or remote output application in the task anatomy step E and the digital technology impact of acceleration for customer interaction tasks. This efficiency potential is determined in a three-step approach. First, the research participants are asked whether the tasks are performed physically on-site at the customer or remotely off-site. Second, if physically on-site, the physical presence at the customer typically requires travel time which must be stated in percent of the total time of tasks performed physically on-site. Third, and only if physically on-site, the task intensity multiplied by the percentual travel time indicates the efficiency potential since digital technologies enable marketing and sales employees to eliminate the travel time by working remotely off-site.
2. Question: (1) "Please indicate whether you perform the following tasks physically on-site at the customer or remotely off-site from another location. If both options find applications, please choose the more frequently used one." and (2) "Please enter the average travel time (in percent) of the total time spent that is required for that task."
3. Efficiency potential option: (1) The answer options are either "physically on-site at the customer" or "remotely from another location," while only the answer option "physically on-site at the customer" is relevant for this efficiency potential; (2) The answer possibilities reach from "10 percent" to "80 percent+" in steps of ten. The answer option of "80 percent+" is converted to 80 percent for calculation purposes but is presented to the research participants with an additional "+" to at least include the option of having more than 80 percent of travel time.

4. Exceptions: Four tasks enrich the customer perspective through the „internal customer perspective, “which deals with colleagues as customers. Six tasks of the job category “telemarketer” are pre-defined as having a remote character due to the initial job description.

#### Efficiency potential 2

1. Model relevance: EP2 refers to the physical output application in the task anatomy step E and the digital technology impact of automation for customer interaction tasks. This efficiency potential evaluates whether a worker must be physically present when performing a task, which is only assessed when the task was previously labeled as physically on-site.
2. Question: “Please indicate, whether you necessarily need to be physically present on-site to perform the task(s).”
3. Efficiency potential option: The answer options are either “yes, I need to be physically present” or “no, I do not need to be physically present,” while the answer option “no, I do not need to be physically present” implies an efficiency potential.
4. Exceptions: The efficiency potentials count only as valid for EP2 when the answer for the following question, however, requires human interaction, either physically on-site or remotely-off-site, explained in the following.

#### Efficiency potential 3

1. Model relevance: EP3 refers to the physical and remote output application in the task anatomy step E and the digital technology impact of outsourcing for customer interaction tasks. This efficiency potential evaluates whether the tasks require human interaction or not. The tasks labeled “remotely from another location” and neglected in the calculation and question for EP2 are now included again. Also, as stated in the EP2 explanation, whenever a task can be outsourced to the customer by, e.g., rewarding the customer working time while performing a task, the efficiency potential is allocated to outsourcing instead of automation due to the possibility of reactively working with the customer on demand to save working time.

2. Question: "Please indicate, if you could imagine, that the task(s) are "outsourced" to the customer(s), meaning that the customer(s) is performing the task(s) in interaction with digital technologies (e.g., digital platforms, business websites, etc.)."
3. Efficiency potential option: The answer options are either "yes, task could be outsourced to the customer" or "no, task could not be outsourced to the customer," while the answer option "yes, task could be outsourced to the customer" implies an efficiency potential.
4. Exceptions: none

According to this procedure, per efficiency potential, the raw data of the data sample can be converted into percentual values. The sum of the percentage points per efficiency potential represents the total efficiency potential per research participant. Annex 18 entails the 251 observations, including details about their respective efficiency potentials from one to eight and the total, calculated according to the above procedure.

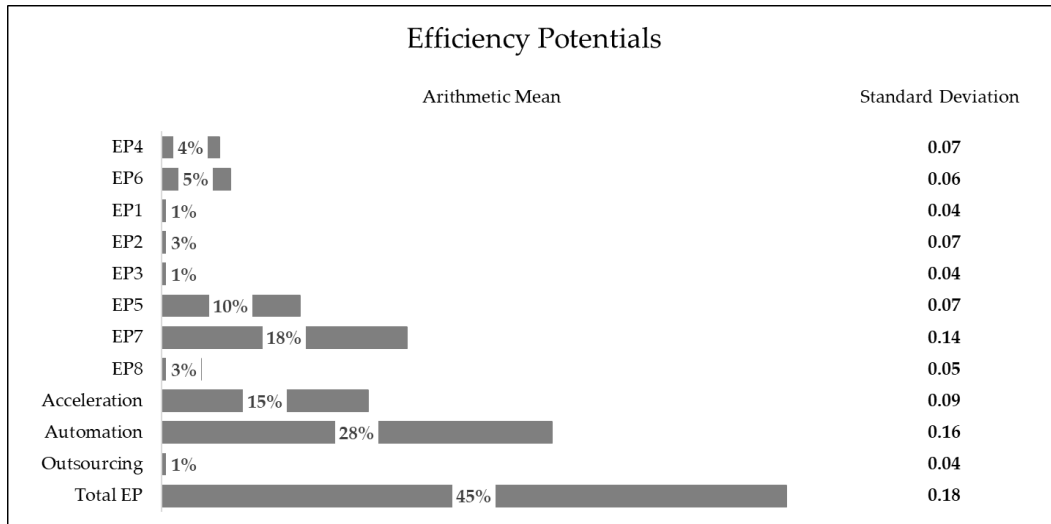
#### **Efficiency potential determination on task level**

The detailed analysis procedure also allows counting the absolute frequency of how often a task is classified as EPT or NEPT. Therefore, a frequency analysis on task level can be derived, which provides an overview of the most susceptible tasks according to the efficiency potentials. The analysis refers to how often a task is classified as EPT divided by the number of how often a task is performed in total (details in annex 19).

#### **Determination of the standard deviation and arithmetic mean for the total efficiency potentials**

The descriptive statistics of the eight efficiency potentials provide an overview of the individual contributions on the digital technology impacts of acceleration, automation, outsourcing, and the total efficiency potential of the data sample. The following figure includes the respective arithmetic means and the standard deviations.

Figure 21: Efficiency Potentials (Arithmetic Mean &amp; Standard Variation)



Source: own illustration

The average efficiency potential across the data sample reveals that 45 percent of the time, marketing and sales employees are subject to a possible increase in efficiency. Acceleration contributes 15 (EP 1, 4, 5), automation 28 (EP 2, 6, 7, 8), and outsourcing 1 (EP3) percentage points.

### 3.5 STRUCTURAL EQUATION MODELING

This chapter covers the procedure, method, and analysis of a multivariate analysis method, the structural equation analysis. It is used for a priori theoretical or factual logically formulated hypotheses structure with an effect-cause correlation between manifest and latent variables, represented in a so-called path diagram. Furthermore, it is transferred in a linear multi-equation system with simultaneously estimated path coefficients for holistic model validation (Weiber and Mühlhaus 2014, 21–22; Weiber and Sarstedt 2021, 7). The basic idea of structural equation models argues that associations between observable indicator variables can provide inferences to relations between a smaller number of underlying constructs, which are called latent variables (Homburg et al. 2008c, 557).

The upcoming sub-chapter details this summary and presents the structural equation model of this study derived from the qualitative research and validates the hypotheses of the model, which are presented in section 3.5.2. The first section of the chapter introduces the framework and method, followed by the procedure described in section two. Sections three and four present the examination criteria of the applied structural equation model and finally present the results. In addition, the base is created to analyze the collected data with the analysis method of structural equation modeling, including the final validation of the hypotheses. Also, to apply proper execution of structural equation-related work, this dissertation uses the SEM checklist from Ryan (2020), which contains nineteen criteria for what journal referees should look for in papers applying structural equation models.

#### 3.5.1 Introduction and Method

In general, the area of business management enjoys frequent attention to evaluations concerning causal dependencies in research and practice (Riekeberg 2002, 802). In social sciences, multivariate analysis methods have been developed, which investigate those cause-effect relationships, known as causality analysis or structural equation modeling. (Ringle 2004, 278). This multivariate statistical method allows the verification of a complex hypotheses model, and it formally reflects the relation between variables in such a way that their validity can be

empirically validated. Structural equation modeling begins with the theoretical hypotheses creation, proceeds with the formal representation of a hypotheses model, and ends with the empirical validation (Weiber and Mühlhaus 2014, 3; Weiber and Sarstedt 2021, 3). A significant advantage is that high statistical accuracy can be ensured even in the case of multiple correlations (Hair et al. 2010, 19). Based on that and accompanied by the general characteristics of the qualitative model of this study itself, it is assumed that there are multiple interdependencies between the variables of efficiency determination (acceleration, automation, outsourcing) and the five exogenous variables of age, educational degree, professional experience, annual salary, and digital technology knowledge.

The method consists of two major benefits. First, it allows the handling of simultaneous correlations (as already briefly introduced), while second, providing a broad consideration of problems through holistic correlation evaluation of the variables. This approach allows the transition of explorative studies (in the case of this study, the development of the qualitative model) toward confirmatory analysis (Hair et al. 2017a). It is furthermore mandatory to assume causality when deploying structural equation modeling, which is summarized by Cook and Campbell (1979, 31) with the three following requirements:

- The change or adjustment of the independent variable leads to a change or adjustment of the dependent variable resulting in a cause-and-effect relationship
- The change or adjustment of the independent variable occurs before the change or adjustment of the dependent variable (time sequence)
- The independent variable represents the only root cause for the change or adjustment of the dependent variable

According to these three requirements, Weiber and Mühlhaus (2014, 10) further stress whether it is possible to know all responsible causes for adjusting the dependent variable in practice. Since this aspect is basically never given, structural equation modeling considers an error variable that reflects not explainable variances of the independent variable. Additionally, it includes measurement accuracies and influencing factors that cannot be captured with the considered variables. Weiber and Mühlhaus (2014, 23–24) further detail the understanding of the different terminologies concerning applied variables in a structural equation model:

- Endogenous variables: explained by the effect of other factors
- Exogenous variables: predefined and serve as an explanation for the endogenous variables and not explained by the model
- Intervening variable: simultaneously predictor variable and dependent variable which precede another predictor variable within a structure model
- Manifest variable: directly observable on an empirical level and measurable
- Latent variables: not directly observable on an empirical level and not measurable, which requires a proper measurement model to capture the characteristics of the variables in reality

The structural equation model represents the theoretically assumed interdependencies between the constructs (latent, not observable variables), distinguished and separated between endogenous and exogenous constructs. Therefore, to determine latent variables, manifest variables are commonly used, also by following compositional approaches and calculating the measure of the latent variable by adding the components which determine the constructs (Backhaus et al. 2021, 6). For every exogenous construct, a hypothesis is formulated to explain its assumed effect on the model. Endogenous constructs, on the contrary, are explained by the stated causal relations within the model. All constructs are measured indirectly with items. In this study, the examples of the eight possible efficiency potentials are latent variables that cannot be observed directly and are measured indirectly through the questionnaire logic explained in 3.4.2 through the “efficiency potential determination per observation” paragraph. Making those latent variables measurable with observable indicators (manifest variables) is called operationalization with the help of a measurement model (Weiber Mühlhaus 2014, 36). Causality furthermore requires a necessary and sufficient condition. The necessary condition is given if there is statistical significance between the considered variables. Concluding causality is only possible if intensive theoretical and factually logical considerations of the material and theory are applied, the so-called sufficient condition (Weiber and Mühlhaus 2014, 12–20). Therefore, and within the course of this study, by developing a new model for efficiency determination, the factually logical consideration of the already existing theory and

newly developed qualitative model is crucial for successfully arguing the practical applicability of the model.

The following describes the specifics of latent constructs by explaining the structure of the two different measurement models (measurement hypotheses), the inner structure model (substance hypotheses), and the outer measurement models according to Weiber and Mühlhaus (2014, 36):

- The structure model represents the theoretically assumed correlations between latent variables. The endogenous latent variables are explained by the causal relations of the model, while exogenous latent variables serve as explaining factors that are, however, not explained by the causality model itself (Tenenhaus et al. 2005, 166)
- The measurement model contains the empirically collected data from the operationalization of the latent exogenous variables and represents the assumed correlations between the exogenous values.

After introducing the method, the following section focuses on how structural equation modeling with latent variables follows a step-by-step approach.

### 3.5.2 Modeling Procedure with Latent Variables

There are several approaches to designing the procedure to develop structural equation models in the literature. This thesis follows the procedure according to Weiber and Mühlhaus (2014, 37), who present a six-step approach<sup>196</sup> to evaluate structural equation models.

1. Classification of latent variables as either endogenous or exogenous
2. Creation of the structure model incl., including hypotheses formulation per endogenous variable
3. Creation of the measurement models per latent variable
4. Graphically presentation of the causality model (path diagram)
5. Estimation of the equation system

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<sup>196</sup> In the explanation of the procedure of the structural equation system this dissertation neglects the step “Development of the linear equation system,” because the linear equation system is visually presented in the path diagram and does not add an explanation or details for the understanding of the model. Therefore, only five of the proposed six steps are described in detail.



The description of this approach is further detailed as follows and is tailored to the theme of the dissertation.

### **Steps 1 and 2: Variable classification and creation of the structure model**

The results of the qualitative research allow the derivation of in total eight latent variables. The three efficiency potential shares of acceleration, automation, and outsourcing represent the latent endogenous variables. The five personal-related variables, which potentially impact the efficiency potential shares of age, educational degree, experience, income, and digital technology knowledge, represent the latent exogenous variables. The exogenous variables are not influenced by any other variables, but it is assumed that they influence the three endogenous variables of the digital technology impacts. For graphical demonstration purposes in the structure model, the endogenous variables are labeled with the symbol ( $\beta$ ), and the exogenous variables with the symbol ( $\delta$ ). A more detailed description of the model, including the relevant symbols to illustrate the structural equation model, is provided using the following nomenclature.

Table 22: Nomenclature of the Structural Equation Model

<b>Symbols</b>	<b>Description</b>
$\beta$	Latent endogenous variable (dependent variable)
$Y$	Measurement indicator for an endogenous variable
$\delta$	Latent exogenous variable (independent variable)
$X$	Measurement indicator for an exogenous variable
$\lambda$	Measurement error for the indicators $Y$ and $X$
$\pi$	Path coefficient of the latent exogenous variables and their indicators
$\gamma$	Path coefficient of the latent endogenous variables and their indicators
$H_{xx}(+)$	Represents the path coefficient between the latent variables of the structure model, which simultaneously represents the hypotheses

Source: own illustration but in the style of Weiber and Mühlhaus (2014, 39)

The assumptions from the qualitative model must be presented in such a way that every endogenous variable has one hypothesis, which results, in this case, in a total of fifteen hypotheses.

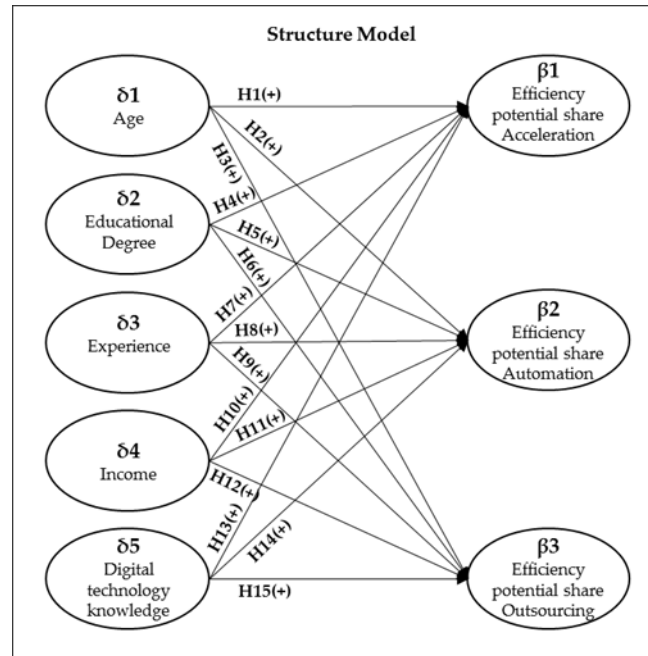
Table 23: Hypotheses

H1(+)	The higher the age ( $\delta_1$ ), the higher the efficiency potential share of acceleration ( $\beta_1$ ) (positive relation)
H2(+)	The higher the age ( $\delta_1$ ), the higher the efficiency potential share of automation ( $\beta_2$ ) (positive relation)
H3(+)	The higher the age ( $\delta_1$ ), the higher the efficiency potential share of outsourcing ( $\beta_3$ ) (positive relation)
H4(+)	The higher the educational degree ( $\delta_2$ ), the higher the efficiency potential share of acceleration ( $\beta_1$ ) (positive relation)
H5(+)	The higher the educational degree ( $\delta_2$ ), the higher the efficiency potential share of automation ( $\beta_2$ ) (positive relation)
H6(+)	The higher the educational degree ( $\delta_2$ ), the higher the efficiency potential share of outsourcing ( $\beta_3$ ) (positive relation)
H7(+)	The higher the professional experience ( $\delta_3$ ), the higher the efficiency potential share of acceleration ( $\beta_1$ ) (positive relation)
H8(+)	The higher the professional experience ( $\delta_3$ ), the higher the efficiency potential share of automation ( $\beta_2$ ) (positive relation)
H9(+)	The higher the professional experience ( $\delta_3$ ), the higher the efficiency potential share of outsourcing ( $\beta_3$ ) (positive relation)
H10(+)	The higher the income ( $\delta_4$ ), the higher the efficiency potential share of acceleration ( $\beta_1$ ) (positive relation)
H11(+)	The higher the income ( $\delta_4$ ), the higher the efficiency potential share of automation ( $\beta_2$ ) (positive relation)
H12(+)	The higher the income ( $\delta_4$ ), the higher the efficiency potential share of outsourcing ( $\beta_3$ ) (positive relation)
H13(+)	The higher the digital technology knowledge ( $\delta_5$ ), the higher the efficiency potential share of acceleration ( $\beta_1$ ) (positive relation)
H14(+)	The higher the digital technology knowledge ( $\delta_5$ ), the higher the efficiency potential share of automation ( $\beta_2$ ) (positive relation)
H15(+)	The higher the digital technology knowledge ( $\delta_5$ ), the higher the efficiency potential share of outsourcing ( $\beta_3$ ) (positive relation)

Source: own illustration

The hypotheses create the structure model of the final structural equation model. The structure model includes the latent variables solely. Assumed causality between variables is displayed with arrows, while arrows only originate from exogenous variables and always point towards only one endogenous variable.

Figure 22: Structure Model



Source: own illustration

### Step 3: The measurement models of causality analysis

Latent variables have the character of not being directly observable or measurable. In the case of this study, the three efficiency potential variables comply with this understanding and require, therefore, an operationalization. The allocation of empirical indicator variables within the context of the measurement models must occur under theoretical factual and logical clarification of the practical meaning of the construct (Fassott and Eggert 2005, 40). The corresponding operationalization is illustrated in figure 11, the decision tree according to the efficiency computation model. The research participants navigate with yes and no answers through the questionnaire to provide feedback about the effective efficiency potentials of their daily tasks.

The measurement indicators of the latent variables can generally be distinguished between formative and reflective measurement models (Blalock 1964, 136). In formative measurement models (regression analytical approach), there is no empirical data for the latent variable as a dependent factor of the regression, which therefore requires an estimation of the relation to other latent variables. The empirical indicator variables are the cause for the extent of the latent

construct (Homburg et al. 2008b, 293). On the contrary, there are reflective measurement models (factor analytical approach), which imply a high correlation between the measurement variables and cause the latent variable (Homburg et al. 2008b, 293). Therefore, the latent variable is understood as the independent variable instead of the dependent variable.<sup>197</sup> Even though the literature provides many remarks about differential use, the proper differentiation of formative and reflective measurement models within the practical application of studies is not applied. However, reflective measurement models dominate, as found by Fassott and Eggert (2005) and Jarvis et al. (2003) in meta-studies. Furthermore, in practice and science, there are examples and analyses of how often authors of specific journals fail to classify the variables correctly. Fassott and Eggert (2005, 44) found that out of 25 articles with 135 latent variables in the journal "Marketing ZFP," 80.7 percent should have been operationalized formatively instead of reflectively. Eberl (2004, 22) did a similar meta-analysis with the "Journal of Marketing" and found that out of 34 articles with 353 variables, 11 percent are wrongly classified as reflective.

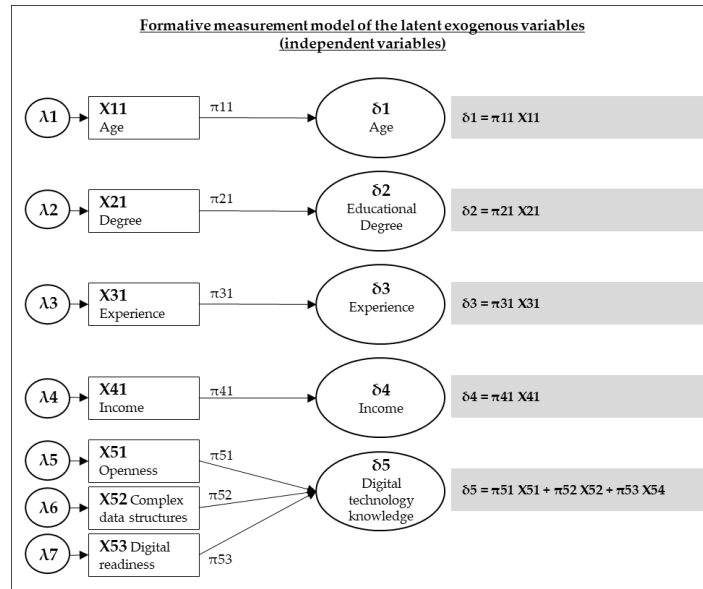
Even if literature proposes using already utilized measurement models from previous studies, also own considerations are accepted if they either have been validated with prior explorative studies or are based on prior explorative studies (Homburg and Klarmann 2006, 732). Especially in this dissertation, it is not possible to use already existing measurement models since one of the main objectives is based on the motivation to create a new model for efficiency determination derived from a clearly defined research gap in the conceptualization on a granular level.

In this study, both measurement models follow a formative structure since the change of the characteristic of the measurement variable leads to a change of the characteristic of the latent variable. The following figure presents the formative measurement model of the exogenous variables, including the mathematical equations to calculate them.

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<sup>197</sup> For details, Jarvis et al. (2003, 201) provide an overview of the differences.

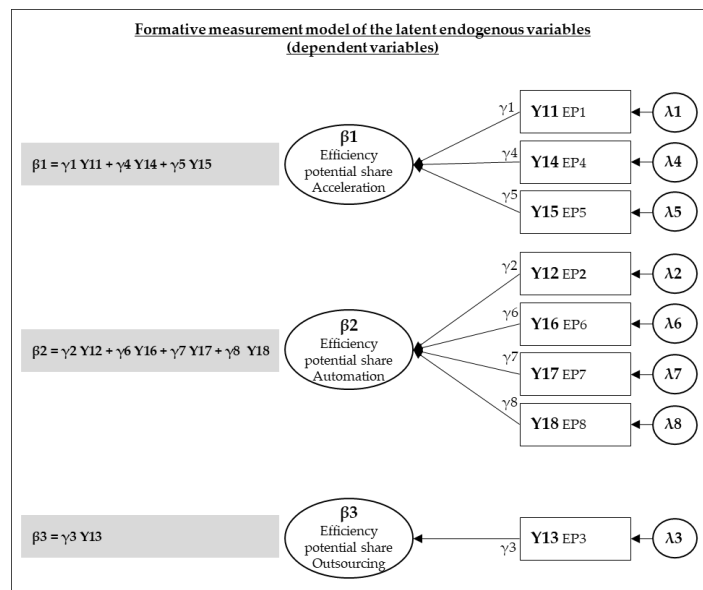
Figure 23: Formative Measurement Model of Exogenous Variables



Source: own illustration but in the style of Weiber and Mühlhaus (2014, 41)

Analog to the illustration of the formative measurement model of the exogenous variables, the following figure presents the formative measurement model of the endogenous variable, including the mathematical equation.

Figure 24: Formative Measurement Model of Endogenous Variables



Source: own illustration but in the style of Weiber and Mühlhaus (2014, 41)

The process to identify the measurement models as either formative or reflective in this study follows the proposed decision criteria according to Weiber and Mühlhaus (2014, 42), supported by the questionnaire of Jarvis et al. (2003, 203).<sup>198</sup> It is essential to classify the measurement models correctly as either formative or reflective and use the correct measurement instruments. By differentiating between covariance and variance analytic analysis, the following section (3.5.3) specifies the individual characteristics of both analyses.

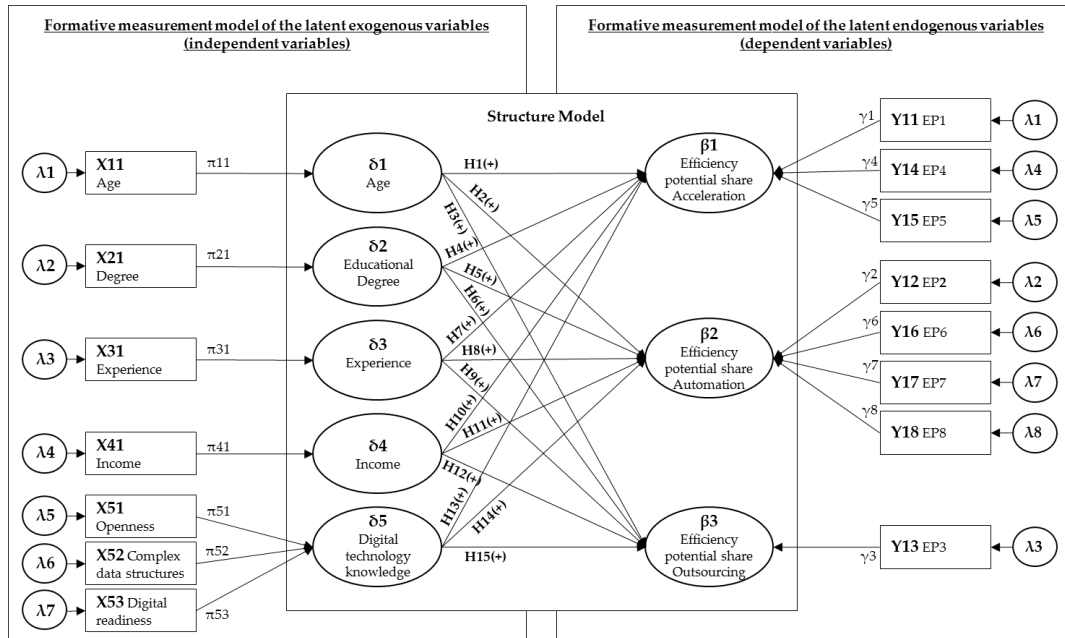
#### **Step 4: Path diagram of a complete structural equation model**

Path analysis in economic and social sciences is an independent procedure to evaluate causality between variables based on regression analysis (Riekeberg 2002, 803). Based on the description of the structure model and the measurement model accompanied by the nomenclature of symbols, figure 25 represents the complete structural equation model (causality model), which is assembled out of the previously presented structure model and the two formative measurement models. The structure model consists of five latent exogenous constructs ( $\delta$ ) and three latent endogenous constructs ( $\beta$ ). The assumed relationship between the variables is visualized with arrows, called path coefficients ( $\pi$  and  $\gamma$ ), while the arrow direction implies the direction of the effect. The path coefficients between the latent variables are presented utilizing the symbols of the formulated hypotheses to design the applied structural equation model. It is an indicator of the strength of the causality relation. According to Wright (1934) and the fundamental theorem of path analysis, effect relations can be distinguished between direct and indirect causal effects, which result in an added version of the total causal effect. The measurements of the considered factors typically contain measurement errors covered by error variables ( $\lambda$ ). The visualization of the presented structural equation model follows the eight general construction rules for developing a path diagram according to Weiber and Mühlhaus (2014, 46).

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<sup>198</sup> For details see both literature references.

Figure 25: Total Structural Equation Model



Source: own illustration but in the style of Weiber and Mühlhaus (2014, 46)

**Step 5: Estimation of the Equation System**

Estimating the equation system requires differentiation between the variance and covariance analytical approach. Furthermore, once determined which approach for this dissertation is the most appropriate, the method is detailed accordingly. The following paragraphs briefly present both approaches.

The covariance analytical approach is attributable to the work of Jöreskog (1970; 1973). This approach also builds the basis of the software program LISREL (linear structural relationships), QS, and AMOS (Weiber and Mühlhaus 2014, 54). The general idea follows the objective of creating simultaneous inferences on dependencies between latent constructs based on variances and covariances of the corresponding indicator variables (Riekeberg 2002, 803; Weiber and Mühlhaus 2014, 54). Thus, the correlation between indicator variables is based on the effect of the latent variable. This statistical procedure is based on confirmatory factor analysis.

On the contrary, the variance analytical approach is based on the work of Wold (1966; 1973; 1975; 1980; 1982). Lohmöller (1984; 1989) used this so-called partial least square approach as a basis for the implementation in the software

program LVPLS (latent variables path analysis with partial least squares estimation), which is still used for other programs today, such as Visual PLS, PLS-Graph, and SmartPLS (Weiber and Mühlhaus 2014, 67). The general idea is to receive reliable estimations even in the case of a relatively low information basis (Wold 1980, 70). The on two steps based partial least squares approach estimates in the first step concrete values for the latent variables generated from the empirical data, which are in the second step used to estimate the parameter in the structure model (Weiber and Mühlhaus 2014, 67). The approach tries to present a prognosis as precisely as possible to the actual values. Thereby, it is attempted to minimize the variance of the error variables in both the structure and the measurement model (Herrmann et al. 2008, 571).

However, the objective of this dissertation is not the detailed comparison between the two statistical procedures but the profound application and presentation of the most appropriate approach. The following table summarizes both procedures' critical aspects and requirements to determine the correct approach.<sup>199</sup> With particular reference to the sample size for the PLS approach and the achievement of reliable results, there are fewer empirical observations needed than in comparison to covariance analytical analyses because partial parts of the causality model are estimated, resulting in a minimum sample size of 30 and 100 observations (Chin and Newsted 1999, 314). Chin (1998b, 311) provides a guiding value of at least ten times the maximal number of indicator variables of those latent variables with the highest number of formative indicators. However, the variance analytical approach is not supposed to be seen as a substitution for the covariance analytical approach, and vice versa, but as a complementation based on different targets within the causality analysis (Weiber and Mühlhaus 2014, 78).

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<sup>199</sup> For a very current discussion and comparison see also Hair et al. (2017b).



Table 24: Variance Analytical Versus Covariance Analytical Approach

<b>Evaluation Criteria</b>	<b>Variance Analytical Approach</b>	<b>Covariance Analytical Approach</b>
<b>Objective</b>	Best possible prognosis of empirical data structures	Best possible reproduction of the empirical variance-covariance matrix
<b>Theory Relation</b>	Prognosis-orientated approach (soft modeling)	Theory validation approach (hard modeling)
<b>Target function</b>	Minimization of the differentiation between observed and estimated case data (partial least square)	Minimization of the difference between empirical and model theoretical covariances
<b>Methodology</b>	Regression analytical approach with a two-step estimation of structure and measurement model	Factor analytical approach with simultaneous estimation of all parameters of the causality model
<b>Data Basis</b>	Initial data matrix	Variance-covariance matrix
<b>Latent Variable</b>	Values of the variables explicitly estimated	Values of the variables not determined
<b>Structure Model</b>	Recursive models only	Recursive and non-recursive models
<b>Measurement Model</b>	Formative and reflective	Primarily reflective; formative measurement models require special procedures
<b>Distribution Assumption</b>	none	Multivariate normal distribution
<b>Quality Assessment</b>	Partial quality criteria (prognosis of the data matrix)	Global and local inference statistical quality criteria
<b>Sample Size</b>	Small sample size (minimum size between 30 and 100)	Big sample size (dependent on the complexity of the model and estimation procedure and minimum size between 200 and 800)
<b>Scale Niveau</b>	No limitations	At least an interval scale
<b>Theory Requirements</b>	Flexible	High
<b>Model Comparison</b>	With limitations only	possible
<b>Model Complexity</b>	High complexity (e.g., models with 100 latent constructs / 1,000 indicators analyzable)	Low to middle complexity (e.g., models with < 100 indicators analyzable)
<b>Software Programs</b>	LVPLS, PLS Graph, SmartPLS	LISREL, EQS, AMOS

Source: own illustration but in the style of Weiber and Mühlhaus (2014, 74) enriched with data from Chin and Newsted (1999, 314), Bliemel et al. (2005, 11), Herrmann et al. (2006, 44)

Additionally, Chin and Newsted (1999, 337) emphasize the following aspects to favor the PLS approach, which also supports the application of the PLS approach in this dissertation:

- The research phenomena are novelties without any profound measurement or construct theories
- Correct prognoses represent a major target
- There is only a small sample size

Ultimately, and as presented, the circumstances of formative measurement models propose the application of variance analytical analysis, which finds application in the model of this dissertation. The further analysis procedure of the data is explained through the software program SmartPLS and a variance analytical approach to meet the recommendation. By applying the partial least square approach, the causality model is divided into an inner model (structure model) and an outer model (measurement model), as already presented and elaborated in the previous sections. According to Lohmöller (1989, 30 et. seqq.) and Weiber and Mühlhaus (2014, 68 et. seqq.), the partial least squares estimation algorithm follows a three-step approach:

1. Iterative determination of the construct values for latent variables with multiple regression (formative measurement model)
  - a. inner estimation of the construct value (a.1: estimation of the inner weights; a.2.: calculation of the inner estimation value for latent variables)
  - b. outer estimation of the construct value (b.1: estimation of the outer weights; b.2.: calculation of the outer estimation value for latent variables)
2. Determination of the path coefficients of the structure model
3. Determination of the mean values and constants for the regression function

In the first step, the raw data gathered from the questionnaire is used to estimate concrete values for all latent variables through four partial steps and repeated iteratively (Tenenhaus et al. 2005, 202; Weiber and Mühlhaus 2014, 68). Such construct values are also called “scores” or “case values” (Weiber and Mühlhaus 2014, 68). As described in the three-step approach, the inner weights for the latent variables are first estimated. The algorithm nevertheless requires an

initialization of the estimation as a starting point (Lohmöller 1989, 28 et. seqq.). PLS uses information from both the structure and the measurement model to receive the most valid construct values possible. Since the estimation for latent variables follows a regression analysis approach, the weighting sizes are determined, and those sizes are used to calculate the construct values (Weiber and Mühlhaus 2014, 69).

To determine the inner weights, Weiber and Mühlhaus (2014, 70) describe three weighting schemes: i) the Centroid Weighting Scheme: if there is a relation between the latent variables, the inner weighting size equals the sign of the correlation of the latent variables<sup>200</sup>, ii) the Factor Weighting Scheme: insofar there is a relation between the latent variables, the inner weighting size equals the correlation between the latent variables<sup>201</sup>, and iii) if the latent variable is a successor of another latent variable, the inner weighting size equals the correlation between the two variables. If the latent variable is a predecessor of another latent variable, the inner weighting size equals the regression coefficient.<sup>202</sup> The values can therefore be on an interval of -1 and +1, which is valid for adjoining variables. Otherwise, the inner weight is 0 (Lohmöller 1989, 29). Once the inner weighting sizes are determined, the found weight is used to calculate the inner construct value. The resulting value also counts for the outer construct value estimation (Weiber and Mühlhaus 2014, 70)

To determine the outer weights, the construct value of a latent variable results from a linear combination of its allocated manifest variables. At this moment, a differentiation between reflective and formative measurement models is required, while in this study, only formative measurement models are described. The outer weights are determined utilizing a multiple regression analysis in which regression coefficients, the estimation value dependent latent variable, and its corresponding indicator variables are used as outer weights (Lohmöller 1989, 29; Weiber and Mühlhaus 2014, 71). Once the outer weighting sizes are determined, the outer construct value can be calculated, derived from the described linear combination of a latent variable and the corresponding indicator variables.

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<sup>200</sup> For a detailed description see also Wold (1982).

<sup>201</sup> For a detailed description see also Lohmöller (1989).

<sup>202</sup> For a detailed description see Weiber and Mühlhaus (2014).

As soon as the results are calculated, this iterative process (the four sub-steps from step one) switches between the inner and outer approximation until the weights almost show no difference anymore (Wold 1982, 14). This condition is called convergence and counts as achieved when the change of the weights is  $\leq 0.001$  (Chin and Newsted 1999, 320). Wold (1982, 14) recommends canceling the algorithm if the sum of the squared weight changes between the iterations and undercuts a value of  $10^{-5}$ . The construct value can be used to estimate the path coefficient if the convergence criterion is successful. Weiber and Mühlhaus (2014, 72) describe that the PLS approach is named after this iteration process because, during both estimations (inner and outer model), least square estimations are applied, for which only partial information (either inner or outer model) is used.

In the second step, the PLS algorithm calculates the path coefficients and factor loads based on the least squares method with the results from the iterative first step (Lohmöller 1989, 30).

In the third and last step, the PLS algorithm calculates the mean and location parameters for the linear regression function (Chin and Newsted 1999, 315).

### 3.5.3 Examination of the Model

The variance and covariance analytical approaches have similar quality measurements to assess causality models with latent variables (Homburg et al. 2008c, 573). Nevertheless, the covariance analytical approach uses parametrical quality measurements with missing distribution assumptions, which does not apply to variance analytical approaches (Chin 1998b, 316). Therefore, the examination procedure of the model quality differs between reflective and formative models. Quality assessments for formative measurement models include the collinearity test, while nevertheless, the reliability assessment according to reflective models is only limited applicable since these criteria mostly focus on the indicator correlations, but formative indicators should only correlate slightly. Therefore, reliability assessment criteria for reflective indicators such as the average variance extracted (AVE) and composite reliability (CR) do not find application in this thesis, while also for validity, other procedures must be applied (Weiber and Mühlhaus 2014, 262).

For reliability, there is only the possibility of so-called test-retest reliability, which is difficult to apply practically, because the same information needs to be collected from the same research participants twice (Weiber and Mühlhaus 2014, 264). Therefore, the concentration for formative measurement models in this dissertation lies on the quality type of validity, which is in line with the proposal of the referenced literature. For validity and based on the initial work of Wold (1982), there are non-parametric tests that meet the estimations of the free distribution of empirical data and not the goodness of the fit of covariance analyses, also emphasized by Chin and Newsted (1999, 328).

The following three sub-sections present the examination procedures of the measurement model, the structure model, and ultimately the overall model, which are applied in the data analysis section.

#### 3.5.3.1 *Examination of the Measurement Model*

Two major quality types are considered to assess a formative measurement model employing quality criteria: validity and collinearity. Both are explained in detail as follows.

For the quality type validity, the indicator relevance can provide valuable information. Before that, it has to be distinguished whether the indicator relevance is statistically significant with the help of the alpha error (Hair et al. 2021, 96). The measurement unit to describe the indicator relevance is expressed with the indicator weight, and the higher the weight, the stronger the indicator's effect in the allocated construct (Krafft et al. 2005, 77). Both analyses help to decide whether to eliminate or keep certain indicators according to their effect. This study follows the decision-making process proposal of Hair et al. (2021, 95) for eliminating or keeping formative indicators, explained in the following two paragraphs.

The indicator size is interpreted if the indicator's weight is significant with an exemplary threshold of  $t \geq 1.96$ . The standardized value of weights ranges from +1 to -1, while +1 implies a positive and -1 a negative relationship, and every value close to 0 implies a very weak relationship (Hair et al. 2021, 96; Krafft et al. 2005, 78). Furthermore, the literature argues that a minimum value of 0.1 (Lohmöller 1989, 60 et. seq.), respectively 0.2 (Chin 1998b, 324 et. seq.) is mandatory to weight formative indicators at all. Consequently, if a value is not significantly differentiable from 0, the indicator has very low relevance for explaining the

construct (Diamantopoulos and Riefler 2008, 1189). Weiber and Sarstedt (2021, 284) add that such indicators should probably be eliminated from the measurement, which, however, should not be performed just because of statistical criteria but also because of profound theoretical justification. Removing indicators could result in a falsification of the content of the construct, including a wrong measurement model specification (Jarvis et al. 2003, 202). Also, if an indicator does not significantly correlate with, e.g., another indicator or criterion, the indicator can probably be eliminated from the measurement model (Weiber and Sarstedt 2021, 284). Analog to that, is it also possible to assess the correlation of an entire formative construct with a reflective measurement or single item of the same concept for which a correlation of  $\geq 0,708$  is accepted (Hair et al. 2021, 96). This procedure is called redundancy analysis and is especially applied in PLS modeling (Weiber and Sarstedt 2021, 284). However, this analysis method doesn't find application in this dissertation because no reflective measurement items exist.

Furthermore, and in contrast to a significant indicator weight, the indicator weight can also be not significant. Therefore, Hair et al. (2021, 95) propose analyzing the indicators loading. If the loading is  $\geq 0.5$ , keep the indicator. If the loading is  $< 0.5$ , test the significance of the indicator's loading. If it is again not significant, delete the indicator. If it is significant, it is possible only to consider the removal of the indicator.

The next quality criterion is the variance inflation factor (VIF) which refers to the quality type of collinearity. In formative measurement models, the indicators must show low multicollinearity (Weiber and Sarstedt 2021, 284). Today, the most common measure for multicollinearity is represented by the VIF (Backhaus et al. 2021, 123). The easiest way to counteract high multicollinearity is to remove indicators with a high VIF (Backhaus et al. 2021, 124). Typically, values  $> 10$  are already seen as critical as they lead to a distortion of the identification of the regression parameters (Herrmann et al. 2006, 61). Once the VIF value is  $> 3$ , the indicator should be examined under factually logical conditions for its necessity (Weiber and Sarstedt 2021, 284). It is unproblematic to eliminate the indicator if it is of minor importance, but it becomes problematic if the indicator is critical since

usually, the model adjustment ( $R^2$ )<sup>203</sup> decreases and the standard error of the regression increases (Backhaus et al. 2021, 124; Weiber and Sarstedt 2021, 284).

Another criterion for the assessment of multicollinearity is the condition index (CI) which allows, through the variance decomposition, the identification of indicators correlating with each other while values  $\leq 30$  are accepted (Krafft et al. 2005, 79). However, the focus of the applied and interpreted quality criterion for multicollinearity is on the VIF. The following table ultimately provides an overview of the criteria and summarizes the threshold for quality assessments of formative measurement models.

Table 25: Quality Criteria for Formative Measurement Models

Quality type	Quality criterion	Threshold	Source
Validity	Significance of indicator relevance (measured in indicator weights)	$t \geq 1.65$ ( $\alpha=10\%$ ) $t \geq 1.96$ ( $\alpha=5\%$ ) $t \geq 2.576$ ( $\alpha=1\%$ )	Hair et al. (2021, 96) for all thresholds and Anderson and Gerbing (1988, 417) for $\alpha=5\%$
	Indicator weights	+1 (positive) -1 (negative)	Krafft et al. (2005, 78) & Hair et al. (2021, 96)
	Indicator loading (only if indicator relevance is not significant)	$\geq 0.5$	Hair et al. (2021, 96)
Collinearity	Variance Inflation Factor (VIF)	$\leq 10$	Kim and Timm (2006, 63); Krafft et al. (2005, 82) & Herrmann et al. (2006, 61)
		$\leq 5$	Diamantopoulos and Riefler (2008, 1193)
		$> 3$ (must be examined)	Weiber and Sarstedt (2021, 284)
	Condition Index (CI)	$\leq 30$	Krafft et al. (2005, 79 et. seq.)

Source: own illustration but in the style of Weiber and Mühlhaus (2014, 266)

### 3.5.3.2 Examination of the Structure Model

After assessing the formative measurement model, the structure model is examined. The quality criteria for the structure model are distinguished by

<sup>203</sup> Further explanation and details in the next sub-section.

examining three quality types: the path coefficients, the constructs, and the robustness of the estimations. Each type consists of certain criteria, which are elaborated on in this section.

The coefficient of determination ( $R^2$ ) is considered the central criterion for quality examination of the structure model within the PLS approach and determines the variance share of an endogenous latent variable (Chin and Newsted 1999, 316; Henseler 2005, 74). For the interpretation of  $R^2$ , Chin (1998b, 323) proposes three thresholds for weak, medium, and strong at  $\geq 0.19$ ,  $\geq 0.33$ , and  $\geq 0.67$ .  $R^2$ , however, enjoys the possibility of exceptions. Even lower values can be interpreted as substantial if the research applies in a field where unconsciously or consciously, certain influencing variables have not been considered in the overall structural equation model (Schloderer et al. 2009, 594). An example is presented by Bauer (2002, 250 et. seqq.), who analyzes the controlling contribution to corporate success and finds in his results of the dependency analyses that a value of 0.17 is to be interpreted as strong.<sup>204</sup> Nevertheless, the higher the coefficient of determination, the higher the variance share. According to Chin (1998b), a deviation of the thresholds must be reasonably explained since lower values practice criticism on the model.

Examining the path coefficients provides transparency about the effect strength of the latent variables. Standardized path coefficients range from +1 (positive effect) to -1 (negative effect), which respectively represent a strong effect on the appointed variable in the causality model, while 0 has no effect (Weiber and Mühlhaus 2014, 229). The value of a path coefficient is only deemed as meaningful if it is  $\geq 0.2$ , respectively  $-0.2$  (Chin 1998a, 11).

Proof of solid relevance of an indicator within the model structure is provided if the t-value is  $\geq 1.96$ , while rejected hypotheses with a negative value also provide valuable information (Herrmann et al. 2006, 59). Even if in variance analytical procedures, no significance tests are accepted because of missing distribution assumptions of the sample, the non-parametric method bootstrapping calculates a t value for every path coefficient to be able to assess their significance (Weiber and Mühlhaus 2014, 327).

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<sup>204</sup> It is argued, that several more variables practice influence on the corporate success besides the controlling unit which are probably not depicted in the total model.



Besides the path coefficients, the effect size ( $f^2$ ) represents a further dimension to determine the effect of a latent exogenous variable on a latent endogenous variable (Chin 1998b, 316 et. seq.). The effect is determined by changing the coefficient of determination ( $R^2$ ) of the endogenous variable, while the structure model is calculated, once with the responsible exogenous variable and once without. Chin (1998b, 317) interprets  $f^2$  as weak, medium, and strong with thresholds of  $\geq 0.02$ ,  $\geq 0.15$ , or  $\geq 0.35$ , which he equates with the operational multiple regression definition of Cohen (1988). The effect size also allows the possible detection of causalities for which the tested structure model does not offer hypotheses. However, Huber et al. (2007, 46) emphasize that new hypothetical relations should only be added if there is profound theoretical reasonability. In the model of this dissertation, this probability is not realistic, because for all exogenous variables there is causality of the endogenous variables assumed.

As already briefly introduced, the variance analytical approach allows the assessment of the model stability only with the help of non-parametric resampling procedures to determine the path significance since no distribution assumption exists (Weiber and Mühlhaus 2014, 327). The bootstrapping method allows to overcome the missing theoretical distribution function with an empirical distribution function of the sample (Efron 1979). Thus, robust confidence intervals can be determined by identifying the significance value through t-tests (Ringle 2004, 310; Chin 1998b, 320). With the bootstrapping procedure, the null hypothesis can be evaluated with a t-test, assuming that the estimated path coefficients do not differ significantly from the value zero. If a t-value is  $\geq 1.96$ , it indicates that the respective parameters are very relevant to the model structure, and the null hypothesis can generally be rejected with an error probability of 5 percent (Weiber and Mühlhaus 2014, 327). It is important to mention, also in reference to the following table, that for example, a t-value of  $\geq 1.96$  must not necessarily imply a p-value of  $< 0.05$ , even if it is true in most cases.

Table 26: Quality Criteria for Structure Models

Quality type	Quality criterion	Threshold	Source
Examination of path coefficients	Standardized path coefficient	$\geq 0.2-0.3$ $\geq 0.1$	Chin (1998a, 11) Lohmöller (1989, 60 et seq.)
	t-value	$\geq 1.65$ $\geq 1.96$	2-tailed t-test ( $\alpha=0.1$ ; 0.05)
	Effect size ( $f^2$ )	0.02 (weak) 0.15 (medium) 0.35 (strong)	Chin (1998b, 317)
Examination of the constructs <sup>205</sup>	Coefficient of determination ( $R^2$ )* (*size of required $R^2$ must be defined according to the field of application)	0.19 (weak) 0.33 (medium) 0.66 (strong)	Chin (1998b, 323)
Examination of robustness of the estimation	Requirements: Sample size must be representative of the total population Sample size must be big enough (e.g., $N \geq 100$ ) Enough bootstrap-sample (e.g., $B=200$ ) Size n of bootstrap samples must be comparable with sample size N		Byrne (2001, 270 et. seq.)

Source: own illustration but in the style of Weiber and Mühlhaus (2014, 331)

### 3.5.3.3 Examination of the Overall Model

The PLS approach does not allow the general examination of the model quality since no uniformly accepted criterion exists (Huber et al. 2007, 43) as is the case for covariance analytical approaches, e.g., goodness-of-fit-index (GoF) for

<sup>205</sup> A further method for the examination of the constructs is represented by the prognosis relevance  $Q^2$  based on Geisser (1974) and Stone (1974) which is used to assess the usability of the measurement and structure model for prognosis creation. The results are calculated with the help of the blindfolding procedure (Tenenhaus et al. 2005, 174 et. seqq.). Caused by the fact, that this criterion is only applicable to reflective measurement models (Weiber and Mühlhaus 2014, 324), it is neglected in this study. Another criterion for predictiveness is represented by the average variance measure according to Fornell and Larcker (1981) for reflective measurement models.

LISREL (Herrmann et al. 2006, 59). This matter falls victim to the iterative procedure of the PLS algorithm, as already explained (Herrmann et al. 2006, 42). Henseler and Sarstedt (2013, 570) support this view and argue that the GoF is not generally recommendable for formative indicators and emphasize its Inappropriateness since formative models are “partly based on average communalities.” They also stress that implementing latent variables with single-item measurement, which is the case in this study, increases the GoF even though it must not increase predictive validity or reliability. Esposito Vinzi et al. (2010) propose to simply refrain from single-item variables. Therefore, the presented quality criteria must be cumulated. If all quality criteria deemed relevant for the presented model fulfill the requirements of the thresholds, the entire model (structure and measurement model) is interpreted as reliable (Weiber and Mühlhaus 2014, 330). Nevertheless, Homburg et al. (2008c) emphasize that researchers should desist from rejecting the entire model only because single local quality criteria do not achieve the threshold values. Not all proposed quality criteria must be fulfilled to receive a reliable model estimation. Ultimately, models with various variables and relationships within the structure and measurement model are not necessarily more valuable or better models, but the meaningfulness can be distorted through too many variables (Diller 2006, 612). Lastly, in formative models, it is recommended to analyze the path coefficient, including their significance, to determine the most relevant paths in the model and those which might be discarded Henseler and Sarstedt (2013, 577).

#### **3.5.4 Data Analysis**

The data analysis section describes the quantitative research results of the study. At the center of the analysis are the examination of the latent variables (measurement model) and the hypothesis validation (structure model). The applied structural equation modeling with the statistic software SmartPLS examines the results per construct individually and validates the quality criteria regarding validity and reliability. Ultimately, the results are summarized, and the individual hypotheses are evaluated, including a recommendation to either support or reject them. Also, in this dissertation, the author assumes linearity of the data even though it is not explicitly tested and validated across all variables.

### 3.5.4.1 Results of the Empirical Investigation

This sub-section aims to provide empirical evidence about potential correlation and relations between the exogenous and endogenous variables. The endogenous variables are based on the conceptualization of the efficiency determination model as a result of the qualitative research representing the eight efficiency potentials allocated to the three accumulated efficiency potentials of acceleration, automation, and outsourcing. The exogenous variables are deemed influence dimensions to affect the efficiency potentials derived from the applied qualitative research or concerning already applied and related research studies. Table 27 illustrates the variable operationalization and scales.

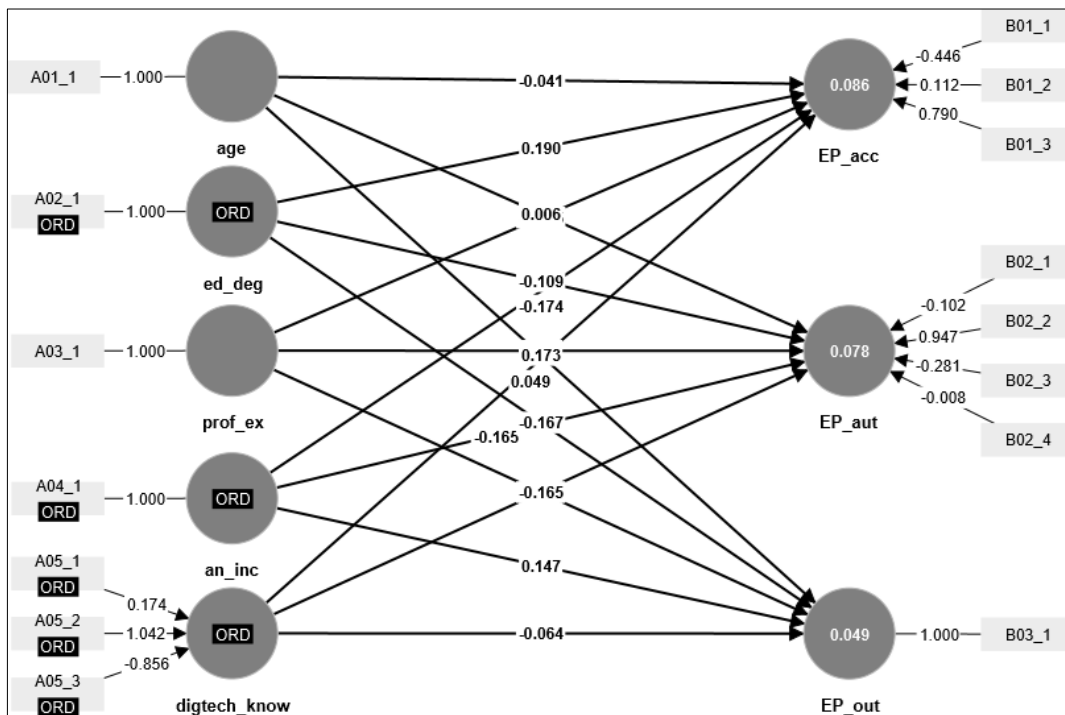
Table 27: Measurement of Items

Item	Variable Code	Measurement	Translation	Final Scale
Age	A01_1	in years	-	metric
Education Degree	A02_1	no vocational qualification	1	ordinal
		at least two years of vocational training	2	
		master craftsman/technician (or equivalent)	3	
		University bachelor's degree	4	
		University master's degree	5	
University doctoral degree	6			
Professional Experience	A03_1	in years	-	metric
Annual Income	A04_1	0-19.999 EUR	1	ordinal
		20.000-39.999 EUR	2	
		40.000-59.999 EUR	3	
		60.000-79.999 EUR	4	
		80.000-99.999 EUR	5	
		100.000 EUR and more	6	
Openness Comfort Readiness	A05_1 A05_2 A05_3	Likert scale of 1-5	-	ordinal
EP 1 EP 4 EP 5 EP 2 EP 6 EP 7 EP 8 EP 3	B01_1 B01_2 B01_3 B02_1 B02_2 B02_3 B02_4 B03_1	in percent	Efficiency Determination Model	metric

Source: own illustration

According to the explanations from chapter 3.5.3, the examination of the measurement model and structure model is presented and evaluated individually. The examination of the measurement model (outer model) is based on the derived validity and collinearity criteria. In contrast, the structure model (inner model) is based on the examination of path coefficients, constructs, and stability of the estimation. The inner model also validates or falsifies the assumed correlations between the latent variables, formulated as hypotheses. The following two figures illustrate the structural equation model extracted from the statistic software SmartPLS with the individual results. Figure 26 presents the indicator weight of the outer model, path coefficients of the inner model, and coefficient of determination of the constructs.

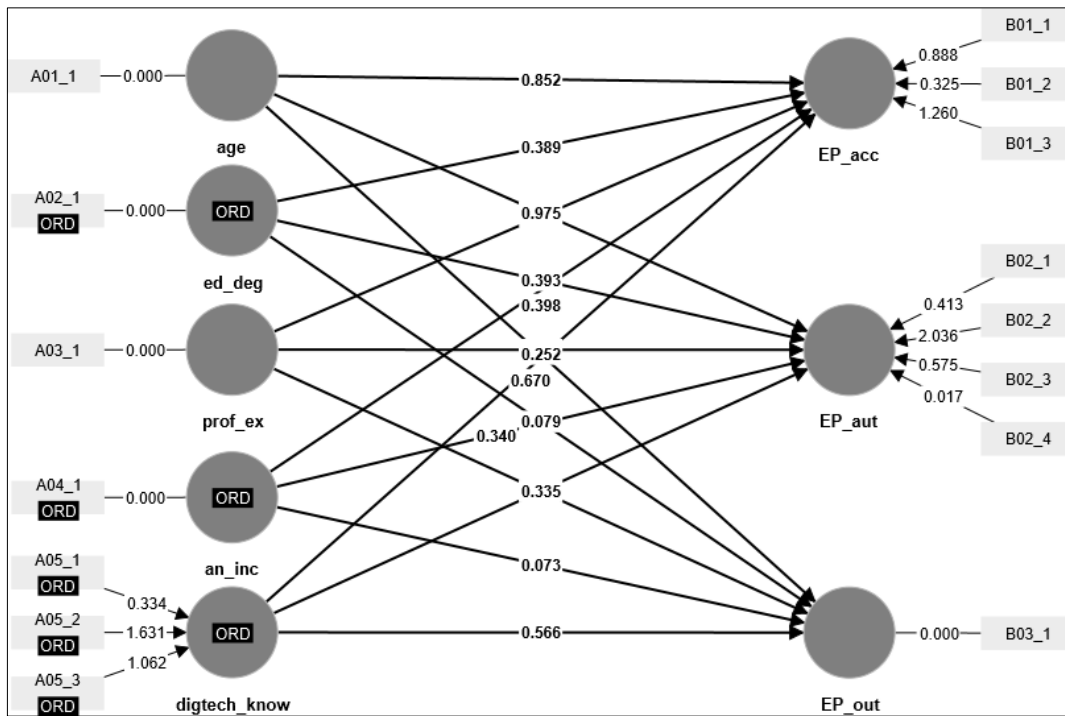
Figure 26: SmartPLS Results for Weights, Path Coefficients & R<sup>2</sup>



Source: own illustration but in the style of SmartPLS 4 extract

Figure 27 presents the t-value for the outer model and p-values for the inner model of the path coefficients (figure 27).

Figure 27: SmartPLS Results for P- & T-Values of Path-Coefficients



Source: own illustration but in the style of SmartPLS 4 extract

The following two sub-sections present the results of the model, and the validation and interpretation of the results are distinguished between the outer (3.5.4.2) and the inner (3.5.4.3) model.

### 3.5.4.2 Measurement Model Validation and Interpretation

As already argued in sub-section 3.5.3.1, in this dissertation, the proposed procedure of Hair et al. (2021, 95) is used to assess whether a formative indicator of the measurement model should be kept in the model or not concerning the quality criterion of validity. Based on bootstrapping of, first, the outer weights and second, the outer loadings, the following table allows a significance analysis of the indicators. Also, the outer weights, outer loadings, respective sample means, and standard deviations are presented.

Analyzing the results of the weights bootstrapping in table 28, the p-value and t-value only reveal significance for EP6. Consequently, and according to the procedure, only this indicator could be interpreted according to its original sample weights. Weights of 1.000 and p/t-values of 0.000 are respectively indispensable for constructs that are only achieved if the construct has only one indicator.

Table 28: Significance Analysis Outer Model (Weights)

Bootstrapping (Weights)	Original sample	Sample mean	Standard deviation (STDEV)	T-value (O/STDEV)	P-value
Threshold	+1 / -1	-	-	$\geq 1.96$	$< 0.05$
EP1 -> EP_acc	-0.446	0.106	0.503	0.888	0.375
EP4 -> EP_acc	0.112	0.269	0.346	0.325	0.746
EP5 -> EP_acc	0.790	0.247	0.627	1.260	0.208
EP2 -> EP_aut	-0.102	-0.009	0.247	0.413	0.680
EP6 -> EP_aut	0.947	0.549	0.465	2.036	0.042
EP7 -> EP_aut	-0.281	-0.027	0.489	0.575	0.565
EP8 -> EP_aut	-0.008	0.060	0.481	0.017	0.986
EP3 -> EP_out	1.000	1.000	0.000	0.000	0.000
age -> age	1.000	1.000	0.000	0.000	0.000
ed_deg -> ed_deg	1.000	1.000	0.000	0.000	0.000
prof_ex -> prof_ex	1.000	1.000	0.000	0.000	0.000
an_inc -> an_inc	1.000	1.000	0.000	0.000	0.000
open_digtech -> digtech_know	1.042	0.266	0.639	1.631	0.103
comf_datastruc -> digtech_know	0.174	0.083	0.521	0.334	0.738
rea_digsys -> digtech_know	-0.856	0.162	0.806	1.062	0.288

Source: own illustration but in the style of SmartPLS 4 extracts

If the formative indicator does not show significance, the procedure proposes to analyze the indicator loading and loading significance (table 25). With a threshold of  $\geq 0.5$ , the indicator is considered relevant. The indicator's significance must be determined if the loading is  $< 0.5$ . If it is again not significant, the indicators can be deleted. If it is significant, it is possible to consider the removal of the indicator still. The original sample loading for EP5 achieves the threshold of  $\geq 0.5$ . If this dissertation's approach follows the proposed procedure, all other efficiency potentials are irrelevant to the model. Nevertheless, a removal should always be

based on profound theoretical justification and not only statistical criteria (Weiber and Sarstedt 2021, 284; Jarvis et al. 2003, 202), as also already described in subsection 3.5.3.1.

Since the efficiency determination model represents an entirely accepted qualitative model, including the detailed existence of tasks in marketing and sales, no indicators are removed from the model. The different digital transformation statuses of companies stress the reason for this decision. If all the indicators were significant, all research participants would have argued the same digitization and digitalization possibilities of tasks in their companies across the entire data sample, which is assumed as highly unlikely. The reasonability of this argumentation is emphasized by, for example, frameworks of the digital maturity assessments of companies. In collaboration with management consultants from Crosswalk from 2017, an exemplary report from the University of St. Gallen analyzed 452 different companies and distributed their digital maturity from 1 to 5 in half-point steps. Forty-three percent were allocated to levels 1.0-2.5, 39 percent to level 3.0, and 18 percent to levels 3.5-5.0 (Berghaus et al. 2017). These results imply a strong differentiation between companies regarding how far their digital transformation has already proceeded and how they perform tasks. In total, 25 percent of the research participants in this exemplary report represent the field of marketing and sales.<sup>206</sup>

As a reason why there is indicator weight significance of EP6 (manual system input – automation potential if repetitive), and the indicator loading of EP5 (cognitive output generation – acceleration potential of data supply) would consequently be argued according to its homogeneity across the data sample. That means that companies deal with these two efficiency potentials in a very similar manner, or phrased differently, tasks labeled as manual system input or cognitive output generation underly the same efficiency potential. Therefore, a missing significance in the efficiency potential universe of the efficiency determination model is preferred rather than rejected. The same idea is valid for the latent exogenous variable of digital technology knowledge with its three indicators, and

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<sup>206</sup> For an overview of different digital maturity measurement models see for example recent publications of Vadana et al. (2020), Thordsen et al. (2020), Wolf and Strohschen (2018), Reinhard et al. (2020), OECD (2019), Katz and Koutroumpis (2013).



the significance of the indicators would reveal the same situation according to digital technology knowledge across the entire data sample.

Table 29: Significance Analysis Outer Model (Loadings)

<b>Bootstrapping (Loadings)</b>	<b>Original sample (O)</b>	<b>Sample mean (M)</b>	<b>Standard deviation (STDEV)</b>	<b>T-value (O/STDEV)</b>	<b>P-value</b>
	≥ 0.5	-	-	≥ 1.96	< 0.05
EP1 -> EP_acc	-0.658	0.052	0.640	1.028	0.304
EP4 -> EP_acc	-0.014	0.238	0.351	0.039	0.969
EP5 -> EP_acc	0.896	0.178	0.732	1.224	0.221
EP2 -> EP_aut	-0.027	-0.003	0.217	0.125	0.900
EP6 -> EP_aut	0.962	0.563	0.421	2.287	0.022
EP7 -> EP_aut	-0.313	-0.067	0.477	0.656	0.512
EP8 -> EP_aut	0.182	0.164	0.453	0.402	0.688
EP3 -> EP_out	1.000	1.000	0.000	0.000	0.000
age -> age	1.000	1.000	0.000	0.000	0.000
ed_deg -> ed_deg	1.000	1.000	0.000	0.000	0.000
prof_ex -> prof_ex	1.000	1.000	0.000	0.000	0.000
an_inc -> an_inc	1.000	1.000	0.000	0.000	0.000
open_digtech -> digtech_know	0.708	0.389	0.432	1.637	0.102
comf_datastruc -> digtech_know	0.274	0.305	0.442	0.620	0.536
rea_digsys -> digtech_know	-0.251	0.339	0.593	0.423	0.672

Source: own illustration but in the style of SmartPLS 4 extracts

Furthermore, the remaining quality criterion for collinearity is represented by the variance inflation factor (VIF) and is presented in the following table for the outer model.

Table 30: Collinearity Analysis Outer Model

Collinearity	VIF
Threshold	< 10
EP1 -> EP_acc	1.081
EP4 -> EP_acc	1.019
EP5 -> EP_acc	1.100
EP2 -> EP_aut	1.070
EP6 -> EP_aut	1.038
EP7 -> EP_aut	1.072
EP8 -> EP_aut	1.040
EP3 -> EP_out	1.000
age -> age	1.000
ed_deg -> ed_deg	1.000
prof_ex -> prof_ex	1.000
an_inc -> an_inc	1.000
open_digtech -> digtech_know	1.512
comf_datastruc -> digtech_know	1.545
rea_digsys -> digtech_know	1.503

Source: own illustration but in the style of SmartPLS 4 extracts

The indicators show low multicollinearity with VIF values far from the threshold of < 10. It will be problematic if the VIF value is critical for critical indicators, which are in this study EP5 and EP6 since usually the model adjustment ( $R^2$ ) decreases and the standard error of the regression increases. However, it does not find application concerning the results of this study.

#### 3.5.4.3 Structure Model Validation and Interpretation

This sub-section discusses the quality criteria of the constructs. Here, it is also distinguished between the exogenous and endogenous latent variables. As presented in section 3.5.3.2, the coefficient of determination is considered the central criterion for the quality examination of the structure model. The variables reveal results with values below the thresholds. However, as already stressed by Schloderer et al. (2009), also lower values can be interpreted as substantial if certain

influencing variables have not been considered, consciously or unconsciously. Bauer (2002) applies this argumentation in his study for analyzing the controlling contribution to corporate success since he finds only a  $R^2$  of 0.17. A similar reasonability exists in this study. The influence factors that affect the three accumulated efficiency potentials of acceleration, automation, and outsourcing are not fully covered by the questionnaire and analysis. It is assumed that various variables influence the different efficiency potentials, which the model does not capture. Thus, further exogenous variables or so-called moderation variables could extend the model, such as company-related criteria. Examples are the company size, the branch, the age of the company, the customer structure, the products, the product complexity, or the sales process. Consequently, a variety of factors is not incorporated in this model, which is reasoned by the already high complexity of the model and duration of the questionnaire. If a research participant must provide an answer to all just presented model extensions and selects many tasks, the questionnaire can result in a duration where more research participants either drop out or enter incorrect data just to complete the data input finally. Therefore, this study focuses on data quality for efficiency potential determination as the main lever for the research results. Ultimately, the coefficient of determination results are accepted, knowing that they are not meaningful due to several missing influence factors.

Table 31: Coefficient of Determination of the Inner Model

Examination of the constructs	$R^2$
Threshold	0.19 (we.) 0.33 (med.) 0.66 (str.)
EP_acc	0.086
EP_aut	0.078
EP_out	0.049

Source: own illustration but in the style of SmartPLS 4 extracts

The effect strength of the latent variables is expressed with the path coefficient ranging between +1 (positive effect) and -1 (negative effect). Except for the meaningful positive effect strength between professional experience and the efficiency potential of automation with 0.254, the other assumed relationships result in values below the threshold. The higher the professional experience, the

higher the efficiency potential of automation. According to the respective hypothesis, it was initially assumed that this relationship is vice versa. More years of professional experience supposedly represent a bundle of tasks that are more difficult to replace by digital technologies, such as complex cognitive tasks that could not be proven with these results. A possible reason for the unexpected effect strength of the structure model's path coefficient is the high level of detail in the model. The previously existing models from labor market research argue that highly skilled labor performs tasks that are more difficult to substitute by digital technologies measured by the wage scale. This model uses professional experience, annual income, age, educational degree, and digital technology knowledge to extend but also examine the approach. Similar variables have also been applied to explain the wage differentials and wage inequality in the 1980s (Autor et al. 2006, 189), presented in section 2.2.3.1. Also, the named labor market research did not apply quantitative research with specific research participants but consulted machine learning experts for task labeling and to assess the entire labor market on job level. Thus, these two very different research approaches might have led to different research results. As Autor (2013) proposed, concrete hypotheses have been developed in this dissertation and evaluated newly based on new data sets (see also 2.2.3.3). Concerning p-value, only the educational degree shows significance concerning the efficiency potential outsourcing but also with a negative effect strength.

Table 32: Standardized Path Coefficient of the Inner Model

Examination of Path Coefficients	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-value (O/STDEV)	P-value
	$\geq 0.2 / \leq -0.2$	-	-	$\geq 1.96$	$< 0.05$
age -> EP_acc	-0.041	0.100	0.217	0.186	0.852
age -> EP_aut	0.006	-0.021	0.186	0.032	0.975
age -> EP_out	0.173	0.165	0.151	1.145	0.252
ed_deg -> EP_acc	0.190	-0.001	0.220	0.862	0.389
ed_deg -> EP_aut	-0.109	-0.072	0.128	0.855	0.393
ed_deg -> EP_out	-0.167	-0.162	0.095	1.759	0.079
prof_ex -> EP_acc	-0.075	-0.161	0.202	0.372	0.710
prof_ex -> EP_aut	0.254	0.198	0.245	1.036	0.300
prof_ex -> EP_out	-0.165	-0.156	0.171	0.964	0.335
an_inc -> EP_acc	-0.174	0.002	0.206	0.846	0.398
an_inc -> EP_aut	-0.165	-0.126	0.173	0.954	0.340
an_inc -> EP_out	0.147	0.139	0.082	1.793	0.073
digtech_know -> EP_acc	0.049	-0.030	0.115	0.427	0.670
digtech_know -> EP_aut	0.072	-0.030	0.187	0.386	0.699
digtech_know -> EP_out	-0.064	-0.037	0.111	0.574	0.566

Source: own illustration but in the style of SmartPLS 4 extracts

Further elaborating the path coefficients,  $F^2$  shows at least weak effects for four relations: the educational degree for the efficiency potential acceleration and outsourcing and the annual income for the efficiency potential acceleration and automation. These results do not prompt to argue that the influence of the exogenous variables on the endogenous variables is meaningful.

Lastly, the VIF does not reveal critical results in the structure model. The low variable collinearity, therefore, justifies no adjustments to the model.

Table 33: Collinearity &amp; Effect Size of the Inner Model

Path Coefficients & Examination of the Collinearity	F <sup>2</sup>			VIF		
	EP_acc	EP_aut	EP_out	EP_acc	EP_aut	EP_out
Thresholds	0.02 (we.) / 0.15 (med.) / 0.35 (str.)			< 10		
Indicators and Constructs						
age	0.000	0.000	0.008	3.768	3.768	3.768
ed_deg	0.035	0.011	0.026	1.141	1.141	1.141
prof_ex	0.002	0.018	0.007	3.963	3.963	3.963
an_inc	0.022	0.020	0.015	1.510	1.510	1.510
digtech_know	0.003	0.005	0.004	1.051	1.051	1.051

Source: own illustration but in the style of SmartPLS 4 extracts

#### 3.5.4.4 Final Validation of the Hypotheses

This chapter summarizes the presented results from the last three data analysis sections to be able to evaluate the hypotheses. The p-value for significance analyses and the path coefficient concerning the loading does not simultaneously reach the threshold for any estimated relation, which means that all hypotheses cannot be validated and must be rejected. Nevertheless, since the hypotheses are based on an assumed reality from the decision-makers in the field of marketing and sales and supported by the skill distribution across the wage scale of task approach literature, the quantitative results indicate an opposite truth. The applied approach from labor market research to use the wage scale to cluster workers as low-, mid, and high-skilled allows the explanation of the SBTC and RBTC phenomenon but not the determination of efficiency potentials in the field of marketing and sales with the estimated model. Also, there is neither statistical proof that the wage scale approach is correct nor that exogenous independent variables such as age, educational degree, professional experience, or digital technology knowledge must positively correlate with large efficiency potentials of marketing and sales. Therefore, the structure model is entirely rejected, but the measurement model of the efficiency potential stays accepted.

Table 34: Results of the Hypothesis Evaluation

Hypotheses	Criteria		Evaluation
	P-value	Path Coeff.	
	< 0.05	$\geq 0.2 / \leq -0.2$	
The higher the age, the higher the efficiency potential share of acceleration.	0.852	-0.041	rejected
The higher the age, the higher the efficiency potential share of automation.	0.975	0.006	rejected
The higher the age, the higher the efficiency potential share of outsourcing.	0.252	0.173	rejected
The higher the educational degree, the higher the efficiency potential share of acceleration.	0.389	0.190	rejected
The higher the educational degree, the higher the efficiency potential share of automation.	0.393	-0.109	rejected
The higher the educational degree, the higher the efficiency potential share of outsourcing.	0.079	-0.167	rejected
The higher the professional experience, the higher the efficiency potential share of acceleration.	0.710	-0.075	rejected
The higher the professional experience, the higher the efficiency potential share of automation.	0.300	0.254	rejected
The higher the professional experience, the higher the efficiency potential share of outsourcing.	0.335	-0.165	rejected
The higher the income, the higher the efficiency potential share of acceleration.	0.398	-0.174	rejected
The higher the income, the higher the efficiency potential share of automation.	0.340	-0.165	rejected
The higher the income, the higher the efficiency potential share of outsourcing.	0.073	0.147	rejected
The higher the digital technology knowledge, the higher the efficiency potential share of acceleration.	0.670	0.049	rejected
The higher the digital technology knowledge, the higher the efficiency potential share of automation	0.699	0.072	rejected
The higher the digital technology knowledge, the higher the efficiency potential share of outsourcing.	0.566	-0.064	rejected

Source: own illustration

As already stated within this dissertation, performance measurement approaches must be detailed to justify specific actions after identifying low performances in certain areas. Furthermore, digital technology development has been progressing in such an accelerated manner during the last years that the applicability and general assembly of the efficiency computation model must be examined on an ongoing basis.

### 3.6 LIMITATIONS OF THE STUDY

This chapter serves the purpose of presenting and discussing the limitations and restrictions of this study. In total, ten limitations could be identified, which are described in the following.

#### **Limitation 1**

The applied mixed-methods approach starts with conducting qualitative expert interviews to increase the level of detail when applying task conceptualizations techniques in marketing and sales. Derived from qualitative research, ultimately, the efficiency computation model and its preceding models are developed. The models are therefore based on qualitative research and information, but the decision has been made that the models are not subject to review to demonstrate statistical significance. This decision is justified by the required level of applied abstraction to develop these models. The operationalization of the model to quantitatively validate its significance is deemed complex and almost impossible. It must be ensured that the research participants from the quantitative study semantically understand the questions doubtlessly to realize such an examination properly. Due to high complexity, the just described aspect refrained from in this study. Also, the quality criterion of communicative validation could have been applied to examine the developed results further. This aspect has been neglected due to the characteristic of the research participants' audience. Also, a potential communicative validation of these models is deemed far from trivial and would have required even more time from the experts than the initial interview, as already stressed in 3.2.5. Therefore, the developed model represents a solely qualitative research-based model to determine efficiency potentials in marketing and sales.

#### **Limitation 2**

The desired result of the efficiency computation model is a percentage result that indicates potentially high values of efficiency-inhibiting work practices in companies. Therefore, the result only highlights a value that implies potentials that must not find effective application in reality. The identification of 45 percent efficiency potentials in this dissertation is supposed to be used as a benchmark for specific business unit analyses and does not ultimately indicate that every minute



can benefit from efficiency-increasing measures. Once a conspicuously high value is identified, it is recommended to consult digital technology experts to discuss tailored hardware and software solutions for individual situations. Also, if a business unit results in, for example, 55 percent efficiency potential, it might be subjectively interpreted as a negative result. However, referring to the created benchmark of 45 percent, 55 percent is only ten percentage points higher than the average market standard in marketing and sales.

### **Limitation 3**

The developed model is tailored to marketing and sales. Caused of a variety of possible task compositions in this field, it is impossible to transfer this model to further professional fields in this first research effort. Generally, a new study set-up must be created to develop similar models. Also, it is assumed that generally transferable models for performance measurements are impossible to derive since the dedication to detail in task conceptualization combined with digital technology effects refers to the emphasized research gap to justify the necessity of the presented research, especially in the field of marketing and sales.

### **Limitation 4**

Concerning the operationalization of the variables in the questionnaire in the quantitative research section, the possibility of measurement difficulties must be considered carefully. Necessary to mention are so-called measurement issues. As stressed by Bisello et al. (2019, 4), who discuss the qualification of tasks, the operationalization of routine tasks is subject to measurement difficulties because of, e.g., subjective connotations of the term "boring," "monotonous," or "repetitive"). Such obstacles mainly occur when data are collected and job incumbents are asked directly. For example, Matthes et al. (2014, 283) developed an operationalization for task indices using specific items to counteract subjective connotations. This dissertation was renounced to develop a detailed variable operationalization since the pretests did not indicate a subjective understanding of the sample group, and the qualitative data material did not allow a detailed operationalization for, e.g., routine, system input. Therefore, descriptions have been chosen as a single item for the variable operationalizations.

**Limitation 5**

Concerning the presentation of the data sample in the descriptive statistics section (3.4.1), the five exogenous variables reveal limitations according to their distribution. First, the age distribution until 30 shows a share of 70 percent, and the professional experience distribution until five years shows a share of 67 percent. Due to the major of younger participants in this study with a maximum of five years of professional experience, the efficiency potential can be distorted when applying the data and the study to a holistic picture. Furthermore, referring to the distribution of the educational degree, 87 percent have at least a master craftsman/technician (or equivalent), and 31 percent have at least a university master's degree. Consequently, when utilizing this study as a reference or for application purposes, it must be considered that the data sample contains relatively young professionals with a higher education level. Besides that, the assumption can be made that marketing and sales is probably a field with well-educated personnel.

**Limitation 6**

Section 3.4.2 describes how the questionnaire is operationalized to calculate the efficiency potentials ultimately. Due to the already high complexity of the questionnaire, the decision was made to solely label and determine tasks as one dimension. For example, efficiency potential 1 covers EP1, which refers to the physical or remote output application in the task anatomy step E and the digital technology impact of acceleration for customer interaction tasks. The research participant is supposed to state whether this task is performed physically on-site at the customer or remotely off-site. As argued, and to focus on simplicity and ensure uniform understanding of the participant, this question includes the aspect of "if both options find applications, please choose the more frequently used one." In addition, one aspect of a possible actual reality is entirely neglected if the research participant performs one task physically and sometimes remotely. However, it is assumed that the answers to this question for indicating a potential split are at least as vague as the decision to decide for either physical or remote task conduction.

**Limitation 7**

The utilized data from ONET database represent somehow generalized data. As already stated, ONET and comparable databases have been used for labor

market assessments concerning the application of task approaches. A fully individualized model operationalization and application could be realized with an individual line-up of tasks of business units. Such a tailored approach could also result in different correlations and causalities between the exogenous and endogenous variables from the structural equation model. Also, some data from ONET, albeit only a few, have not been updated since 2004. The majority has been adjusted to the current market standards between 2018 and 2022. Snyder (2019, 333) stresses a tremendously fast knowledge production these days, which makes it challenging to keep up with the assessment of scientific evidence in certain fields of interest as well as the current state-of-the-art. Areas, such as tasks performed by human labor, which fall victim to the intense adoption of newly emerging technologies, especially the task line-up is strongly individual across companies, require increased attention.

#### **Limitation 8**

Important to mention are also intervening variables. The inapplicability of such a model can be caused by, for example, works council decisions not to monitor employees. Also, the model application can be hindered by economic factors (e.g., high prices for digital technologies), external market requirements (e.g., missing customer acceptance for self-service tasks), or internal company factors (inaccurate use of technologies), which are also presented in section 2.2.4.2.

#### **Limitation 9**

As emphasized in section 2.2.3.4 and the summarized overview of operationalization possibilities of offshoring in appendix 2, this dissertation does not adapt the measurement possibilities of existing literature. Even if offshoring refers to moving tasks to different countries, the adapted aspect in the model refers to performing tasks remotely, which could have justified certain operationalizations from the literature. However, as already mentioned, the questionnaire duration is already exhausted and pushed to the limit. Adopting one of the offshoring measures was deemed too complex within the questionnaire, mainly due to the high number of possible task combinations on a single-worker level. Therefore, the sole question of whether the employee must be physically present or if the task can also be performed from a remote location was considered, which is comparable to the one-question approach according to Blinder and Krueger (2013, 107–111). Nevertheless, they focus on specific aspects concerning

offshoring utilizing formulations such as “foreign country.” Also, their description of what is meant by offshoring might provide a more detailed understanding for the interviewees to understand the questions uniformly, but it would have led to a more prolonged reading period for the participants.

**Limitation 10**

Lastly, the presented results are based on the efficiency computation model in the conjoint business function of marketing and sales. Nevertheless, the model neglects the branch of the companies, which might have led to a less detailed conceptualization. The development of an overarching efficiency computation model across all branches and industries is a great challenge due to business function and branch versatilities.

### 3.7 CENTRAL FINDINGS FOR DECISION-MAKERS

The sub-chapter of the central findings closes the empirical research by presenting and summarizing the most relevant results of the study. As stated in the introduction, the gained insights are supposed to help decision-makers in practice and motivate researchers with further scientific projects. Three primary insights are generated, supporting them to benefit from digital technology adoptions while relieving them of the effort to identify the offered performance potentials by digital technologies.

#### 3.7.1 The Final Model and its Application in Practice

The efficiency computation model represents the first central finding (3.2.4.3). It offers an operationalization approach for tasks in marketing and sales while adding digital technology effects to imply possible complementation or substitution of human labor-operated tasks. Using an inductive qualitative research approach allows an uninfluenced development of new categories from the expert interview while not being affected by the, at this point, interpreted generic task indices from the ALM-related publications in labor market research. Also, since labor market research in this field mainly tries to explain labor market incidents, researchers primarily integrate all occupations and branches, including the assessment of technology substitutability at job level, which implies job bundling omitting individual task assessments.

The developed qualitative model also offers an immediate application in practice. The dimension matrix (3.3.1.3 figure 10) proposes a task indices operationalization based on the calibration of qualitative research findings and available information from the ONET database. Since ONET entails extensive descriptions of the labor market and occupations, it is deemed a profound basis to cover a large area of marketing and sales. Therefore, the efficiency computation models, in combination with the dimension matrix, allow immediate model application in a marketing and sales business function. It is recommended to individually list all tasks performed in a business function newly, not relying on the marketing and sales tasks from the ONET database, to ensure first the most detailed task overview possible and second, a tailored approach to the respective

business function. Once the tasks are listed, they can be labeled according to the dimension matrix. Ultimately, all tasks must be incorporated into a questionnaire based on the decision tree logic of figure 11. Thus, each task can be evaluated individually according to its digital technology vulnerability and can be allocated to the eight efficiency potentials. With this information in hand, decision-makers can identify possible inefficiency areas of the business function to, in the last step, free-up resources of high-skilled personnel to concentrate on more profitable tasks. Also, it is recommended that the answering of the questionnaire is not solely performed by the affected employee since such focused efforts of task analysis might be understood by the employee as a substitutability evaluation of the workforce. Therefore, it is essential to clearly set the scope concerning the intended objective first to ensure proper data entry in the questionnaire and, second, not stir up fear in the workforce.

### **3.7.2 The Industry Benchmark**

The second central finding is the created efficiency potential benchmark in marketing and sales by merging the efficiency computation model with the task data from ONET and applying the model in the field. This quantitative research approach builds upon the qualitative results in form of a sequential mixed-methods approach and creates real market data. The descriptive result of 45% using the marketing and sales task data represents an average value across all marketing and sales employees who participated in the quantitative questionnaire. Thus, decision-makers have transparency about the current market standard before trying to interpret the result of their business on their own. Even though a possible high efficiency potential results from the analysis, it must be set in relation to the market standard since not every potential can be translated into effective application in the market due to specific market conditions, individual firm or industry characteristics, or intense digital technology costs. Managers are therefore enabled to facilitate the model application focus on their core business without being occupied with the endeavor to identify or interpret the result. After the model application, it is recommended to follow up with digital technology experts in the identified low-efficiency areas of the business unit to seek and match the most proper digital solution for increased efficiency. Knowing that the industry benchmark only serves as guiding value it must not be used as a hard and

unflexible number, but as a reference to steer the own efficiency potential results. Also, the five latent exogenous variables of age, educational degree, experience, income, and digital technology knowledge do not provide any information or prediction possibility to forecast the efficiency potential. Consequently, the fifteen hypotheses of the dissertation consisting of the five latent exogenous variables, each in assumed correlation to the three latent endogenous variables of acceleration, automation, and outsourcing, are rejected.

### 3.7.3 The Individual Value of Task in Marketing and Sales

The third central finding enlightens the effective value of the individual applied tasks in marketing and sales. Although the utilized data are somehow generic since ONET is an occupational database and not directly related to performance management, the individual task assessment offers decision-makers 214 task evaluations for their business. For the model application in central finding one, they can either compare their individually created task lists with, e.g., ONET tasks and compare the results or already seek a digital solution for low-value tasks if those are already determinable. Details about how to read and interpret the results on task-level in this study are presented in 4.1. The results especially refer to annex 19, the efficiency frequency distribution on task-level, and to annex 17, the task details presentation of the sample, which both list the 214 individual work tasks containing interlinked results necessary to interpret the results.

To summarize the three central findings and translate them into a recommendation for action for decision-makers in marketing and sales:

- Defining and listing all tasks in marketing and sales
- Task labeling according to the task dimension matrix
- Translating the pre-work into the questionnaire logic
- Answering the questionnaire on employee level
- Analyzing the results and defining the less efficient areas
- Following up with digital technology experts to match the most proper digital solutions to substitute or complement human labor input

How to use the central findings to answer the research questions is presented in the last chapter of this dissertation, the conclusion. The answers to the central

findings already entail, to a certain extent, the answers to the research questions since they represent the guiding questions to steer through the scientific work but are discussed more in detail and tailored to the scientific requirements to answer the initial matters of the dissertation fully.



## **IV – CONCLUSION**



## 4 CONCLUSION

The last main chapter of the dissertation covers two objectives. First, the interpretation of the qualitative and quantitative studies results is presented, which also answers the research questions. Second, an outlook and research agenda are provided, which build upon the conducted research and propose advanced research concerning efficiency potentials in marketing and sales and adjusted research in related fields of interest.

Especially the answers to the research questions have already been touched on and presented in the previous parts of the dissertation, as in the central findings. However, the following sub-chapters describe in detail the individual results and how they should be understood in reference to the research question since they represent the guiding wheel throughout the dissertation. Nevertheless, the outlook and research agenda for further scientific efforts are also subject-related information and explanations related to the already presented literature but point to the future and are oriented toward creating new research projects under the guise of individual task assessments, the role of newly emerging digital technologies, and performance management in firms.

#### 4.1 ANSWERING THE RESEARCH QUESTIONS

The interpretation of the results of the two empirical research methods serves different purposes to provide a thorough answer to the research questions.

**Research question 1: To what extent can efficiency potentials be quantitatively calculated by empirical modeling and low-value activities conceptually identified and delimited?**

The first research question consists of two aspects. The first aspect is interpreted in this dissertation as whether and how empirical modeling can be a tool to provide a solution, while the second aspect targets identifying specific tasks which can be determined through the model. Therefore, both aspects are strongly intercorrelated, resulting in only one research question.

The literature review gives the impetus for formulating this research question. Since current models discussing the effects of digital technologies on labor in the context of work solely cover labor market developments and issues, the possibility of determining performance measurement figures stays untouched. Furthermore, since existing studies mainly claim to discuss all professional fields and branches to provide a holistic research approach, they limit their engagement to identify detailed results. The task operationalizations allow the allocation of either task bundles (entire occupations) or individual tasks to task indices which automatically results in either substitution, complementation, or no impact effects. The omission of involving the workforce, which is supposed to be investigated, only allows superordinated analysis, such as just labor market evaluations. The definition of a specific performance measurement figure (efficiency) accompanied by the derivation of a specific professional field that has a particular necessity of penetrating this figure (marketing and sales) and incorporating the coefficient of time narrows the research field down to a researchable and discussable scope.

Qualitative explorative expert interviews with decision-makers in marketing and sales are chosen to elaborate this pre-defined scope. The inductive approach allows the development of new theories and approaches since it was determined that current models do not suit the idea of developing detailed performance measurement concepts. The results of the qualitative research approach yield the

findings of the anatomy model of a task, the efficiency determination model, and the efficiency computation model, which have been presented in detail in section 3.2.4. They represent the main answer to the first part of research question one. They determine a clear framework and extent to quantitatively calculate efficiency potentials by empirical modeling in marketing and sales. Based on the additional effort to follow up on those results with quantitative research, the operationalization of the task anatomy model allows the allocation of certain tasks to specific steps in the anatomy model of a task. It proves its effective practicability with the help of the database ONET. Since the research was explicitly applied in the field of marketing and sales, the digital technology effects, including the entire operationalization, most likely strongly differ from other professional fields, which therefore represents a tailored approach for the aim of this dissertation. Thus, the answer to the first aspect of research question 1 is presented by the applied qualitative research approach and its resulting efficiency computation model. Accompanied by the operationalization with, e.g., the data from ONET, the efficiency potentials can be quantitatively calculated.

According to the concept of efficiency determination, the tasks can be evaluated individually and weighted as per effective duration per individual worker. The task determination as either EPT or NEPT consequently answers the second part of the research question. Once a task is allocated EPT (efficiency potential task), the task is deemed a low-value task. The weight of determining a task as such is argued by the coefficient of time. The more time is spent on a task that falls victim to one of the eight efficiency potentials of the efficiency determination model, the less value a task has. The final model can output detailed task information according to the task occurrence within the job and task scope of ONET (as a pre-defined database), the frequency per task in the sample as chosen by the research participants of the quantitative research, and consequently, the weighted frequency of the tasks. As already presented in the study's limitations, an individual application of the model in specific marketing and sales business functions can detail the effectively applied tasks resulting in an even more detailed possibility to determine efficiency potentials. However, the approach of dealing with the identified and delimited low-value task utilizing the model is presented in detail when discussing research question three. However, the second part of

research question 1, to conceptually identify and delimit low-value tasks, is provided by this paragraph and through the developed models.

Lastly, developing the decision tree according to the efficiency computation model provides an implementable possibility to apply the model in practice. The questionnaire of the quantitative research approach translates the decision tree into an actual operationalization and, ultimately, questions for the research participants. Therefore, summarizing the answer to the question of to what extent can efficiency potentials be quantitatively calculated by empirical modeling is finally represented by the conversion of the developed model into a questionnaire for employees in the field of marketing and sales. The analysis of the questionnaire results and how they contributed to the overarching objective of the dissertation is part of the answer to the second research question.

**Research question 2: How far does digital transformation propel companies to fully exploit their efficiency potential to fulfill the requirements of new value propositions?**

The second research question refers to companies and their participation in the process of change a digital transformation entails. The calculated result of the efficiency computation model by determining tasks as either EPT (efficiency potential tasks) or NEPT (non-efficiency tasks), which is 45 percent, reveals the actual situation in the market. It indicates to what extent companies already exploit their full efficiency potential according to the developed model and applied definitions in this dissertation. Consequently, almost half of the workers' time in marketing and sales is subject to underly one of the eight developed efficiency potentials.

The efficiency potential acceleration consists of EP1 (1 percent), EP4 (4 percent), and EP5 (10 percent) and results in a total of 16 percent. The efficiency potential automation consists of EP2 (3 percent), EP6 (5 percent), EP7 (18 percent), and EP8 (3 percent) and results in a total of 28 percent, which represents the largest opportunity for achieving greater efficiency. The efficiency potential outsourcing solely consists of EP3 (3 percent) and results in a total of 3 percent, which represents the smallest opportunity to improve performance. These results can be interpreted as the threshold when applying the model in specific marketing and sales

departments. For example, if an accumulated efficiency potential across all eight potentials yields 60 percent, it must not mean that only 40 percent of the time is spent properly. It rather means that the specific department yields a result of 15 percent higher than average. The likelihood of reducing the potential to 0 percent is interpreted as difficult to achieve due to, e.g., societal and political forces which slow down or even hinder entirely the speed of digital technology introduction, such as ethical and legal barriers (Pajarinen and Rouvinen 2014, 4; Arntz et al. 2016, 8), the dependence on technological capabilities (Dengler and Matthes 2015b, 6), or even unattractive selling and implementation prices for the desired digital solution.

Summarizing and answering research question two (employing a quantitative result, companies, with a sole focus on marketing and sales) hold an efficiency potential of an average of 45 percent, which occurs within the scope of digital transformations and the application of digital technologies (digitalization). The aspect of fulfilling the requirements of new value propositions is derived from the literature that defines the requirements of a successful digital transformation as a holistic understanding of value proposition, value demonstration (Ritter and Pedersen 2020, 188), and value co-creation mechanisms (Lenka et al. 2017, 95). Also, Schumpeter (1934) already argued that technological progress and innovation lead to new value creation through innovative resources, while the latter is interpreted as digital technologies.

Lastly, rejecting the hypotheses indicates an increased difficulty in determining the efficiency potential of marketing and sales business units, influenced by the digital transformation, by exogenous indicators. The latent variables of age, educational degree, professional experience, annual salary, and digital technology knowledge do not allow to draw the conclusion of high or low potentials solely by considering these variables or assuming positive or negative correlations or causality. Also, the concept transfer from the labor to the firm of the applied approach on task level indicates the vagueness of the conceptualization of the skill level utilizing the wage scale, as performed by the research articles concerning job polarization.

**Research question 3: Which tasks in marketing and sales are determined as low-value activities causing efficiency potentials?**

As already briefly introduced, research question three provides a detailed explanation of how to interpret and label the 214 tasks as either rather high-value or low-value. Annex 19 lists all 214 tasks, including the information on EP level and total EP of how likely it is, according to the sample, that the respective task is allocated as EPT according to the efficiency computation model and the corresponding decision tree to determine them as such. For example, if EP total in annex 19 states a task as 80 percent, it means that this task occurred as efficiency potential in 80 percent of the cases if the task has been chosen from a research participant in the questionnaire. The lower the percentual figure, the higher the task value since it seems that this work duty is still hard to digitize due to, e.g., the difficulties presented when answering research question two. Important to mention is the frequency distribution of the tasks and their quantitative occurrences in the different occupations (annex 17). The less a task has been chosen generally, the less representative the results in annex 19. For example, in case a task has in total only been chosen three times and occurs only one time in all the occupations of the data (see, for example, task 161), three decision tree evaluations of three different research participants can already lead to 100 percent NEPT likelihood of this particular task. In case a fourth research participant had been chosen this task resulting in EPT, the task would only show 75 percent efficiency potential likelihood anymore. Therefore, the data from annex 19 must be compared to annex 17 when analyzing individual tasks to interpret the results correctly and to understand the sensitivity of certain results on task level. Also, the frequency distribution in annex 17 can provide information about the value of the task from a different perspective. The lower the task frequency in the sample, or even no distribution at all, might indicate that specific tasks are either already completely substituted by digital technologies (which would meet the definition of low-value tasks in this dissertation) or are nowadays not relevant anymore in the field of marketing and sales.



## 4.2 OUTLOOK AND RESEARCH AGENDA

The outlook and research agenda build upon the conducted research and findings in this dissertation and propose advanced research concerning efficiency potentials in the field of marketing and sales, as well as adjusted research in related fields of interest.

As especially found in the field of marketing in sales, social interaction tasks such as negotiation, relationship building, and empathy are still somehow shielded by their social-behavioral related characteristic to fall victim to the capabilities of digital technologies. This argument is also part of the argumentation of Autor and Dorn (2013) with their presentation of technology-immune low-skill service tasks and the engineering bottleneck of social intelligence tasks, according to Frey and Osborne (2017). Besides that, Goldmann and Knoerzer (2022, 13–14) present three management insights, besides a statement about the seemingly unassailable social-behavioral task characteristic, to support decision-makers.

1. “First, a missing emphasis on the partial factor input of human labor and digital technology in the field of marketing and sales runs the risk of profligacy use of resources.
2. Second, the absence of an equilibrium between input and output in the field of marketing and sales may result in uncoordinated efforts to meet customer expectations with weak work productivity.
3. Third, executives should permanently realize the need to emphasize efficiency across the entire organization, even in business functions which are according to their general characteristics majorly focused on consumer value generation such as marketing and sales instead of the endeavor of a work input decrease of human labor.”

Even if the further development of digital technologies seems unstoppable, there will be a limit. Once this limit is reached, human brainwork, social and behavioral characteristics will become even more important than before, especially marketing and sales as an intense customer-orientated field. Maybe this limit is now reached since science and practice have argued for many years about the incapability of digital technologies to take over the steering wheel fully. Even if

newly emerging technologies should develop that far, acceptance through society must still be put to the test.

However, with the initial task approach as seminal work, conceptualizing tasks to evaluate the digitalization effects on human labor stays relevant. Besides the isolated concentration on digital technologies, advanced studies are already busy by explicitly focusing on artificial intelligence or robots relating to human labor and work tasks. Acemoglu et al. (2020a), for example, present a framework to determine the artificial intelligence exposure at establishment-level if their workers perform artificial intelligence-compatible tasks with the help of different assumption-based measurement approaches (Felten et al. 2018; Felten et al. 2019; Brynjolfsson et al. 2018; Webb 2020). Also, under the consideration of performance-related figures, further studies examine the effect on productivity. Acemoglu et al. (2020b) discuss a reduction of labor share for production and productivity increase by robots adoption. Bonfiglioli et al. (2020) find that robot adoption increases productivity and the demand for high-skilled workers. Also, with a weak effect on total sales, they suggest not entirely passing on the gained productivity of robot adoption to the consumer by simply reducing the price of products. Kracke and Rodrigues (2020) add the perspective of human labor skills who perform the tasks. A mismatch of skills and tasks leads to decreased instead of increased productivity. Bessen et al. (2019) provide the first direct empirical evidence of automation's impact on individual worker level. They conclude that firm automation increases the probability of employees leaving their company. Employees with at least three years of employment in this firm are even approximately 25 percent more likely to quit, resulting in fewer days of actively working annually. Building upon that work, there are several possibilities to continue research in related research fields, especially with newly emerging digital technologies in the field of robots, artificial intelligence, and machine learning.

As part of the research agenda, three main fields of interest are emphasized. First, the efficiency computation model can be newly developed for other business functions such as logistics, finance, and more. Nevertheless, a new anatomy model of a task is required to ensure a tailored model for these business functions. Consequently, developing a new anatomy model of a task and efficiency determination model is recommended based on the most current digital technology effects in the respective field. It is a necessity to apply a customized

approach per business function. Furthermore, collecting individual work tasks on company level would further detail the approach and customize the analysis, resulting in a more accurate value. Also, the incorporation of industry branches offers the possibility to provide an even more specified approach.

Second, once the efficiency potentials on task level are identified, it is proposed to consult digital technology experts to improve the performance with the most effective technologies. As already argued within the course of this dissertation, digital technology development is fast-paced, and once a digital solution for low-value tasks has been found, it might already be outpaced by another one. Experts in this field can also support finding the most effective technologies and seminal and long-lasting implementations. Ultimately, the consideration of the price of possible digital technology implementation is subject to be considered carefully since optimized performance in firms, in the end, is mainly considered by the operating statement. Improved productivity through greater efficiency is only one aspect of a company's success.

Third and lastly, digital technologies can be further detailed based on the identified tasks and practical application of digital solutions. As compiled in section 2.2.1.2, the terminology of digital technologies can be distinguished between digital artifacts, platforms, and infrastructures. By employing this differentiation, the tasks performed by digital technologies, which lead to either a substitution or complementation of human labor, can provide additional information about the most appropriate digital technology type needed. This would provide a more transparent overview of the categories of digital technologies and can also be extended by the terminologies of artificial intelligence, machine learning, or even the individual technologies themselves.



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## ANNEX

### Annex 1: Task Operationalizations based on ALM Hypothesis

Autor et al. (2003, 1283-1284, 1323) based on DOT (fourth (1977) and revised (1991) edition);  
 Goos and Manning (2007), Michaels et al. (2014) with reference to data from Autor et al. (2003)

Task indexes	Definitions	Variables
non-routine analytic	Non-routine: "tasks for which the rules are not sufficiently well understood to be specified in computer code and executed by machines."  No explicit definition of analytic, interactive, or cognitive.	(GEDMATH) quantitative reasoning requirements
non-routine interactive		(DCP) Direction, Control, and Planning of activities (managerial and interpersonal tasks)
non-routine manual		(EYEHAND) Eye-Hand-Foot coordination
routine cognitive	Routine: "if it can be accomplished by machines following explicit programmed rules," and "tasks that require the methodical repetition of an unwavering procedure"	(STS) adaptability to work requiring Set limits, Tolerances, or Standards
routine manual		(FINGDEX) Finger Dexterity

Autor et al. (2006, 191–192) with reference to data from Autor et al. (2003);

Autor et al. (2008), Autor and Dorn (2009), Autor and Dorn (2013), Goos et al. (2014), Beaudry et al. (2016) with reference to data from Autor et al. (2003) but task measure of task indexes collapsed from five to three aggregated task indexes according to Autor et al. (2006)

Task indexes	Definitions	Variables
Abstract (non-routine cognitive)	Abstract: "reasoning tasks such as problem solving and coordination," "those most complementary with computerization"	average of (GEDMATH) quantitative reasoning requirements & (DCP) Direction, Control, and Planning of activities (managerial and interpersonal tasks)
Routine (cognitive and manual)	Routine: "clerical work and repetitive production tasks," "those most substitutable for computers."	average of (STS) adaptability to work requiring Set limits, Tolerances, or Standards & (FINGDEX) Finger Dexterity
Manual (non-routine manual)	no explicit definition, only examples: "truck drivers, waiters, and janitors," "tasks for which computers currently	(EYEHAND) Eye-Hand-Foot coordination

	neither directly substitute nor strongly complement"	
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Spitz-Oener (2006, 239-240, 243) based on Qualification and Career Survey by BIBB & IAB (1979-1999)

Task indexes	Definitions	Variables
non-routine analytic	non-routine: "not well defined and programmable and, as things currently stand, cannot be accomplished by computers." analytical: "refers to the ability of workers to think, reason, and solve problems encountered in the workplace."	Researching, analyzing, evaluating and planning, making plans/constructions, designing, sketching, working out rules/prescriptions, and using and interpreting rules
non-routine interactive	Interactive: "refers not only to communication skills—that is, the ability to communicate effectively with others through speech and writing—but also to the ability to work with others, including coworkers and customers."	negotiating, lobbying, coordinating, organizing, teaching or training, selling, buying, advising customers, advertising, entertaining or presenting, and employing or managing personnel
non-routine manual		repairing or renovating houses/apartments or machines/vehicles, restoring art/monuments, and serving or accommodating
routine cognitive	Routine (cognitive & manual): "expressible in rules such that they are easily programmable and can be performed by computers at economically feasible costs (Levy and Murnane 1996)"	calculating, bookkeeping, correcting texts/data, and measuring length/weight/temperature
routine manual		operating or controlling machines and equipping machines

Goos et al. (2009, 60) with reference to Goos et al. (2008, 15) based on ONET data (December 2006 version)

Task indexes	Definitions	Variables
abstract (non-routine cognitive)	no explicit definition, only examples: "complex problem solving" such as (engineers and medical doctors)	critical thinking, judgment and decision making, complex problem solving, interacting with computers, and thinking creatively
routine (cognitive and manual)	routine: "those which computers can perform with relative ease, such as jobs that require the input of repetitive physical strength or motion, as well as jobs requiring repetitive and non-complex cognitive skills."	arm-hand steadiness, manual dexterity, finger dexterity, operation monitoring, and estimating the quantifiable characteristics of products, events, or information



service (non-routine manual)	no explicit definition, only examples: “caring for others” such as (hairdressers and medical doctors)	social perceptiveness, service orientation, assisting and caring for others, establishing and maintaining interpersonal relationships, selling, performing for, or working directly with the public
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Acemoglu and Autor (2011, 1076-1079, 1099-1101, 1162-1163) based on DOT (1977) and ONET data

Task indexes	Definitions	Variables
(DOT) abstract (non-routine cognitive)	Abstract: “activities that require problem-solving, intuition, persuasion, and creativity.”	average of (GEDMATH) quantitative reasoning requirements & (DCP) Direction, Control, and Planning of activities (managerial and interpersonal tasks)
(ONET) non- routine cognitive analytic	no explicit definitions, but examples. non-routine cognitive: managerial, professional, and technical	analyzing data/information, thinking creatively, interpreting information for others
(ONET) non- routine cognitive interpersonal	non-routine cognitive analytic: “mathematics and formal reasoning” non-routine cognitive interpersonal: “managerial”	establishing and maintaining personal relationships, guiding, directing, and motivating subordinates, coaching/developing others
(DOT) routine	routine: “rule-based activities to which computers are currently well-suited”, “codifiable”, “sufficiently well understood that the task can be fully specified as a series of instructions to be executed by a machine”	average of (STS) adaptability to work requiring Set limits, Tolerances, or Standards & (FINGDEX) Finger Dexterity
(ONET) routine (cognitive)	No explicit definitions, but examples. Routine cognitive: clerical, administrative, and sales occupation	importance of repeating the same task, the importance of being exact or accurate, structured vs. unstructured work (reverse)
(ONET) routine (manual)	No explicit definitions, but examples. Routine manual: “production and operative occupations”	pace determined by the speed of equipment, controlling machines and processes, spending time making repetitive motions
(DOT) non- routine manual	non-routine manual: “activities that require situational adaptability, visual and language recognition, and in- person interactions.”	(EYEHAND) Eye-Hand-Foot coordination
(ONET) non- routine manual	No explicit definitions, but examples. non-routine manual: “service”	operating vehicles, mechanized devices, or equipment, spending time using hands to handle, control,

		or feel objects, tools, or controls, manual dexterity, spatial orientation
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Autor and Handel (2013, 70–71) based on PDII data

Task indexes	Definitions	Variables
Abstract	Abstract: “problem solving and creative, organizational, and managerial tasks”	(1) the length of the longest document typically read as part of the job (ranging from one page or less to more than 25 pages); (2) the frequency of mathematics tasks involving high school or higher mathematics (algebra, geometry, trigonometry, probability/statistics, or calculus); (3) frequency of problem-solving tasks requiring at least 30 minutes to find a good solution; and (4) proportion of workday managing or supervising other workers.
Routine	Routine: “codifiable cognitive and manual tasks that follow explicit procedures”	(1) the proportion of the workday spent performing short, repetitive tasks and complete absence of face-to-face interactions with (2) customers or clients, (3) suppliers or contractors, or (4) students or trainees
Manual	Manual: “nonroutine manual job tasks that require physical adaptability”	(1) the proportion of the workday spent performing physical tasks such as standing, operating machinery or vehicles, or making or fixing things by hand.

Fernández-Macías and Hurley (2017, 565-566; 570-571) based on EWCS and ESS data

Task indexes	Definitions	Variables
Cognitive	No explicit definition for cognitive. Routine: “to routinize a task is to automate it, to be able to do it without even thinking about it” Proposed criticism on the conceptualization of Autor et al. (2003), Spitz-Oener (2006), Autor and Handel (2013), Goos et al. (2014) arguing that the factor of “repetitiveness” is missing and neglected	3 variables EWCS: (a) complex tasks; (b) use of computers at work; (c) use of the internet at work and 1 variable ESS: (d) number of years of formal education necessary to perform the job adequately
Routine		4 variables EWCS: (a) repetitive hand or arm movements; (b) repetitive hand movements of less than 1 or 10min; (c) monotonous

		tasks; (d) dealing with unforeseen problems (reverse coded)
social	No explicit definition, only reference to the routine measure variables of Autor and Handel (2013) arguing to introduce (no) social interaction for the first time.	2 EWCS variables: (a) whether the current job requires direct interaction with non-colleagues; (b) whether the pace of work is determined by the demands from customers.

Source: own illustration

## Annex 2: Operationalization of Offshorability Measures

Blinder (2009, 54–55) based on ONET data (June 2006 Version)

Index	Variable	Possible answers
(IV) Not offshorable	[1 variable: "location specific"] A1 "Does a person in this occupation need to be physically close to a specific US work location?"	A1: yes
(III) Hard to offshore	A2 "Must be physically close to work unit?" A3: "Must work unit be at US location?"	A1: no A2: yes A3: yes
(II) Offshorable	[2 variable: "face-to-face contact"] A4: subjective assessment of ONET tasks per job on their need for face-to-face contact for categories I-III	A1: no A2: yes A3: no
(I) Highly offshorable		A1: no A2: no

Acemoglu and Autor (2011, 1163) based on ONET data

Index	Variables
Not offshorable:	<ol style="list-style-type: none"> <li>1. Face-to-face discussions</li> <li>2. assisting and caring for others</li> <li>3. performing for or working directly with the public</li> <li>4. inspecting equipment, structures, or material</li> <li>5. handling and moving objects</li> <li>6. repairing and maintaining mechanical equipment</li> <li>7. repairing and maintaining electronic equipment</li> </ol>

Blinder and Krueger (2013, 104–105) based on NAAL data coded by Westat coders

Index	Variables
Not offshorable	<ol style="list-style-type: none"> <li>1. Need for face-to-face interaction with customers or suppliers</li> <li>2. Delivering/transporting products or materials that cannot be transported electronically</li> <li>3. Public speaking</li> <li>4. Requires "cultural sensitivity"</li> <li>5. Providing supervision, training, or motivation to others working in the United States</li> <li>6. Physical presence at site (or sites) in the United States is required</li> <li>7. Maintaining or repairing fixed structures that are in the United States</li> <li>8. Maintaining or repairing large objects</li> </ol>
Easily offshorable:	<ol style="list-style-type: none"> <li>1. Extensive use of computers/email</li> <li>2. Processing information/data entry</li> <li>3. Talking on the telephone</li> <li>4. Analyzing data</li> <li>5. Assembling or packaging a product</li> </ol>

Blinder and Krueger (2013, 107–111) based on self-measurement criteria (single vs. combined/inferred)

Variable (single measure)	Possible answers
<p>A1 “Some jobs can be done remotely using a telephone or a computer, while others require face-to-face or physical presence at the job. For example, a telephone survey-taker like me can call you from some other state or even from a foreign country. A computer programmer or a person who takes customer orders over the phone can do the job from anywhere using a computer or telephone. However, a taxi-cab driver, a barber, or a waitress must be at the same place as their customers, and a construction worker has to be physically present at a job site.</p> <p>So thinking about the distinction I just described, can the work that you do for your current employer or customers be done at a remote location or does it require you to be physically present where the employer or job site is?”</p> <p><i>[the answer c automatically classifies as non-offshorable, a as offshorable, and b and d are split on a 50-50 basis]</i></p>	<p>a. Can be done at remote location</p> <p>b. Can be done remotely, but with difficulty</p> <p>c. Requires physical presence at a particular location</p> <p>d. Some parts/sometimes</p> <p>e. Refused or don’t know</p>
<b>Variables (inferred measure)</b>	<b>Possible answers</b>
<p>B1 “To what extent does the work you do on your main job involve face-to-face contact with people other than your co-workers or supervisors? Would you say a lot, a moderate amount, a little, or none at all?”</p> <p><i>[the answers a and b automatically classify as non- and difficult-offshorable, c as offshorable, and d as easily offshorable]</i></p>	<p>a. A lot</p> <p>b. A moderate amount</p> <p>c. A little</p> <p>d. None at all</p> <p>e. Refused or don’t know</p>
<i>[following up on those respondents who chose d in B1]</i>	
<p>B2 “To what extent is it possible for you to do the work on your job without being physically present? By that I mean could you do the work at a remote location and then deliver it by mail, by telephone, by sending it over the Internet, and so on. Would you say all of the work could be done that way, most of the work, a little of it, or none at all?”</p> <p><i>[the answer d automatically classifies as non-offshorable, a, b, and c as at least partially offshorable]</i></p>	<p>a. All of the work</p> <p>b. Most of the work</p> <p>c. A little of the work</p> <p>d. None at all</p> <p>e. Refused or don’t know</p> <p>[not asked]</p>
<i>[following up on those respondents who chose a, b or c in B2]</i>	
<p>B3 “If work like yours is done elsewhere and delivered from a remote location, by how much, if at all, do you think the quality would deteriorate?”</p> <p><i>[the answer d, c, and 50% of b are automatically classified as offshorable, a as non-offshorable]</i></p>	<p>a. A lot</p> <p>b. A moderate amount</p> <p>c. A little</p> <p>d. None at all</p> <p>e. Refused or don’t know</p> <p>[not asked]</p>
<i>[following up on those respondents who chose a, b or c in B1]</i>	
<p>B4 “Now think about the work you do face-to-face with others. To what extent is it possible for you to do that work without being</p>	<p>a. All of the work</p> <p>b. Most of the work</p> <p>c. A little of the work</p> <p>d. None at all</p>

<p>physically present? By that, I mean doing the work at a remote location and then delivering it by mail, by telephone, by sending it over the Internet, and so on. Would you say all of the work could be done that way, most of the work, a little of it, or none at all?"</p> <p><i>[the answer d automatically classifies as non-offshorable]</i></p>	<p>e. Refused or don't know [not asked]</p>
<p><i>[following up on those respondents who chose a, b, c, or e in B4]</i></p> <p>B5 "If work like yours is done elsewhere rather than face-to-face, do you think the quality would deteriorate a lot, a moderate amount, a little, or none at all?"</p> <p><i>[the answer d, c, and 50% of b are automatically classified as offshorable, a as non-offshorable]</i></p>	<p>a. A lot b. a moderate amount c. A little d. None at all e. Refused or don't know [not asked]</p>

Source: own illustration

## Annex 3: Expert Contact for the Study

Dear Mr./Mrs. (Name of the addressed expert),

My name is Sebastian Goldmann, and I am a doctoral student at the UCAM Universidad Católica San Antonio de Murcia. I am writing my doctoral thesis about “task efficiency modeling,” which is driven by digitalization with an emphasis on marketing and sales.

For the first study, a qualitative content analysis, I am looking for senior managers in the field of marketing and sales who are currently experiencing a substantial impact by a digital transformation in their company, accompanied by respective experience in this field and leadership responsibility.

The interview duration is estimated at approximately 30-60 minutes, depending on the course of the conversation. Additionally, I am sending you the details about the research project and the framework in the form of a declaration of consent for the interview.

If you should be interested in contributing to this study, I am looking forward to your reply.

Thank you in advance.

Sincerely,

Sebastian Goldmann

## Annex 4: Qualitative Expert Interview - Declaration of Consent

**Declaration of consent for the interview**

**Research project:** “Value Loss of Activities Propelled by Digital Transformation: Theoretical Evaluation and Empirical Modelling to Identify Efficiency Potentials to Maximize Value in the Field of Marketing & Sales.”

**Description of the Research Project:** The empirical investigation takes place within the course of a doctoral thesis. The target of the study is to identify the potential impact of a firm’s digital transformation on tasks in the field of marketing and sales. The target of the interview is to gather qualitative data about the tasks performed in this field, if and how the tasks are assessed according to their value, and how far digital technologies can take over partial elements or whole tasks performed by human labor.

**Institution:** UCAM Universidad Católica San Antonio de Murcia

**Research Investigator:** Sebastian Goldmann

**Research Participant:** Name

**Interview Date:** dd.mm.yyyy

**Interview Time:** hh:mm am/pm – hh:mm am/pm

I agree to participate in an interview within the framework of the above-mentioned research project and I have been informed about the aim and process.

I agree that the interview will be recorded with a recording device and put into written form through transcription. The transcripts of the interviews will be stored anonymously, i.e., without names and personal details.

The scientific analysis of the interview text will be done by the research investigator.



I agree that individual sentences from the transcripts that cannot be linked to my person may be used as material for scientific purposes. I agree that the results of the study will be published. After completion of the project, all personal data will be deleted.

My participation in the survey and my consent to the use of the data as described above are voluntary. I have the option to revoke my consent at any time. I will not suffer any disadvantages as a result of refusal or revocation. I have the right to information, correction, blocking and deletion, restriction of processing, objection to further processing and data portability of my personal data.

Under these conditions, I agree to give the interview and consent to it being recorded, written down, anonymized and evaluated.

The research investigator may be contacted for any questions concerning the purpose of the research, data protection issues and research results.

Name Research Participant

Sebastian Goldmann

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Annex 5: Qualitative Expert Interview – Interview Guideline 1

**I Tasks in the field of marketing and sales**

1a: Which tasks do marketing and sales teams perform nowadays?

1b: How do you, if at all, quantify the tasks performed?

**II Low-value versus high-value tasks**

2a: How do you, if at all, determine tasks as high-value versus low-value tasks?

2b: To what extent do you eliminate low-value tasks and foster high-value tasks?

**III Impact of digital technologies on tasks and human labor**

3a: Which of the stated tasks are already involving the application of digital technologies (digital tasks)?

3b: Which of the stated tasks can be replaced by digital technologies and why?

3c: What is the general impact of digital technologies on tasks and human labor?

3d: How far are digital technologies substituting or complementing human labor in performing tasks?

3e: How far do you assess the skills of human labor to perform certain tasks, especially digital tasks?

3f: Which knowledge and skills marketing and sales professionals need to have about digital technologies?

**IV Performance measurement calculations**

4a: Do you measure the digital technology impact on performance measurement?

4b: If yes, what are the measurement criteria?

**V Full potential exploitation**

5a: How do you use digital technologies to exploit the full performance potential?

5b: Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade driven by digital technologies? If yes, why?

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Annex 6: Qualitative Expert Interview – Interview Guideline 2

**I Tasks in the field of marketing and sales**

1a: Which tasks do human labor in marketing and sales perform nowadays?

1b: Which tasks do digital technologies in marketing and sales perform nowadays?

1c: How do you, if at all, quantify the tasks performed?

**II Low-value versus high-value tasks**

2a: How do you, if at all, determine tasks as high-value versus low-value tasks?

2b: To what extent do you eliminate low-value tasks and foster high-value tasks?

**III Impact of digital technologies on tasks and human labor**

3a: What's the general impact of digital technologies on tasks and human labor?

3b: How far are digital technologies substituting or complementing human labor in performing tasks?

3c: How far do you assess the skills of human labor in accordance with performing certain tasks, especially digital tasks?

3d: Which knowledge and skills marketing and sales professionals need to have about digital technologies?

**IV Efficiency measurement calculations**

4a: Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?

4b: If yes, what are the measurement criteria?

**V Full potential exploitation in marketing and sales**

5a: How do you use digital technologies to exploit the full performance potential in marketing and sales?

5b: Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade driven by digital technologies? If yes, why?

### Annex 7: Overview of the Extracted Statements of the Interviews

The following annex provides the extracted statements from the expert interviews. The statements are numbered since the presentation of the results in previous sections refers to individual statements. The presentation of the interview statements distinguishes two main aspects of the findings.

First, the 193 statements (no. 1-193) for the development of the efficiency computation model are presented, followed by second, the presentation of the 28 interview statements (no. 194-221) for the development of the five exogenous variables (besides provided information from literature). The tables contain the following information:

- information about the respective interview and in which the statement was found
- the field of expertise of the interview partner, the paragraph within the interview transcription (see appendix 20 for the transcripts)
- the interview statement itself as well as whether it is a paraphrase or verbatim (verbatim only if exact wording is either already very precise or influences the meaning)
- the category to which the statement was allocated.

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
1	RP_10	Sales	Pos_3	Marketing and sales must be considered differently because it is two areas. Marketing is directed inwards, preparatory.	Category Level 1, Office Work
2	RP_10	Sales	Pos_35	Marketing activities prepare a customer visit by searching and providing the appropriate content per customer.	Category Level 1, Office Work
3	RP_02	Sales	Pos_23	It is important to apply the correct orchestration of tasks toward the customer and not simply replace the tasks piece by piece.	Category Level 1, Customer Interaction
4	RP_02	Sales	Pos_23	The entire market penetration of the retail network will become more focused and concentrated.	Category Level 1, Customer Interaction
5	RP_02	Sales	Pos_25	Customer interaction can be seen as a ripple effect from throwing a stone into water. The created ripples are provided by technology to have an impact on a more lasting basis.	Category Level 1, Customer Interaction
6	RP_02	Sales	Pos_27	“ For me, it is not a black or white decision whether this is a physical task, digitalized task, or remote task. For me, it is an orchestration of the journey as such, or maybe even an interplay of the three different disciplines when it comes to tasking to maximize the impact on the customer/consumer.”	Category Level 1, Customer Interaction

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
7	RP_12	Marketing	Pos_11	Approaching the customer can be performed in a hybrid model by either working from home or in the office.	Category Level 1, Customer Interaction
8	RP_01	Marketing	Pos_9	One category of tasks is deemed mandatory, mainly manual tasks, as the basis for further strategic activities that a team must perform.	Category Level 2, Manual
9	RP_01	Marketing	Pos_57	Once the understanding of a topic has been reached, manual input is provided into interpretative tools.	Category Level 2, Manual
10	RP_07	Sales	Pos_3	Preparatory work before getting in touch with the customer is performed differently by many companies, which is still manual labor at the moment. If the human factor is involved, it is time-consuming work, and the error rate increases.	Category Level 2, Manual
11	RP_13	Marketing	Pos_39	It is helpful to find out which tasks performed by human labor can be digitized and which activities are administrative tasks, challenging to digitize.	Category Level 2, Manual
12	RP_01	Marketing	Pos_9	The workload of brand managers differs throughout the year, but it is important to be flexible based on the demand at brand level.	Category Level 2, Cognitive

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
13	RP_01	Marketing	Pos_15	It is very different from what is important on brand level since every brand is at a different life stage, but the consumer is always at the core.	Category Level 2, Cognitive
14	RP_01	Marketing	Pos_57	The creative aspect of human labor work to fully exploit the potential remains.	Category Level 2, Cognitive
15	RP_05	Marketing	Pos_3	The main task of marketing has a creative character.	Category Level 2, Cognitive
16	RP_08	Marketing	Pos_7	A generalized marketing toolbox must be individually analyzed concerning the specific consumer needs and insights that are either fully, partially, or not deployed at all.	Category Level 2, Cognitive
17	RP_08	Marketing	Pos_7	Based on the business problems a company wants to solve, the current status quo must be analyzed constantly by strategic thinking to determine what is currently driving the business and where the consumers are allocated.	Category Level 2, Cognitive
18	RP_01	Marketing	Pos_57	Once the final input is provided in a digital environment, a system calculates the demanded output itself.	Category Level 2, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
19	RP_05	Marketing	Pos_15	The human factor still dominates the sales department, but particular tasks can already be automated in marketing.	Category Level 2, Digital
20	RP_02	Sales	Pos_11	One possibility to define a task is a physical visit to the retailer.	Category Level 2, Physical
21	RP_02	Sales	Pos_11	By counting and estimating the time spent per physical customer visit, the corresponding return of time invested can be analyzed once the physical character disappears.	Category Level 2, Physical
22	RP_02	Sales	Pos_23	The first contact with a customer is personally to create a connection and common understanding.	Category Level 2, Physical
23	RP_02	Sales	Pos_23	Further customer visits and contact points are again physically and personally to manage and control onsite whether agreements are implemented.	Category Level 2, Physical
24	RP_02	Sales	Pos_27	Besides the task of negotiation and contracting with customers, all other tasks are probably not replaced by digitalization but enhanced.	Category Level 2, Physical



Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
25	RP_05	Sales	Pos_15	In the sales area, the human element still predominates. Digital technologies are utilized to support and work efficiently, but further virtual or live interactions are tailored to the person sitting in front of someone.	Category Level 2, Physical
26	RP_02	Sales	Pos_23	Further contact points with a customer can happen remotely off-site once a physical visit is preceded.	Category Level 2, Remote
27	RP_05	Marketing	Pos_11	Much face-to-face conversation is being shifted to the virtual space, which must be handled differently.	Category Level 2, Remote
28	RP_05	Marketing	Pos_11	" Corona has acted as a booster at this point, and much has been shifted to the virtual space..."	Category Level 2, Remote
29	RP_05	Marketing	Pos_15	In the sales area, the human element still predominates. Digital technologies are utilized to support and work efficiently, but further virtual or live interactions are tailored to the person sitting in front of someone.	Category Level 2, Remote
30	RP_07	Sales	Pos_7	" I am still a strong believer that the first point of contact should be via phone."	Category Level 2, Remote

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
31	RP_07	Sales	Pos_35	Before the Covid-19 crisis started, many companies argued that employees should come to the office. Two years later, remote work is the new normal, which helped for digitalization purposes.	Category Level 2, Remote
32	RP_02	Sales	Pos_11	Tasks can also be performed digitally.	Category Level 2, Digital
33	RP_02	Sales	Pos_11	Visits and interactions on digital platforms can be counted automatically to quantify them.	Category Level 2, Digital
34	RP_02	Sales	Pos_15	The orchestration of tasks is limited to the field force and not applicable in the headquarter. It is possible for labor-related tasks and digital activities such as email send-outs.	Category Level 2, Digital
35	RP_02	Sales	Pos_23	Digital technologies help to follow up on particular topics with the customer.	Category Level 2, Digital
36	RP_02	Sales	Pos_23	If a certain activity with the customer progresses, certain follow-ups are digital.	Category Level 2, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
37	RP_02	Sales	Pos_49	A digital communication platform measures the share of customers in a territory who are digitally engaged with the platform, how much time customers spend on the platform, and how many tasks are conducted. "The idea is actually that the retailer goes to that webpage and applies for a certain task to participate in a certain program to present the corresponding proof of performance of a given task to finally get rewarded, more or less instantly."	Category Level 2, Digital
38	RP_05	Marketing	Pos_15	Customer offers are also generated digitally.	Category Level 2, Digital
39	RP_05	Marketing	Pos_37	Instead of cold calling companies, social media, online contact research, knowledge, and content presentations are used to convince potential customers from projects to create a relationship.	Category Level 2, Digital
40	RP_07	Sales	Pos_7	A customer relationship system should know which customer has not been contacted to create automated content. The more relevant email content is, the more likely a customer will reply.	Category Level 2, Digital
41	RP_01	Marketing	Pos_33	For every task, it is crucial to understand what the input is. Concerning digitalization, it is important to understand what kind of data is fed to the program.	Category Level 3, Input

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
42	RP_01	Marketing	Pos_57	"Strategic planning can only work if you do the research right. You need the understanding first, and you input that into interpretative tools."	Category Level 3, Input
43	RP_03	Sales	Pos_5	"Now we have two standard software programs in place, which is "workfront" which plans or helps to plan, monitor, and execute marketing campaigns. We also have "salesforce" to work on customer inquiries or complaints and administer these proceedings."	Category Level 3, Input
44	RP_06	Sales	Pos_5	Information such as certain order processes is already fully digitalized.	Category Level 3, Input
45	RP_08	Marketing	Pos_37	"You need to feed it with data that a prediction can be made."	Category Level 3, Input
46	RP_01	Marketing	Pos_55	Especially in marketing, it is important to get the best understanding of the customer, the market, and the customer's needs. By managing a massive amount of data, insights, and information, you get a clear picture of who your customer is.	Category Level 3, Input Processing
47	RP_01	Marketing	Pos_57	"You must think about a fully optimized and automated system that takes all available data."	Category Level 3, Input Processing

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
48	RP_02	Sales	Pos_23	Technology helps to manage the ever-increasing level of complexity of data and requirements.	Category Level 3, Input Processing
49	RP_02	Sales	Pos_35	It is not mandatory to reduce the number of employees but to be able to manage the increasing complexity.	Category Level 3, Input Processing
50	RP_05	Marketing	Pos_35	Automated customer data processing allows approaching customers in the initial research phase quickly.	Category Level 3, Input Processing
51	RP_06	Sales	Pos_5	Digital data processing allows processes to become digitalized, which before had to be executed and controlled manually.	Category Level 3, Input Processing
52	RP_06	Sales	Pos_35	Interconnected digital data processing allows a better understanding and utilization of information.	Category Level 3, Input Processing
53	RP_06	Sales	Pos_35	Digital technologies enable human labor to manage much more complex systems. Much more is still possible, but human labor would become, at one point, dispensable.	Category Level 3, Input Processing
54	RP_01	Marketing	Pos_33	Information is translated into output which is made actionable by decisions or actionable by itself.	Category Level 3, Output Generation
55	RP_05	Marketing	Pos_35	Customers receive automated advertising support as a result of created content.	Category Level 3, Output Generation

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
56	RP_06	Sales	Pos_5	Information is created digitally but still handled manually, assessed, and combined with further information to draw conclusions and make decisions.	Category Level 3, Output Generation
57	RP_06	Sales	Pos_9	"Related to us directly, of course, we have the digital visit report, which is available online. On-site, the information is still entered manually and then forwarded to us digitally. We then derive evaluations and statistics from this according to specific requirements. However, it is still very rudimentary. In the future, it will certainly be possible to formulate completely different requirements that can be filtered out of the data."	Category Level 3, Output Generation
58	RP_06	Sales	Pos_33	All information must be brought together intelligently to make decisions.	Category Level 3, Output Generation
59	RP_05	Marketing	Pos_29	Digital systems should not decide on their own. Certain tasks could be omitted, and they could be valuable for support or recommendations.	Category Level 3, Output Control
60	RP_06	Sales	Pos_5	Output must be checked again and again.	Category Level 3, Output Control

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
61	RP_10	Sales	Pos_11	Generated lead data from events must be manually qualified, systematized, and enriched with additional information.	Category Level 3, Output Control
62	RP_06	Sales	Pos_3	Actions or drawn conclusions must be implemented analog and with the help of digital services	Category Level 3, Output Application
63	RP_10	Sales	Pos_3	Marketing prepares content, and sales utilize this content to make sales.	Category Level 3, Output Application
64	RP_01	Marketing	Pos_25	Digital technologies make life easier if it is working right.	Category Level A, Complementation
65	RP_01	Marketing	Pos_33	Digital technologies support the job.	Category Level A, Complementation
66	RP_02	Sales	Pos_53	Digital technologies complement work.	Category Level A, Complementation
67	RP_05	Marketing	Pos_15	Digital technologies are used as a support.	Category Level A, Complementation
68	RP_05	Marketing	Pos_31	Digital technologies are a support.	Category Level A, Complementation
69	RP_12	Marketing	Pos_23	"It is a mixture of both. Clearly, the continued and accelerated use of digital technologies is to some extent making certain labor work redundant."	Category Level A, Complementation

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
70	RP_13	Marketing	Pos_27	"I do not believe that we can completely replace humans, and we can certainly replace certain tasks, but I believe that technology should always be complementary, a linkage of both."	Category Level A, Complementation
71	RP_02	Sales	Pos_21	"As I said earlier, it is not about the elimination of low-value tasks because as soon as we can eliminate them, it is a no-value task, to my understanding."	Category Level A, Elimination
72	RP_04	Sales	Pos_27	Certain human labor tasks can be eliminated.	Category Level A, Elimination
73	RP_06	Sales	Pos_33	If you manage to connect digitally solved tasks, more and more human labor performed tasks will disappear.	Category Level A, Elimination
74	RP_12	Marketing	Pos_23	"It is a mixture of both. Clearly, the continued and accelerated use of digital technologies is to some extent making certain labor work redundant."	Category Level A, Elimination
75	RP_02	Sales	Pos_53	Digital technologies enhance work results.	Category Level B, Amplification
76	RP_02	Sales	Pos_53	Digital technologies amplify work.	Category Level B, Amplification



Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
77	RP_04	Sales	Pos_27	Digital technologies are getting more advanced every year. The main impact is described by supporting the business.	Category Level B, Amplification
78	RP_12	Marketing	Pos_21	The application of digital technologies leads to more output over time.	Category Level B, Amplification
79	RP_01	Marketing	Pos_29	Digital technologies increase the pace of work.	Category Level B, Acceleration
80	RP_02	Sales	Pos_33	Digital technologies are less aiming for substitution but for complementation. Therefore, they enhance the output of activities by being able to allocate higher-value activities to the best-educated people.	Category Level B, Acceleration
81	RP_12	Marketing	Pos_21	"Intervals of task delivery are shortened."	Category Level B, Acceleration
82	RP_12	Marketing	Pos_21	"Digital technologies help us to get there faster..."	Category Level B, Acceleration
83	RP_12	Marketing	Pos_21	"... the overall weight is just to get more done in a shorter period with the support of digital technologies."	Category Level B, Acceleration
84	RP_13	Marketing	Pos_25	"We are becoming faster and faster..."	Category Level B, Acceleration

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
85	RP_01	Marketing	Pos_29	"... technology will eliminate many tasks, and therefore jobs. So, the bigger challenge in the future will be not to find a new workforce, which is currently rather scarce, but to occupy the society."	Category Level B, Automation
86	RP_02	Sales	Pos_52	"...it is replacing each and every task over time."	Category Level B, Automation
87	RP_04	Sales	Pos_9	"The more digital technology is advanced, the better it is and, in the future, it can replace labor and will save costs."	Category Level B, Automation
88	RP_04	Sales	Pos_23	Low-value tasks can be digitized, resulting in generating value because of saving manpower, and saving manpower means saving costs.	Category Level B, Automation
89	RP_03	Sales	Pos_26	Customer self-checkouts lead to a lower number of employees rostered for a shift to get a job done but would not increase the total number of customers.	Category Level B, Outsourcing
90	RP_02	Sales	Pos_25	Digital technologies amplify physical tasks.	Category Level C, Amplification, Physical/ Remote/ Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
91	RP_02	Sales	Pos_55	"... if a field force colleague is physically visiting a retailer trying to educate them on a certain program, or a certain product out of our portfolio, where we expect him to transfer that message to his consumers, the enhancement part is then an ongoing and lasting training, task or program which can be conducted digitally. The first intervention is physical, and then we invite them to go online, and there are certain training or modules, and you can participate in that curriculum and educate and enhance yourself over time."	Category Level C, Amplification, Physical/ Remote/Digital
92	RP_12	Marketing	Pos_11	Face-to-face interactions with a customer are supported or facilitated by digital technologies.	Category Level C, Amplification, Physical/ Remote/Digital
93	RP_04	Sales	Pos_45	Digital technologies reduce the failure rate of human labor executed tasks.	Category Level C, Amplification, Manual
94	RP_07	Sales	Pos_3	Many errors can be made by human labor.	Category Level C, Amplification, Manual

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
95	RP_07	Sales	Pos_31	"Robots do not have human error ...".	Category Level C, Amplification, Manual
96	RP_12	Marketing	Pos_21	"The downside sometimes is the quality of work and also sometimes the vulnerability to mistakes and errors..."	Category Level C, Amplification, Manual
97	RP_01	Marketing	Pos_25	Digital technologies make life a lot easier.	Category Level C, Amplification, Cognitive
98	RP_04	Sales	Pos_29	A salesperson with relevant information about the market, the segments, the products, the competitors, and the consumers available in a digital tool, is better prepared for negotiation purposes with a customer.	Category Level C, Amplification, Cognitive
99	RP_09	Sales	Pos_15	"The ideal scenario is that the work is made much easier with tools, databases, and digital resources to support human labor."	Category Level C, Amplification, Cognitive
100	RP_12	Marketing	Pos_21	Digital technologies make work simpler.	Category Level C, Amplification, Cognitive

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
101	RP_13	Marketing	Pos_5	Digital technologies support the creativity of human labor to express ideas and integrate them into concepts and media to present them to customers.	Category Level C, Amplification, Cognitive
102	RP_01	Marketing	Pos_29	Digital technologies make things better.	Category Level C, Amplification, Digital
103	RP_02	Sales	Pos_31	The use of machine learning and artificial intelligence allows us to anticipate and forecast certain human behavior by instantly learning which activities work the best in which segments.	Category Level C, Amplification, Digital
104	RP_03	Sales	Pos_5	Digital technologies are used to personalize advertisements.	Category Level C, Amplification, Digital
105	RP_03	Sales	Pos_48	The more data are processed, the better decisions can be made. Also, digitalization leads to more specialization and the possibility of entering niches.	Category Level C, Amplification, Digital
106	RP_05	Marketing	Pos_9	"The algorithm also tells you that it may not be worthwhile to keep processing with the company if certain factors do not meet the minimum requirements."	Category Level C, Amplification, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
107	RP_05	Marketing	Pos_9	Customers can be classified to receive certain automated advertising support, and digital technologies also tell at which status of the selling process a customer currently is.	Category Level C, Amplification, Digital
108	RP_05	Marketing	Pos_33	Digital technologies support administrative topics and automated advertising.	Category Level C, Amplification, Digital
109	RP_07	Sales	Pos_9	In the automation process, it is important to give the consumer a voice to provide targeted marketing and to keep customer data up to date by sending automated and targeted emails.	Category Level C, Amplification, Digital
110	RP_09	Sales	Pos_3	Digitalization provides support for human beings who lead strategic situational assessments.	Category Level C, Amplification, Digital
111	RP_10	Sales	Pos_45	The implementation of digital technologies creates the ability to draw conclusions from customer actions.	Category Level C, Amplification, Digital
112	RP_13	Marketing	Pos_5	Digital technologies allow the digital presentation of concepts to customers with a visual collaboration tool resulting from inputted creativity.	Category Level C, Amplification, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
113	RP_13	Marketing	Pos_5	Structured data preparation is the basis for gaining value from applying artificial intelligence tools.	Category Level C, Amplification, Digital
114	RP_02	Sales	Pos_11	Interventions with a customer can be performed physically and remotely (via telephone), requiring less time, less effort, and fewer resources.	Category Level C, Acceleration, Physical
115	RP_10	Sales	Pos_35	Traveling to the customer can be completely substituted by making an online appointment.	Category Level C, Acceleration, Physical
116	RP_10	Sales	Pos_37	Through the Covid-19 crisis, there is now customer acceptance for digital consumer appointments to reduce long travel times.	Category Level C, Acceleration, Physical
117	RP_01	Marketing	Pos_17	Digital technologies allow a digital communication.	Category Level C, Acceleration, Manual
118	RP_03	Sales	Pos_5	The scanning of products in retail stores is enabled by digital technologies based on individual product data, which are interconnected.	Category Level C, Acceleration, Manual

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
119	RP_12	Marketing	Pos_11	<p>"The past year through the pandemic has expedited everything related to the daily routine work from a digital technology perspective. File-sharing elements, and platforms for communications, such as Microsoft Teams or Google hangout, are used dominantly in a hybrid model when we are partly working from home or in the office. We would not be able to deduct any regular business activity if we could not access our digital technology platforms and the way we govern information, share information, and communicate with each other. While we still have face-to-face interactions, these interactions are supported or facilitated by digital technology."</p>	Category Level C, Acceleration, Manual
120	RP_04	Sales	Pos_11	<p>"Technology can support acknowledgment management, databases, market share figures, and more. However, I do not think that human labor can be replaced here."</p>	Category Level C, Acceleration, Cognitive
121	RP_04	Sales	Pos_29	<p>Digital technologies support knowledge management. The availability of a management dashboard summarizes information at an accelerated time to support human labor.</p>	Category Level C, Acceleration, Cognitive



Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
122	RP_06	Sales	Pos_11	Office staff draws information from visit reports from the field sales force, which are digitally collected mass data.	Category Level C, Acceleration, Cognitive
123	RP_06	Sales	Pos_35	Information provision and drawing conclusions from data can be made more quickly with the support of digital technologies.	Category Level C, Acceleration, Cognitive
124	RP_06	Sales	Pos_37	Trained personnel can draw digital mass information from digital technologies to act in a results-orientated manner.	Category Level C, Acceleration, Cognitive
125	RP_07	Sales	Pos_31	"The smarter you work, the more successful you are, and I think that will have a massive impact in the future. Digitalization can support us."	Category Level C, Acceleration, Cognitive
126	RP_08	Marketing	Pos_37	Complementation through digital technologies is especially relevant for human labor when more manpower is required.	Category Level C, Acceleration, Cognitive
127	RP_11	Sales	Pos_7	Digital technologies allow the enriching of information of field sales force employees in an efficient way.	Category Level C, Acceleration, Cognitive
128	RP_11	Sales	Pos_15	Digital technologies are used to efficiently gain customer information without employing human labor to conduct manual research or repetitive work.	Category Level C, Acceleration, Cognitive

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
129	RP_11	Sales	Pos_17	"Digital technologies themselves are more data-driven for customer research. The full picture and profile of a customer in a software as a service, which is also capable of mapping a certain intelligence for public corporate initiatives, is provided by our solution. A salesperson does not need to spend time thinking that through and already gets a hint from digital technology".	Category Level C, Acceleration, Cognitive
130	RP_12	Marketing	Pos_23	"Complementing happens exactly with the tasks of a brand manager because a brand manager can deliver today more output helped by the technologies he is employing to get the tasks done. Complementarity is a value that this person can create against the currency of consumer value for us. He can run more campaigns than he was able to run and deploy towards consumers without the support of digital technologies ..."	Category Level C, Acceleration, Cognitive
131	RP_02	Sales	Pos_21	Digitalization may further enable the conduction of more simple activities at large scale in no time.	Category Level C, Acceleration, Digital
132	RP_02	Sales	Pos_11	The corresponding return on investments can measure the change of task orchestration from physical to digital.	Category Level C, Automation, Physical

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
133	RP_11	Sales	Pos_21	"It is already a kind of substitution. It is an effect to substitute labor in the case of low-level tasks because it is difficult to hire that many persons at all. In that case, it is not to get rid of people, and the substitution is more in case of growing easier without hiring on the same level."	Category Level C, Automation, Physical
134	RP_11	Sales	Pos_21	"It is already a kind of substitution. It is an effect to substitute labor in the case of low-level tasks because it is difficult to hire that many persons at all. In that case, it is not to get rid of people, and the substitution is more in case of growing easier without hiring on the same level."	Category Level C, Automation, Remote
135	RP_02	Sales	Pos_29	Digital platforms can be used to engage with customers at large scale permanently.	Category Level C, Automation, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
136	RP_11	Sales	Pos_7	<p>"We are performing more and more tasks with digital technologies. We use software as a service to make the salesperson more efficient. An example is reaching out to customers with mailings. We use tools called " Outreach." You can use templates built on your self-defined preferences from a time perspective and reach and push emails automatically sent without any human interaction. You can herewith reduce the workload to reach out to customers via email."</p>	Category Level C, Automation, Digital
137	RP_12	Marketing	Pos_9	<p>"Digital technologies in communicating with consumers are becoming the majority of our work at this point, and that is, of course, manifold channels through social channels, through direct marketing channels such as email marketing, through online videos as well as display and banners advertisings which become a hugely important role in the life of a marketing professional."</p>	Category Level C, Automation, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
138	RP_1	Marketing	Pos_7	The most repetitive tasks are budget management, tracking, purchase order creation, and monthly reoccurring tasks such as data analysis.	Category Level C, Automation, Manual
139	RP_1	Marketing	Pos_27	In the past, the sales force had an iPad or a hard copy for reporting purposes. Today, applications screen the shelf to identify which products are available and perform routine jobs.	Category Level C, Automation, Manual
140	RP_02	Sales	Pos_29	Digital technologies can already conduct digital marketing and send emails.	Category Level C, Automation, Manual
141	RP_03	Sales	Pos_5	"For ordering and stock replenishment, we are already using a program called " computer-generated ordering for stores" that supports the store manager in placing the orders. There are different levels to what extent the program can run, and you can do it on autopilot or get some ideas of what the program suggests as order quantities for the different products."	Category Level C, Automation, Manual

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
142	RP_04	Sales	Pos_7	Low-value activities such as compliance checks of customer agreements are automated by taking a picture of the shelf instead of collecting the information and manually entering the data in the system.	Category Level C, Automation, Manual
143	RP_04	Sales	Pos_9	There was a change from manually writing invoices to automated billing processes without human labor input.	Category Level C, Automation, Manual
144	RP_04	Sales	Pos_9	Human labor had to manually conduct compliance checks to determine whether products were in the right place on the shelf.	Category Level C, Automation, Manual
145	RP_05	Marketing	Pos_7	Digital technologies can automatically calculate the contact intensity between a customer and the field sales force and how high the actual sales opportunity is.	Category Level C, Automation, Manual
146	RP_05	Marketing	Pos_9	"In addition, we can further cover our social media area with these tools to plan and pre-scatter posts so that not everyone has to do it themselves."	Category Level C, Automation, Manual
147	RP_05	Marketing	Pos_23	The regular cleansing of data and databases, which had to be done manually previously, can be automated.	Category Level C, Automation, Manual

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
148	RP_07	Sales	Pos_7	Digital technologies should be able to automatize data collection of publicly accessible information.	Category Level C, Automation, Manual
149	RP_07	Sales	Pos_31	"I think people will spend less time on manual repetitive tasks and focus more on high-value or quality tasks."	Category Level C, Automation, Manual
150	RP_08	Marketing	Pos_37	Computers outperform tasks that do not just have a physical character.	Category Level C, Automation, Manual
151	RP_12	Marketing	Pos_23	Expense and cost management is simply automatized by taking a picture of the invoice, which information is automatically transferred into the system.	Category Level C, Automation, Manual
152	RP_13	Marketing	Pos_23	A cleaned database leads to a reduction of administrative tasks by automatized data reports without manual human labor input. Therefore, the concentration of work can be put on concept and idea development.	Category Level C, Automation, Manual

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
153	RP_01	Marketing	Pos_15	"The third category is hard to categorize because it is very individual. It is about creative problem-solving in which you have an issue or a consumer, for example, trying to find a solution to the consumer's perception. That is something which is, at least in marketing, strongly individual."	Category Level C, Automation, Cognitive
154	RP_01	Marketing	Pos_21	Digital technologies cannot eliminate tasks that require human interaction or creativity.	Category Level C, Automation, Cognitive
155	RP_01	Marketing	Pos_23	"Creativity is about problem-solving."	Category Level C, Automation, Cognitive
156	RP_01	Marketing	Pos_23	Currently, digital technologies are still dependent on creative input from human labor, which might change in the future.	Category Level C, Automation, Cognitive
157	RP_01	Marketing	Pos_57	"Just the creative aspect remains."	Category Level C, Automation, Cognitive
158	RP_02	Sales	Pos_27	Digital technologies cannot replace negotiation and contracting tasks with customers because of a mandatory level of human interaction.	Category Level C, Automation, Cognitive



Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
159	RP_04	Sales	Pos_7	Digital technologies cannot replace strategic tasks which need to be performed by human labor.	Category Level C, Automation, Cognitive
160	RP_05	Marketing	Pos_11	"I completely agree on the support aspect, but I do not yet see a substitution in our area of creativity."	Category Level C, Automation, Cognitive
161	RP_05	Marketing	Pos_15	Creativity must be applied to automatize tasks to develop a workflow for digital technology.	Category Level C, Automation, Cognitive
162	RP_13	Marketing	Pos_29	"If creativity is required, then it will be exciting to see to what extent artificial intelligence can actually replace humans."	Category Level C, Automation, Cognitive
163	RP_13	Marketing	Pos_39	"In my opinion, we can digitally support these value-creating activities, but no system will take away the elaboration of a concept or a strategy. The system will support us in capturing, documenting, preparing, and presenting the result, but it will not take away the creative work that takes place in the minds of individuals."	Category Level C, Automation, Cognitive
164	RP_05	Marketing	Pos_9	"In addition, our cooperation is still very much dependent on personal interaction."	Category Level C, Automation, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
165	RP_06	Sales	Pos_11	Digital technologies can automatize reoccurring reports.	Category Level C, Automation, Digital
166	RP_08	Marketing	Pos_11	Digital technologies provide digitized data as real consumer behavior. Interviewing a consumer will not provide as detailed insights as observing the actual actions, which is fully automated.	Category Level C, Automation, Digital
167	RP_09	Sales	Pos_7	"We can also measure, for example, the share of shelf. Our products should have a certain share on the shelf in terms of product facings which we can also evaluate within the system. The sales representative takes a picture, and the system automatically counts the work. We take a picture before and afterward to understand the impact of being in the store."	Category Level C, Automation, Digital
168	RP_09	Sales	Pos_11	Digital technologies can take over repetitive and reoccurring volume planning processes on customer and stock-keeping unit level if the results are trustworthy.	Category Level C, Automation, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
169	RP_10	Sales	Pos_7	Digital technologies allow partially automated lead generation derived from customer activities on digital platforms via customer relationship systems but not consistently through all data management processes.	Category Level C, Automation, Digital
170	RP_10	Sales	Pos_13	The preparation of customer behavior data and sales figures can be fully automated.	Category Level C, Automation, Digital
171	RP_12	Marketing	Pos_9	Digital technologies enable automated data provision through dashboard solutions for consumer preference data, selling data, and market research data in case the data are initially entered into an information inflow system.	Category Level C, Automation, Digital
172	RP_12	Marketing	Pos_23	Digital technologies substitute full-time equivalents performing the mining of large data volumes with dashboard solutions and scorecard systems.	Category Level C, Automation, Digital
173	RP_03	Sales	Pos_30	By employing self-checkout solutions for customers with only one employee supervising those digital solutions, the customer is taking over the tasks initially performed by cashiers.	Category Level C, Outsourcing, Physical

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
174	RP_03	Sales	Pos_32	"Self-service in terms of customer self-service, no matter whether in-store or online, both ways the customer needs to do more parts of the job."	Category Level C, Outsourcing, Physical
175	RP_03	Sales	Pos_34	"Not in our region, but tests are running in some regions with self-checkouts, yes."	Category Level C, Outsourcing, Physical
176	RP_08	Marketing	Pos_33	The face-to-face engagement role of human labor will play a less important role since it becomes easier and easier to replace human interaction with customers with digital technologies. Easy tasks are replaced by self-service solutions while offering freedom and good digital experiences.	Category Level C, Outsourcing, Physical
177	RP_10	Sales	Pos_41	Digital technologies enable market development from push to pull. Therefore, less human labor is required to push information into the market and to customers since the pull effect lets the customer request the information themselves.	Category Level C, Outsourcing, Physical

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
178	RP_11	Sales	Pos_19	"It is becoming more and more popular and important to use every digital help you can get to outsource those low-level tasks which in the end will end up in the fact that there is not that much labor needed."	Category Level C, Outsourcing, Physical
179	RP_03	Sales	Pos_32	"Self-service in terms of customer self-service, no matter whether in-store or online, both ways the customer needs to do more parts of the job."	Category Level C, Outsourcing, Remote
180	RP_08	Marketing	Pos_33	The face-to-face engagement role of human labor will play a less important role since it becomes easier and easier to replace human interaction with customers with digital technologies. Easy tasks are replaced by self-service solutions while offering freedom and good digital experiences.	Category Level C, Outsourcing, Remote
181	RP_10	Sales	Pos_41	Digital technologies enable market development from push to pull. Therefore, less human labor is required to push information into the market and to customers since the pull effect lets the customer request the information themselves.	Category Level C, Outsourcing, Remote

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
182	RP_11	Sales	Pos_19	"It is becoming more and more popular and important to use every digital help you can get to outsource those low-level tasks which in the end will end up in the fact that there is not that much labor needed."	Category Level C, Outsourcing, Remote
183	RP_03	Sales	Pos_5	"We also installed a mobile app that allows our customers to check the availability of certain products."	Category Level C, Outsourcing, Digital
184	RP_04	Sales	Pos_9	Customers can take over the task of taking and uploading a picture which saves time for the human labor force.	Category Level C, Outsourcing, Digital
185	RP_04	Sales	Pos_11	Chatbots are very helpful in customer service in answering simple questions.	Category Level C, Outsourcing, Digital
186	RP_04	Sales	Pos_19	A store can take a picture and upload it as proof of performance that products are placed as agreed.	Category Level C, Outsourcing, Digital
187	RP_04	Sales	Pos_33	Online chatbots can be used for task outsourcing to provide a customer self-service solution while only little human labor is needed to steer and feed those tools with content.	Category Level C, Outsourcing, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
188	RP_06	Sales	Pos_13	Digital order platforms in the form of electronic queries represent task outsourcing to customers while, nevertheless, the spoken word on-site could still influence the customer individually, which could be neutralized with a respective digital guide.	Category Level C, Outsourcing, Digital
189	RP_06	Sales	Pos_17	RFID (Radio-Frequency Identification) technology allows the precise location determination of products and merchandise in, for example, stores. Also, video facilities could digitalize customer interaction without physical or remote presence.	Category Level C, Outsourcing, Digital
190	RP_08	Marketing	Pos_35	Digital platforms as booking elements replace customer interaction and increase immediate transparency about all product-related items, increasing customer convenience.	Category Level C, Outsourcing, Digital
191	RP_11	Sales	Pos_41	Artificial intelligence to ask questions and provide answers as an entry point for customer contact will increase enormously.	Category Level C, Outsourcing, Digital
192	RP_13	Marketing	Pos_09	Digital platforms allow lead generation to be outsourced to the customer who enters the data, which is captured automatically.	Category Level C, Outsourcing, Digital

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
193	RP_13	Marketing	Pos_27	There are always possibilities to replace certain activities enabled by digital technologies regarding additional resources.	Category Level C, Outsourcing, Digital



Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
194	RP_13	Marketing	Pos_31	The mental abilities necessary to work with digital technologies decrease with age and the development of technology increases.	Age
195	RP_05	Marketing	Pos_43	Employees in marketing all employees have a master's degree and are deemed high-skilled employees performing only high-skill activities.	Educational Degree
196	RP_05	Marketing	Pos_45	A certain level of education is expected from the employees.	Educational Degree
197	RP_11	Sales	Pos_27	It is about studies completed.	Educational Degree
198	RP_05	Marketing	Pos_45	It is about work experience and practical skills. Even if an applicant can fulfill the requirement for one skill but is convincing for all other skills, the missing skill can be appropriated.	Professional Experience

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
199	RP_05	Marketing	Pos_55	People for specific technical positions with complex products are only hired if they have experience from the targeted industry or sector.	Professional Experience
200	RP_06	Sales	Pos_23	It is about work experience.	Professional Experience
201	RP_11	Sales	Pos_27	"It is mainly about looking at the resume and the experience."	Professional Experience
202	RP_11	Sales	Pos_27	It is about the experience accompanied by asking specific questions to identify a person's skills in a specific area.	Professional Experience
203	RP_12	Marketing	Pos_25	An individual worker is required to have a certain set of experience and capabilities to be able to perform specific tasks.	Professional Experience
204	RP_02	Sales	Pos_45	"Interest, openness, and a bit of digital or tech-savvy."	Digital Technology Knowledge - Openness
205	RP_03	Sales	Pos_54	Digital technology knowledge depends on the job, but with a level of education, anyone with interest, motivation, and willingness can learn how to perform a job.	Digital Technology Knowledge - Openness

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
206	RP_10	Sales	Pos_43	The willingness to use and drive digital technology knowledge is mandatory.	Digital Technology Knowledge - Openness
207	RP_13	Marketing	Pos_33	"Open-mindedness, curiosity, fun to discover new things, no fear of contact, and self-motivation to deal with new things."	Digital Technology Knowledge - Openness
208	RP_01	Marketing	Pos_35	It is required to have a certain understanding of how to deal with data.	Digital Technology Knowledge - Comfort
209	RP_03	Sales	Pos_56	The accuracy of data is very important, and the employees need to learn a solid understanding of how data work.	Digital Technology Knowledge - Comfort
210	RP_09	Sales	Pos_17	"In the past, it was more people-driven such as connecting with people, and today it is more data-driven such as understanding and analyzing data, and finally making decisions."	Digital Technology Knowledge - Comfort
211	RP_10	Sales	Pos_43	The ability to analyze complex data structures and information will become even more important, as well as the interconnectedness of various topics.	Digital Technology Knowledge - Comfort

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
212	RP_12	Marketing	Pos_27	"If you have not understood or are not versatile in understanding that digital marketing system approach or set-up, I think that is an entry element you are lacking."	Digital Technology Knowledge - Comfort
213	RP_01	Marketing	Pos_33	It is about knowing how to manage certain digital tools.	Digital Technology Knowledge - Readiness
214	RP_01	Marketing	Pos_39	When it comes to hardware, the laptop and the mobile phone must today already be seen as standard tools.	Digital Technology Knowledge - Readiness
215	RP_01	Marketing	Pos_39	Regarding software, the standard tools from Microsoft must be considered standard tools.	Digital Technology Knowledge - Readiness
216	RP_05	Marketing	Pos_39	Driven by the industry, a certain level of software affinity is required.	Digital Technology Knowledge - Readiness
217	RP_05	Marketing	Pos_53	Depending on the task, not every employee needs to be able to perform all tasks, but it is a well-accepted supplement in case of the absence of a colleague.	Digital Technology Knowledge - Readiness

Interview Statement No.	Research Participant	Field of Expertise	Paragraph	Interview Statement	Category
218	RP_07	Sales	Pos_41	It is important that the respective personnel can perform certain skills, such as creating a website.	Digital Technology Knowledge - Readiness
219	RP_08	Marketing	Pos_41	It depends on the level of digitalization. Specialists are required to perform particular tasks and must be trained beforehand. The employee, however, can most likely not perform other digital-related specialist tasks. There are always different skills needed.	Digital Technology Knowledge - Readiness
220	RP_11	Sales	Pos_29	It is helpful if employees are already familiar with digital tools. There are essential tools such as Microsoft Office, but those tools are already designed in a way to be learned very fast.	Digital Technology Knowledge - Readiness
221	RP_13	Marketing	Pos_31	When digital technologies are introduced, it is easy to determine who has an affinity for technologies or not.	Digital Technology Knowledge - Readiness

## Annex 8: Occupational Requirement: Work Activities

The average scores for annexes 8, 9, and 10 are not directly available at ONET but must be calculated individually. In this study, the average score has been determined by adding the score per work activity, skill, and knowledge of the occupations in the career cluster marketing and dividing it by the number of occurrences.

No.	Avg. Score	Work Activity <i>[if applicable, operationalization aspect labels from figure 9]</i>	Work Activity Description
1	79	Getting Information <i>[recording information]</i>	Observing, receiving, and otherwise obtaining information from all relevant sources.
2	75	Establishing and Maintaining Interpersonal Relationships <i>[customer interaction]</i>	Developing constructive and cooperative working relationships with others, and maintaining them over time.
3	75	Communicating with Supervisors, Peers, or Subordinates <i>[communication]</i> <i>[sharing information]</i>	Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
4	74	Selling or Influencing Others <i>[selling]</i>	Convincing others to buy merchandise/goods or to otherwise change their minds or actions.
5	73	Communicating with People Outside the Organization <i>[customer interaction]</i>	Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
6	72	Working with Computers	Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
7	71	Making Decisions and Solving Problems <i>[analyzing/solving business problems]</i> <i>[draw conclusions/make decisions]</i>	Analyzing information and evaluating results to choose the best solution and solve problems.
8	69	Organizing, Planning, and Prioritizing Work <i>[prioritizing work]</i>	Developing specific goals and plans to prioritize, organize, and accomplish your work.

9	66	Updating and Using Relevant Knowledge <i>[content creation]</i> <i>[strategy presentation]</i>	Keeping up-to-date technically and applying new knowledge to your job.
10	65	Identifying Objects, Actions, and Events	Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
11	63	Performing for or Working Directly with the Public <i>[customer interaction]</i>	Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.
12	62	Thinking Creatively <i>[analyzing/solving business problems]</i>	Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.
13	61	Processing Information <i>[data gathering]</i> <i>[data forecasting]</i>	Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.
14	61	Resolving Conflicts and Negotiating with Others <i>[contracting]</i> <i>[negotiation]</i>	Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others.
15	57	Documenting/Recording Information <i>[recording information]</i> <i>[data gathering]</i>	Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.
16	56	Developing Objectives and Strategies <i>[customer strategy development]</i> <i>[customer insights]</i>	Establishing long-range objectives and specifying the strategies and actions to achieve them.
17	56	Analyzing Data or Information <i>[analyzing data]</i>	Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
18	55	Judging the Qualities of Objects, Services, or People <i>[strategy validation]</i>	Assessing the value, importance, or quality of things or people.
19	54	Monitoring Processes, Materials, or Surroundings <i>[monitoring actions/decisions]</i>	Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.
20	53	Interpreting the Meaning of Information for Others <i>[conceptual thinking/creativity]</i>	Translating or explaining what information means and how it can be used.

21	53	Developing and Building Teams	Encouraging and building mutual trust, respect, and cooperation among team members.
22	53	Scheduling Work and Activities <i>[prioritizing work]</i>	Scheduling events, programs, and activities, as well as the work of others.
23	52	Coordinating the Work and Activities of Others <i>[prioritizing work]</i>	Getting members of a group to work together to accomplish tasks.
24	51	Evaluating Information to Determine Compliance with Standards <i>[monitoring actions/decisions]</i>	Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
25	50	Training and Teaching Others <i>[customer education]</i>	Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others.
26	49	Coaching and Developing Others	Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills.
27	48	Performing Administrative Activities	Performing day-to-day administrative tasks such as maintaining information files and processing paperwork.
28	48	Providing Consultation and Advice to Others	Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.
29	47	Guiding, Directing, and Motivating Subordinates	Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.
30	46	Estimating the Quantifiable Characteristics of Products, Events, or Information	Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.
31	41	Monitoring and Controlling Resources	Monitoring and controlling resources and overseeing the spending of money.
32	40	Assisting and Caring for Others	Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.
33	36	Performing General Physical Activities	Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling materials.
34	35	Inspecting Equipment, Structures, or Materials	Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.



35	34	Handling and Moving Objects	Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.
36	31	Operating Vehicles, Mechanized Devices, or Equipment	Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or watercraft.
37	29	Staffing Organizational Units	Recruiting, interviewing, selecting, hiring, and promoting employees in an organization.
38	26	Controlling Machines and Processes	Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).
39	15	Repairing and Maintaining Electronic Equipment	Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.
40	14	Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment	Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.
41	13	Repairing and Maintaining Mechanical Equipment	Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

Source: own illustration based on the information of U.S. Department of Labor (2022)

## Annex 9: Worker Requirement: Skills

No.	Avg. Score	Skills	Skills Description
1	72	Speaking <i>[communication]</i>	Talking to others to convey information effectively
2	71	Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times
3	65	Persuasion	Persuading others to change their minds or behavior
4	63	Social Perceptiveness	Being aware of others' reactions and understanding why they react as they do
5	62	Reading Comprehension	Understanding written sentences and paragraphs in work-related documents
6	62	Critical Thinking <i>[analyzing/solving business problems]</i>	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems
7	59	Service Orientation	Actively looking for ways to help people
8	58	Negotiation <i>[contracting]</i> <i>[negotiation]</i>	Bringing others together and trying to reconcile differences
9	57	Coordination <i>[prioritizing work]</i>	Adjusting actions in relation to others' actions
10	56	Judgment and Decision Making <i>[draw conclusions/make decisions]</i>	Considering the relative costs and benefits of potential actions to choose the most appropriate one
11	56	Writing <i>[recording information]</i>	Communicating effectively in writing as appropriate for the needs of the audience
12	53	Time Management <i>[prioritizing work]</i>	Managing one's own time and the time of others
13	53	Complex Problem Solving <i>[analyzing/solving business problems]</i>	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions
14	53	Monitoring <i>[controlling data/resources]</i> <i>[monitoring actions/decisions]</i>	Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action
15	53	Active Learning	Understanding the implications of new information for both current and future problem-solving and decision-making
16	43	Instructing	Teaching others how to do something
17	42	Mathematics	Using mathematics to solve problems

18	41	Management of Personnel Resources	Motivating, developing, and directing people as they work, identifying the best people for the job
19	40	Systems Analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes
20	40	Learning Strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things
21	39	Systems Evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system
22	29	Management of Financial Resources	Determining how money will be spent to get the work done, and accounting for these expenditures
23	28	Management of Material Resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work
24	26	Operations Analysis	Analyzing needs and product requirements to create a design
25	21	Operations Monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly
26	21	Quality Control Analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance
27	17	Technology Design	Generating or adapting equipment and technology to serve user needs
28	16	Operation and Control	Controlling operations of equipment or systems
29	15	Programming	Writing computer programs for various purposes
30	10	Troubleshooting	Determining causes of operating errors and deciding what to do about it
31	8	Science	Using scientific rules and methods to solve problems
32	4	Equipment Selection	Determining the kind of tools and equipment needed to do a job
33	2	Equipment Maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed
34	2	Repairing	Repairing machines or systems using the needed tools
35	0	Installation	Installing equipment, machines, wiring, or programs to meet specifications

Source: own illustration based on the information of U.S. Department of Labor (2022)

## Annex 10: Worker Requirement: Knowledge

No.	Avg. Score	Knowledge	Knowledge Description
1	81	Customer and Personal Service	Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.
2	77	Sales and Marketing <i>[content creation]</i> <i>[strategy presentation]</i>	Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.
3	72	English Language	Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
4	58	Administration and Management	Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.
5	54	Mathematics	Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
6	51	Computers and Electronics	Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.
7	48	Administrative	Knowledge of administrative and office procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and workplace terminology.
8	46	Communications and Media	Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.
9	43	Economics and Accounting	Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.
10	40	Education and Training	Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.
11	36	Personnel and Human Resources	Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

12	33	Psychology	Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.
13	33	Telecommunications	Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.
14	33	Production and Processing	Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
15	32	Law and Government	Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.
16	31	Public Safety and Security	Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.
17	27	Transportation	Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.
18	23	Design	Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
19	23	Engineering and Technology	Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
20	21	Geography	Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.
21	21	Sociology and Anthropology	Knowledge of group behavior and dynamics, societal trends and influences, human migrations, ethnicity, cultures, and their history and origins.
22	20	Mechanical	Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
23	17	Foreign Language	Knowledge of the structure and content of a foreign (non-English) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation.
24	15	Building and Construction	Knowledge of materials, methods, and the tools involved in the construction or repair of houses,

			buildings, or other structures such as highways and roads.
25	12	Philosophy and Theology	Knowledge of different philosophical systems and religions. This includes their basic principles, values, ethics, ways of thinking, customs, practices, and their impact on human culture.
26	10	Food Production	Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.
27	10	Therapy and Counseling	Knowledge of principles, methods, and procedures for diagnosis, treatment, and rehabilitation of physical and mental dysfunctions, and for career counseling and guidance.
28	9	Chemistry	Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
29	9	Fine Arts	Knowledge of the theory and techniques required to compose, produce, and perform works of music, dance, visual arts, drama, and sculpture.
30	9	Physics	Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.
31	7	History and Archeology	Knowledge of historical events and their causes, indicators, and effects on civilizations and cultures.
32	6	Medicine and Dentistry	Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.
33	5	Biology	Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.

Source: own illustration based on the information of U.S. Department of Labor (2022)

## Annex 11: Issues of Task Anatomy Model Operationalization

Category	Task no. and task	Added Item/changes
Internal customer perspective	28. Conduct employee training programs 86. Train others on work processes 104. Train personnel to enhance job skills 136. Train sales personnel	Customer perspective enriched by „internal customer perspective“
Tasks having a physical character according to their initial description	83. Arrange artwork, products, or props 93. Operate still or video cameras or related equipment 94. Construct distinctive physical objects for artistic, functional, or commercial purposes 95. Apply finishes to artwork, crafts, or displays 139. Clean work areas 143. Package objects for shipping 144. Prepare outgoing shipments 148. Stock products or parts 153. Set up merchandise displays 160. Operate vehicles or material-moving equipment 165. Clean machinery or equipment 167. Maintain vehicles in good working condition 168. Load shipments, belongings, or materials 179. Measure product or material dimensions 180. Repair parts or assemblies 200. Package materials or products	Manual input tasks are pre-defined as manual non-system input without efficiency potentials
Hierarchical approvals	69. Approve expenditures 101. Authorize financial actions	Cognitive output control tasks, which are according to organizational set-ups not indicating efficiency potentials
Data entry tasks in systems according to their initial description	190. Enter information into databases or software programs	Manual input tasks are pre-defined as manual system input without efficiency potentials
Added item to dimension matrix - „coordinate work“	8. Coordinate logistics for productions or events 15. Coordinate operational activities with external stakeholders 22. Coordinate special events or programs	Add „coordinate work“ to cognitive non-system input

	<p>101. Confer with personnel to coordinate business operations</p> <p>145. Communicate with other workers to coordinate activities</p> <p>159. Coordinate sales campaigns</p> <p>192. Coordinate activities with suppliers, contractors, clients, or other departments</p> <p>193. Coordinate legal schedules or activities</p>	
<p>Added item to dimension matrix - „implement processes“</p>	<p>23. Implement organizational process or policy changes</p> <p>75. Establish business management methods</p> <p>202. Implement design or process improvements</p>	<p>Add „implement processes“ to cognitive output generation</p>
<p>Added item to dimension matrix - „updating knowledge“</p>	<p>36. Maintain knowledge of current developments in area of expertise</p> <p>39. Attend training sessions or professional meetings to develop or maintain professional knowledge</p> <p>117. Study product information to acquire professional knowledge</p> <p>126. Attend events to develop professional knowledge</p> <p>187. Review laws or regulations to maintain professional knowledge</p>	<p>Add „updating knowledge“ to cognitive non-system input</p>
<p>Customer Interaction Tasks having a remote character according to the initial job description “Telemarketer”</p>	<p>114. Contact current or potential customers to promote products or services</p> <p>128. Answer customer questions about goods or services</p> <p>110. Deliver promotional presentations to current or prospective customers</p> <p>115. Explain technical product or service information to customers</p> <p>141. Answer telephones to direct calls or provide information</p> <p>195. Schedule appointments with prospective customers</p>	<p>CI tasks of Telemarketers are pre-defined as remote without efficiency potentials from physical presence</p>
<p>Added item to dimension matrix - „Discuss/Confer“</p>	<p>14. Confer with organizational members to accomplish work activities</p> <p>81. Discuss business strategies, practices, or policies with managers</p> <p>84. Discuss production content and progress with others</p>	<p>Add „discuss/confer“ to cognitive non-system input</p>



	100. Confer with personnel to coordinate business operations 173. Discuss design or technical features of products or services with technical personnel	
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Source: own illustration

Internal customer perspective: Four tasks are, by definition, internal company tasks dealing with colleagues and not the customer, but the characteristic of these tasks is analog to customer interaction tasks such as “conduct employee training programs.” In this case, the colleagues are the customers. Therefore, these four tasks were labeled as customer interaction.

Tasks having a physical character according to their initial description: Sixteen tasks were identified as having a physical character according to their initial description, such as “arrange artwork, products, or props.” Therefore, the tasks have been pre-defined as manual non-system input.

Hierarchical approvals: Two tasks refer to hierarchical approvals defined as cognitive output control. This dimension would potentially indicate efficiency potentials in case of a repetitive character, but these two tasks are excluded from that possibility. Tasks such as “authorize financial actions” are pre-defined as not having an efficiency potential since the task characteristic indicates the involvement of human decision-making.

Data entry tasks in systems according to their initial description: One task already reveals the dimension classification of manual system input just by its actual title, “enter information into databases or software programs.”

Added item to dimension matrix - „coordinate work“: The initial task anatomy operationalization misses the possibility of including tasks that refer to the coordination of work. The task labeling shows eight tasks, such as “coordinate special events or programs,” which require the cognitive brainpower of human beings. Therefore, the item “coordinate work” was added to the dimension matrix.

Added item to dimension matrix - „implement processes“: Three further tasks could not be allocated to the dimension matrix. Tasks such as “implement organizational process or policy changes” indicate an item of “implement processes” that was added to the dimension matrix.

Added item to dimension matrix - „updating knowledge“: Five tasks were impossible to label according to the dimension matrix with the existing items. Tasks

such as “maintain knowledge or current development in area of expertise” describe an item of process implementation that was added to the dimension matrix.

Customer Interaction Tasks having a remote character according to the initial job description “Telemarketer”: The occupation “telemarketer” contains six tasks labeled as customer interaction but are identifiable as remote tasks according to the job description. Therefore, these six tasks are excluded from the evaluation of being physical or remote.

Added item to dimension matrix - „Discuss/Confer”: Five further tasks could not be allocated to any dimension with the current items. Tasks such as “confer with organizational member to accomplish work activities” indicate the new item in the dimension of “discuss/confer,” which was added to the dimension matrix.

## Annex 12: Task Labeling (Task Anatomy Model Operationalization)

Legends: OW: Office Work; CI: Customer Interaction; MSI: Manual System Input; MNSI: Manual Non-System Input; MOG: Manual Output Generation; CNSI: Cognitive Non-System Input; COG: Cognitive Output Generation; COC: Cognitive Output Control; P/R OA: Physical/Remote Output Application

Remark MSI & MNSI: Tasks are mainly allocated to both dimensions since the research participants are supposed to provide information on whether they perform the task as manual system input or manual non-system input within the questionnaire. Exceptions are only determined through the identified issues of the task anatomy model operationalization in annex 11 when tasks can already be allocated to MSI or MNSI according to their initial description or title.

Remark P/R OA: Research participants are supposed to provide information on whether they perform the task physically on-site or remotely off-site within the questionnaire.

No.	Detailed Work Tasks	MSI	MNSI	MOG	CNSI	COG	COC	P/R OA
1	Provide educational information to the public							1
2	Write advertising or promotional material	1	1					
3	Develop promotional strategies or plans					1		
4	Coach others				1			
5	Collaborate with others in marketing activities				1			
6	Write informational material	1	1					
7	Edit written materials	1	1					
8	Coordinate logistics for productions or events				1			
9	Conduct market research	1	1					
10	Inform viewers, listeners, or audiences							1
11	Promote products, activities, or organizations							1
12	Develop promotional materials			1				
13	Examine marketing materials to ensure compliance with policies or regulations						1	

14	Confer with organizational members to accomplish work activities				1			
15	Coordinate operational activities with external stakeholders				1			
16	Evaluate employee performance					1		
17	Supervise employees				1			
18	Direct organizational operations, projects, or services				1			
19	Direct financial operations				1			
20	Direct sales, marketing, or customer service activities				1			
21	Develop marketing plans or strategies					1		
22	Coordinate special events or programs				1			
23	Implement organizational process or policy changes					1		
24	Monitor performance of organizational members or partners						1	
25	Negotiate sales or lease agreements for products or services							1
26	Prepare financial documents, reports, or budgets			1				
27	Prepare operational budgets			1				
28	Conduct employee training programs							1
29	Establish interpersonal business relationships to facilitate work activities							1
30	Analyze data to assess operational or project effectiveness			1				
31	Promote products, services, or programs							1
32	Manage organizational or project budgets	1	1					
33	Advise customers on technical or procedural issues							1
34	Represent the organization in external relations							1
35	Manage operations, research, or logistics projects	1	1					
36	Maintain knowledge of current developments in area of expertise				1			
37	Analyze market research data			1				

38	Analyze forecasting data to improve business decisions			1				
39	Attend training sessions or professional meetings to develop or maintain professional knowledge				1			
40	Develop marketing plans or strategies for environmental initiatives					1		
41	Develop procedures to evaluate organizational activities			1				
42	Evaluate program effectiveness			1				
43	Maintain operational records for green energy processes or other environmentally-sustainable activities	1	1					
44	Analyze data to inform operational decisions or activities			1				
45	Estimate cost or material requirements			1				
46	Determine pricing or monetary policies			1				
47	Compile operational data			1				
48	Monitor external affairs or events affecting business operations						1	
49	Negotiate contracts for transportation, distribution, or logistics services							1
50	Conduct opinion surveys or needs assessments	1	1					
51	Develop sustainable organizational policies or practices					1		
52	Recommend organizational process or policy changes			1				
53	Advise others on business or operational matters				1			
54	Direct facility maintenance or repair activities				1			
55	Manage construction activities	1	1					
56	Analyze financial records or reports to determine state of operations			1				
57	Prepare forms or applications			1				
58	Liaise between departments or other groups to improve function or communication				1			
59	Resolve customer complaints or problems							1

60	Perform manual service or maintenance tasks	1	1					
61	Inspect condition or functioning of facilities or equipment						1	
62	Communicate organizational information to customers or other stakeholders							1
63	Evaluate characteristics of individuals to determine needs or eligibility			1				
64	Maintain operational records	1	1					
65	Analyze financial records to improve budgeting or planning			1				
66	Communicate with government agencies							1
67	Purchase materials, equipment, or other resources	1	1					
68	Negotiate project specifications							1
69	Approve expenditures						1	
70	Evaluate potential of products, technologies, or resources			1				
71	Manage human resources activities	1	1					
72	Prepare research reports			1				
73	Analyze consumer trends			1				
74	Conduct surveys in organizations	1	1					
75	Establish business management methods					1		
76	Measure effectiveness of business strategies or practices			1				
77	Analyze market conditions or trends			1				
78	Gather organizational performance information	1	1					
79	Analyze industry trends			1				
80	Monitor business indicators						1	
81	Discuss business strategies, practices, or policies with managers				1			
82	Develop business or market strategies					1		
83	Arrange artwork, products, or props		1					
84	Discuss production content and progress with others				1			
85	Maintain inventories of materials, equipment, or products	1	1					

86	Train others on work processes							1
87	Develop artistic or design concepts for decoration, exhibition, or commercial purposes			1				
88	Maintain records, documents, or other files	1	1					
89	Draw detailed or technical illustrations	1	1					
90	Select materials or props					1		
91	Monitor current trends						1	
92	Build models, patterns, or templates			1				
93	Operate still or video cameras or related equipment		1					
94	Construct distinctive physical objects for artistic, functional, or commercial purposes		1					
95	Apply finishes to artwork, crafts, or displays		1					
96	Purchase stocks of merchandise or supplies	1	1					
97	Negotiate contracts with clients or service providers							1
98	Purchase products or services	1	1					
99	Determine the value of goods or services			1				
100	Confer with personnel to coordinate business operations				1			
101	Authorize financial actions						1	
102	Disburse funds from clients accounts to creditors	1	1					
103	Obtain information about goods or services	1	1					
104	Train personnel to enhance job skills							1
105	Create marketing materials			1				
106	Research issues related to the environment or sustainable business practices	1	1					
107	Evaluate logistics methods to reduce environmental impact					1		
108	Identify strategic business investment opportunities				1			
109	Develop content for sales presentations or other materials			1				
110	Deliver promotional presentations to current or prospective customers							1

111	Identify potential customers				1			
112	Develop professional relationships or networks							1
113	Estimate costs or terms of sales			1				
114	Contact current or potential customers to promote products or services							1
115	Explain technical product or service information to customers							1
116	Gather customer or product information to determine customer needs	1	1					
117	Study product information to acquire professional knowledge				1			
118	Prepare sales or other contracts			1				
119	Prepare documentation for contracts, transactions, or regulatory compliance			1				
120	Process sales or other transactions	1	1					
121	Present work to clients for approval							1
122	Distribute promotional literature or samples to customers							1
123	Develop proposals for current or prospective customers			1				
124	Accompany patients or clients on outings to provide assistance							1
125	Schedule operational activities	1	1					
126	Attend events to develop professional knowledge				1			
127	Reconcile records of sales or other financial transactions			1				
128	Answer customer questions about goods or services							1
129	Calculate costs of goods or services			1				
130	Maintain records of sales or other business transactions	1	1					
131	Issue money, credit, or vouchers	1	1					
132	Provide customers with general information or assistance							1
133	Monitor sales activities						1	
134	Greet customers, patrons, or visitors							1
135	Supervise sales or support personnel				1			
136	Train sales personnel							1



137	Calculate weights, volumes or other characteristics of materials			1				
138	Prepare cash for deposit or disbursement	1	1					
139	Clean work areas		1					
140	Pay charges, fees, or taxes	1	1					
141	Answer telephones to direct calls or provide information							1
142	Record sales or transactions data	1	1					
143	Package objects for shipping		1					
144	Prepare outgoing shipments		1					
145	Communicate with other workers to coordinate activities				1			
146	Sell products or services							1
147	Assist customers to ensure comfort or safety							1
148	Stock products or parts		1					
149	Take product orders from customers							1
150	Advise customers on the use of products or services							1
151	Explain financial information to customers							1
152	Examine condition of property or products						1	
153	Set up merchandise displays		1					
154	Recommend products or services to customers							1
155	Arrange services or reservations for patrons	1	1					
156	Demonstrate products to consumers							1
157	Model cosmetics, clothing, or accessories							1
158	Arrange delivery of goods or services	1	1					
159	Coordinate sales campaigns				1			
160	Operate vehicles or material-moving equipment		1					
161	Collect payments for goods or services	1	1					
162	Provide transportation information to passengers or customers							1
163	Record details of deliveries or shipments	1	1					

164	Resolve issues affecting transportation operations				1			
165	Clean machinery or equipment		1					
166	Collect fares or payment from customers							1
167	Maintain vehicles in good working condition		1					
168	Load shipments, belongings, or materials		1					
169	Review customer information			1				
170	Establish operational policies			1				
171	Monitor inventories of products or materials						1	
172	Assign duties or work schedules to employees				1			
173	Discuss design or technical features of products or services with technical personnel				1			
174	Monitor work areas to provide security						1	
175	Monitor market conditions or trends						1	
176	Order materials, supplies, or equipment	1	1					
177	Analyze shipping information to make routing decisions			1				
178	Calculate shipping costs			1				
179	Measure product or material dimensions		1					
180	Repair parts or assemblies		1					
181	Contract real estate to clients							1
182	Negotiate prices or other sales terms							1
183	Appraise property values					1		
184	Obtain property information	1	1					
185	Oversee business processes						1	
186	Review accuracy of sales or other transactions						1	
187	Review laws or regulations to maintain professional knowledge				1			
188	Help clients get needed services or resources							1
189	Create images or other visual displays			1				
190	Enter information into databases or software programs	1						

191	Assess compliance with environmental laws						1	
192	Coordinate activities with suppliers, contractors, clients, or other departments				1			
193	Coordinate legal schedules or activities				1			
194	Advise real estate clients							1
195	Schedule appointments with prospective customers							1
196	Verify customer credit information						1	
197	Direct fundraising or financing activities				1			
198	Identify investment opportunities or strategies				1			
199	Assist customers with product selection							1
200	Package materials or products		1					
201	Share sales-related or market information with colleagues	1	1					
202	Implement design or process improvements			1				
203	Troubleshoot equipment or systems operation problems				1			
204	Prepare technical or operational reports			1				
205	Prepare drawings or diagrams of products or services			1				
206	Send information, materials or documentation	1	1					
207	Maintain records of customer accounts	1	1					
208	Verify accuracy of records						1	
209	Customize financial products or services to meet customer needs			1				
210	Analyze business or financial data			1				
211	Gather information in order to provide services to clients	1	1					
212	Negotiate purchases or contracts							1
213	Customize energy products or services to meet customer needs			1				
214	Assess locations for potential green technology installations						1	

Source: own illustration but task information based on the U.S. Department of Labor (2022)

## Annex 13: 512 Task and Occupation Combinations

No.	Occupation	Detailed Work Task	Task no.
1	Public Relations Specialists	Provide educational information to the public	1
2	Public Relations Specialists	Write advertising or promotional material	2
3	Public Relations Specialists	Develop promotional strategies or plans	3
4	Public Relations Specialists	Coach others	4
5	Public Relations Specialists	Collaborate with others in marketing activities	5
6	Public Relations Specialists	Write informational material	6
7	Public Relations Specialists	Edit written materials	7
8	Public Relations Specialists	Coordinate logistics for productions or events	8
9	Public Relations Specialists	Conduct market research	9
10	Public Relations Specialists	Inform viewers, listeners, or audiences	10
11	Public Relations Specialists	Promote products, activities, or organizations	11
12	Advertising and Promotions Managers	Develop promotional materials	12
13	Advertising and Promotions Managers	Examine marketing materials to ensure compliance with policies or regulations	13
14	Advertising and Promotions Managers	Confer with organizational members to accomplish work activities	14
15	Advertising and Promotions Managers	Coordinate operational activities with external stakeholders	15
16	Advertising and Promotions Managers	Evaluate employee performance	16
17	Advertising and Promotions Managers	Supervise employees	17
18	Advertising and Promotions Managers	Direct organizational operations, projects, or services	18
19	Advertising and Promotions Managers	Direct financial operations	19
20	Advertising and Promotions Managers	Direct sales, marketing, or customer service activities	20
21	Advertising and Promotions Managers	Develop marketing plans or strategies	21
22	Advertising and Promotions Managers	Coordinate special events or programs	22
23	Advertising and Promotions Managers	Implement organizational process or policy changes	23

24	Advertising and Promotions Managers	Monitor performance of organizational members or partners	24
25	Advertising and Promotions Managers	Negotiate sales or lease agreements for products or services	25
26	Advertising and Promotions Managers	Prepare financial documents, reports, or budgets	26
27	Advertising and Promotions Managers	Prepare operational budgets	27
28	Advertising and Promotions Managers	Conduct employee training programs	28
29	Advertising and Promotions Managers	Establish interpersonal business relationships to facilitate work activities	29
30	Advertising and Promotions Managers	Analyze data to assess operational or project effectiveness	30
31	Advertising and Promotions Managers	Promote products, services, or programs	31
32	Advertising and Promotions Managers	Manage organizational or project budgets	32
33	Advertising and Promotions Managers	Advise customers on technical or procedural issues	33
34	Advertising and Promotions Managers	Represent the organization in external relations	34
35	Advertising and Promotions Managers	Manage operations, research, or logistics projects	35
36	Advertising and Promotions Managers	Maintain knowledge of current developments in area of expertise	36
37	Advertising and Promotions Managers	Analyze market research data	37
38	Advertising and Promotions Managers	Analyze forecasting data to improve business decisions	38
39	Advertising and Promotions Managers	Attend training sessions or professional meetings to develop or maintain professional knowledge	39
40	Advertising and Promotions Managers	Conduct market research	9
41	Advertising and Promotions Managers	Develop marketing plans or strategies for environmental initiatives	40
42	Advertising and Promotions Managers	Develop procedures to evaluate organizational activities	41
43	Advertising and Promotions Managers	Evaluate program effectiveness	42
44	Advertising and Promotions Managers	Maintain operational records for green energy processes or other environmentally-sustainable activities	43
45	Marketing Managers	Develop marketing plans or strategies	21
46	Marketing Managers	Evaluate program effectiveness	42

47	Marketing Managers	Direct sales, marketing, or customer service activities	20
48	Marketing Managers	Analyze data to inform operational decisions or activities	44
49	Marketing Managers	Estimate cost or material requirements	45
50	Marketing Managers	Determine pricing or monetary policies	46
51	Marketing Managers	Compile operational data	47
52	Marketing Managers	Supervise employees	17
53	Marketing Managers	Confer with organizational members to accomplish work activities	14
54	Marketing Managers	Analyze market research data	37
55	Marketing Managers	Analyze forecasting data to improve business decisions	38
56	Marketing Managers	Monitor external affairs or events affecting business operations	48
57	Marketing Managers	Negotiate contracts for transportation, distribution, or logistics services	49
58	Marketing Managers	Coordinate special events or programs	22
59	Marketing Managers	Conduct opinion surveys or needs assessments	50
60	Marketing Managers	Develop sustainable organizational policies or practices	51
61	Marketing Managers	Recommend organizational process or policy changes	52
62	Marketing Managers	Advise others on business or operational matters	53
63	Marketing Managers	Develop marketing plans or strategies for environmental initiatives	40
64	Property, Real Estate, and Community Association Managers	Prepare financial documents, reports, or budgets	26
65	Property, Real Estate, and Community Association Managers	Prepare operational budgets	27
66	Property, Real Estate, and Community Association Managers	Direct facility maintenance or repair activities	54
67	Property, Real Estate, and Community Association Managers	Direct organizational operations, projects, or services	18
68	Property, Real Estate, and Community Association Managers	Manage construction activities	55
69	Property, Real Estate, and Community Association Managers	Analyze financial records or reports to determine state of operations	56
70	Property, Real Estate, and Community Association Managers	Direct financial operations	19

71	Property, Real Estate, and Community Association Managers	Negotiate sales or lease agreements for products or services	25
72	Property, Real Estate, and Community Association Managers	Evaluate employee performance	16
73	Property, Real Estate, and Community Association Managers	Supervise employees	17
74	Property, Real Estate, and Community Association Managers	Prepare forms or applications	57
75	Property, Real Estate, and Community Association Managers	Promote products, services, or programs	31
76	Property, Real Estate, and Community Association Managers	Liaise between departments or other groups to improve function or communication	58
77	Property, Real Estate, and Community Association Managers	Resolve customer complaints or problems	59
78	Property, Real Estate, and Community Association Managers	Perform manual service or maintenance tasks	60
79	Property, Real Estate, and Community Association Managers	Inspect condition or functioning of facilities or equipment	61
80	Property, Real Estate, and Community Association Managers	Communicate organizational information to customers or other stakeholders	62
81	Property, Real Estate, and Community Association Managers	Evaluate characteristics of individuals to determine needs or eligibility	63
82	Property, Real Estate, and Community Association Managers	Confer with organizational members to accomplish work activities	14
83	Property, Real Estate, and Community Association Managers	Maintain operational records	64
84	Property, Real Estate, and Community Association Managers	Analyze financial records to improve budgeting or planning	65
85	Property, Real Estate, and Community Association Managers	Communicate with government agencies	66
86	Property, Real Estate, and Community Association Managers	Coordinate operational activities with external stakeholders	15
87	Property, Real Estate, and Community Association Managers	Analyze forecasting data to improve business decisions	38
88	Property, Real Estate, and Community Association Managers	Purchase materials, equipment, or other resources	67
89	Property, Real Estate, and Community Association Managers	Negotiate project specifications	68
90	Sales Managers	Direct sales, marketing, or customer service activities	20
91	Sales Managers	Resolve customer complaints or problems	59
92	Sales Managers	Advise customers on technical or procedural issues	33

93	Sales Managers	Analyze financial records or reports to determine state of operations	56
94	Sales Managers	Supervise employees	17
95	Sales Managers	Approve expenditures	69
96	Sales Managers	Determine pricing or monetary policies	46
97	Sales Managers	Prepare operational budgets	27
98	Sales Managers	Conduct opinion surveys or needs assessments	50
99	Sales Managers	Evaluate potential of products, technologies, or resources	70
100	Sales Managers	Evaluate employee performance	16
101	Sales Managers	Manage human resources activities	71
102	Sales Managers	Establish interpersonal business relationships to facilitate work activities	29
103	Sales Managers	Advise others on business or operational matters	53
104	Sales Managers	Confer with organizational members to accomplish work activities	14
105	Sales Managers	Represent the organization in external relations	34
106	Market Research Analysts and Marketing Specialists	Prepare research reports	72
107	Market Research Analysts and Marketing Specialists	Analyze consumer trends	73
108	Market Research Analysts and Marketing Specialists	Conduct surveys in organizations	74
109	Market Research Analysts and Marketing Specialists	Establish business management methods	75
110	Market Research Analysts and Marketing Specialists	Measure effectiveness of business strategies or practices	76
111	Market Research Analysts and Marketing Specialists	Analyze market conditions or trends	77
112	Market Research Analysts and Marketing Specialists	Gather organizational performance information	78
113	Market Research Analysts and Marketing Specialists	Analyze industry trends	79
114	Market Research Analysts and Marketing Specialists	Monitor business indicators	80
115	Market Research Analysts and Marketing Specialists	Discuss business strategies, practices, or policies with managers	81
116	Market Research Analysts and Marketing Specialists	Supervise employees	17
117	Market Research Analysts and Marketing Specialists	Develop business or market strategies	82



118	Merchandise Displayers and Window Trimmers	Arrange artwork, products, or props	83
119	Merchandise Displayers and Window Trimmers	Develop promotional strategies or plans	3
120	Merchandise Displayers and Window Trimmers	Discuss production content and progress with others	84
121	Merchandise Displayers and Window Trimmers	Maintain inventories of materials, equipment, or products	85
122	Merchandise Displayers and Window Trimmers	Train others on work processes	86
123	Merchandise Displayers and Window Trimmers	Develop artistic or design concepts for decoration, exhibition, or commercial purposes	87
124	Merchandise Displayers and Window Trimmers	Maintain records, documents, or other files	88
125	Merchandise Displayers and Window Trimmers	Draw detailed or technical illustrations	89
126	Merchandise Displayers and Window Trimmers	Select materials or props	90
127	Merchandise Displayers and Window Trimmers	Collaborate with others in marketing activities	5
128	Merchandise Displayers and Window Trimmers	Monitor current trends	91
129	Merchandise Displayers and Window Trimmers	Build models, patterns, or templates	92
130	Merchandise Displayers and Window Trimmers	Operate still or video cameras or related equipment	93
131	Merchandise Displayers and Window Trimmers	Construct distinctive physical objects for artistic, functional, or commercial purposes	94
132	Merchandise Displayers and Window Trimmers	Apply finishes to artwork, crafts, or displays	95
133	Wholesale and Retail Buyers, Except Farm Products	Purchase stocks of merchandise or supplies	96
134	Wholesale and Retail Buyers, Except Farm Products	Negotiate contracts with clients or service providers	97
135	Wholesale and Retail Buyers, Except Farm Products	Discuss business strategies, practices, or policies with managers	81
136	Wholesale and Retail Buyers, Except Farm Products	Purchase products or services	98
137	Wholesale and Retail Buyers, Except Farm Products	Determine the value of goods or services	99
138	Wholesale and Retail Buyers, Except Farm Products	Advise others on business or operational matters	53
139	Wholesale and Retail Buyers, Except Farm Products	Confer with personnel to coordinate business operations	100

140	Wholesale and Retail Buyers, Except Farm Products	Authorize financial actions	101
141	Wholesale and Retail Buyers, Except Farm Products	Disburse funds from clients accounts to creditors	102
142	Wholesale and Retail Buyers, Except Farm Products	Analyze consumer trends	73
143	Wholesale and Retail Buyers, Except Farm Products	Analyze market conditions or trends	77
144	Wholesale and Retail Buyers, Except Farm Products	Obtain information about goods or services	103
145	Wholesale and Retail Buyers, Except Farm Products	Supervise employees	17
146	Wholesale and Retail Buyers, Except Farm Products	Train personnel to enhance job skills	104
147	Wholesale and Retail Buyers, Except Farm Products	Create marketing materials	105
148	Wholesale and Retail Buyers, Except Farm Products	Research issues related to the environment or sustainable business practices	106
149	Wholesale and Retail Buyers, Except Farm Products	Evaluate logistics methods to reduce environmental impact	107
150	Wholesale and Retail Buyers, Except Farm Products	Develop business or market strategies	82
151	Wholesale and Retail Buyers, Except Farm Products	Identify strategic business investment opportunities	108
152	Advertising Sales Agents	Develop content for sales presentations or other materials	109
153	Advertising Sales Agents	Deliver promotional presentations to current or prospective customers	110
154	Advertising Sales Agents	Identify potential customers	111
155	Advertising Sales Agents	Develop professional relationships or networks	112
156	Advertising Sales Agents	Estimate costs or terms of sales	113
157	Advertising Sales Agents	Contact current or potential customers to promote products or services	114
158	Advertising Sales Agents	Explain technical product or service information to customers	115
159	Advertising Sales Agents	Gather customer or product information to determine customer needs	116
160	Advertising Sales Agents	Study product information to acquire professional knowledge	117
161	Advertising Sales Agents	Prepare sales or other contracts	118
162	Advertising Sales Agents	Prepare documentation for contracts, transactions, or regulatory compliance	119

163	Advertising Sales Agents	Process sales or other transactions	120
164	Advertising Sales Agents	Present work to clients for approval	121
165	Advertising Sales Agents	Distribute promotional literature or samples to customers	122
166	Advertising Sales Agents	Develop marketing plans or strategies	21
167	Advertising Sales Agents	Develop proposals for current or prospective customers	123
168	Advertising Sales Agents	Negotiate sales or lease agreements for products or services	25
169	Advertising Sales Agents	Accompany patients or clients on outings to provide assistance	124
170	Advertising Sales Agents	Schedule operational activities	125
171	Advertising Sales Agents	Attend events to develop professional knowledge	126
172	Cashiers	Reconcile records of sales or other financial transactions	127
173	Cashiers	Process sales or other transactions	120
174	Cashiers	Answer customer questions about goods or services	128
175	Cashiers	Explain technical product or service information to customers	115
176	Cashiers	Calculate costs of goods or services	129
177	Cashiers	Maintain records of sales or other business transactions	130
178	Cashiers	Issue money, credit, or vouchers	131
179	Cashiers	Provide customers with general information or assistance	132
180	Cashiers	Monitor sales activities	133
181	Cashiers	Greet customers, patrons, or visitors	134
182	Cashiers	Supervise sales or support personnel	135
183	Cashiers	Train sales personnel	136
184	Cashiers	Calculate weights, volumes or other characteristics of materials	137
185	Cashiers	Prepare cash for deposit or disbursement	138
186	Cashiers	Clean work areas	139
187	Cashiers	Pay charges, fees, or taxes	140
188	Cashiers	Answer telephones to direct calls or provide information	141
189	Cashiers	Record sales or transactions data	142
190	Cashiers	Package objects for shipping	143
191	Cashiers	Prepare outgoing shipments	144
192	Cashiers	Communicate with other workers to coordinate activities	145
193	Cashiers	Sell products or services	146
194	Cashiers	Assist customers to ensure comfort or safety	147

195	Cashiers	Stock products or parts	148
196	Counter and Rental Clerks	Process sales or other transactions	120
197	Counter and Rental Clerks	Calculate costs of goods or services	129
198	Counter and Rental Clerks	Take product orders from customers	149
199	Counter and Rental Clerks	Advise customers on the use of products or services	150
200	Counter and Rental Clerks	Explain financial information to customers	151
201	Counter and Rental Clerks	Explain technical product or service information to customers	115
202	Counter and Rental Clerks	Gather customer or product information to determine customer needs	116
203	Counter and Rental Clerks	Greet customers, patrons, or visitors	134
204	Counter and Rental Clerks	Answer customer questions about goods or services	128
205	Counter and Rental Clerks	Examine condition of property or products	152
206	Counter and Rental Clerks	Prepare sales or other contracts	118
207	Counter and Rental Clerks	Sell products or services	146
208	Counter and Rental Clerks	Maintain records of sales or other business transactions	130
209	Counter and Rental Clerks	Set up merchandise displays	153
210	Counter and Rental Clerks	Recommend products or services to customers	154
211	Counter and Rental Clerks	Arrange services or reservations for patrons	155
212	Demonstrators and Product Promoters	Distribute promotional literature or samples to customers	122
213	Demonstrators and Product Promoters	Maintain records of sales or other business transactions	130
214	Demonstrators and Product Promoters	Sell products or services	146
215	Demonstrators and Product Promoters	Demonstrate products to consumers	156
216	Demonstrators and Product Promoters	Clean work areas	139
217	Demonstrators and Product Promoters	Explain technical product or service information to customers	115
218	Demonstrators and Product Promoters	Recommend products or services to customers	154
219	Demonstrators and Product Promoters	Record sales or transactions data	142
220	Demonstrators and Product Promoters	Study product information to acquire professional knowledge	117
221	Demonstrators and Product Promoters	Identify potential customers	111

222	Demonstrators and Product Promoters	Set up merchandise displays	153
223	Demonstrators and Product Promoters	Answer customer questions about goods or services	128
224	Demonstrators and Product Promoters	Gather customer or product information to determine customer needs	116
225	Demonstrators and Product Promoters	Advise customers on the use of products or services	150
226	Demonstrators and Product Promoters	Develop content for sales presentations or other materials	109
227	Demonstrators and Product Promoters	Stock products or parts	148
228	Demonstrators and Product Promoters	Deliver promotional presentations to current or prospective customers	110
229	Demonstrators and Product Promoters	Train sales personnel	136
230	Demonstrators and Product Promoters	Contact current or potential customers to promote products or services	114
231	Demonstrators and Product Promoters	Model cosmetics, clothing, or accessories	157
232	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Demonstrate products to consumers	156
233	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Explain technical product or service information to customers	115
234	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Identify potential customers	111
235	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Arrange delivery of goods or services	158
236	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Process sales or other transactions	120
237	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Take product orders from customers	149
238	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Contact current or potential customers to promote products or services	114
239	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Coordinate sales campaigns	159

240	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Answer customer questions about goods or services	128
241	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Sell products or services	146
242	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Distribute promotional literature or samples to customers	122
243	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Purchase stocks of merchandise or supplies	96
244	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Set up merchandise displays	153
245	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Stock products or parts	148
246	Driver/Sales Workers	Operate vehicles or material-moving equipment	160
247	Driver/Sales Workers	Sell products or services	146
248	Driver/Sales Workers	Collect payments for goods or services	161
249	Driver/Sales Workers	Provide transportation information to passengers or customers	162
250	Driver/Sales Workers	Record sales or transactions data	142
251	Driver/Sales Workers	Record details of deliveries or shipments	163
252	Driver/Sales Workers	Resolve issues affecting transportation operations	164
253	Driver/Sales Workers	Clean machinery or equipment	165
254	Driver/Sales Workers	Collect fares or payment from customers	166
255	Driver/Sales Workers	Maintain vehicles in good working condition	167
256	Driver/Sales Workers	Load shipments, belongings, or materials	168
257	Driver/Sales Workers	Review customer information	169
258	First-Line Supervisors of Non-Retail Sales Workers	Monitor sales activities	133
259	First-Line Supervisors of Non-Retail Sales Workers	Supervise sales or support personnel	135
260	First-Line Supervisors of Non-Retail Sales Workers	Contact current or potential customers to promote products or services	114
261	First-Line Supervisors of Non-Retail Sales Workers	Establish operational policies	170

262	First-Line Supervisors of Non-Retail Sales Workers	Gather customer or product information to determine customer needs	116
263	First-Line Supervisors of Non-Retail Sales Workers	Prepare financial documents, reports, or budgets	26
264	First-Line Supervisors of Non-Retail Sales Workers	Examine condition of property or products	152
265	First-Line Supervisors of Non-Retail Sales Workers	Answer customer questions about goods or services	128
266	First-Line Supervisors of Non-Retail Sales Workers	Explain technical product or service information to customers	115
267	First-Line Supervisors of Non-Retail Sales Workers	Maintain records of sales or other business transactions	130
268	First-Line Supervisors of Non-Retail Sales Workers	Train sales personnel	136
269	First-Line Supervisors of Non-Retail Sales Workers	Develop marketing plans or strategies	21
270	First-Line Supervisors of Non-Retail Sales Workers	Analyze market conditions or trends	77
271	First-Line Supervisors of Non-Retail Sales Workers	Monitor inventories of products or materials	171
272	First-Line Supervisors of Non-Retail Sales Workers	Purchase stocks of merchandise or supplies	96
273	First-Line Supervisors of Non-Retail Sales Workers	Assign duties or work schedules to employees	172
274	First-Line Supervisors of Non-Retail Sales Workers	Coordinate sales campaigns	159
275	First-Line Supervisors of Non-Retail Sales Workers	Discuss design or technical features of products or services with technical personnel	173
276	First-Line Supervisors of Non-Retail Sales Workers	Prepare sales or other contracts	118
277	First-Line Supervisors of Retail Sales Workers	Answer customer questions about goods or services	128
278	First-Line Supervisors of Retail Sales Workers	Greet customers, patrons, or visitors	134
279	First-Line Supervisors of Retail Sales Workers	Supervise sales or support personnel	135
280	First-Line Supervisors of Retail Sales Workers	Establish operational policies	170
281	First-Line Supervisors of Retail Sales Workers	Examine condition of property or products	152
282	First-Line Supervisors of Retail Sales Workers	Monitor sales activities	133
283	First-Line Supervisors of Retail Sales Workers	Train sales personnel	136

284	First-Line Supervisors of Retail Sales Workers	Assign duties or work schedules to employees	172
285	First-Line Supervisors of Retail Sales Workers	Set up merchandise displays	153
286	First-Line Supervisors of Retail Sales Workers	Develop marketing plans or strategies	21
287	First-Line Supervisors of Retail Sales Workers	Clean work areas	139
288	First-Line Supervisors of Retail Sales Workers	Maintain records of sales or other business transactions	130
289	First-Line Supervisors of Retail Sales Workers	Sell products or services	146
290	First-Line Supervisors of Retail Sales Workers	Coordinate sales campaigns	159
291	First-Line Supervisors of Retail Sales Workers	Monitor inventories of products or materials	171
292	First-Line Supervisors of Retail Sales Workers	Prepare financial documents, reports, or budgets	26
293	First-Line Supervisors of Retail Sales Workers	Purchase stocks of merchandise or supplies	96
294	First-Line Supervisors of Retail Sales Workers	Monitor work areas to provide security	174
295	First-Line Supervisors of Retail Sales Workers	Monitor market conditions or trends	175
296	First-Line Supervisors of Retail Sales Workers	Authorize financial actions	101
297	First-Line Supervisors of Retail Sales Workers	Prepare operational budgets	27
298	Parts Salespersons	Process sales or other transactions	120
299	Parts Salespersons	Order materials, supplies, or equipment	176
300	Parts Salespersons	Take product orders from customers	149
301	Parts Salespersons	Gather customer or product information to determine customer needs	116
302	Parts Salespersons	Prepare sales or other contracts	118
303	Parts Salespersons	Explain technical product or service information to customers	115
304	Parts Salespersons	Monitor inventories of products or materials	171
305	Parts Salespersons	Stock products or parts	148
306	Parts Salespersons	Arrange delivery of goods or services	158
307	Parts Salespersons	Advise customers on the use of products or services	150
308	Parts Salespersons	Analyze shipping information to make routing decisions	177
309	Parts Salespersons	Calculate shipping costs	178



310	Parts Salespersons	Clean work areas	139
311	Parts Salespersons	Examine condition of property or products	152
312	Parts Salespersons	Set up merchandise displays	153
313	Parts Salespersons	Demonstrate products to consumers	156
314	Parts Salespersons	Measure product or material dimensions	179
315	Parts Salespersons	Repair parts or assemblies	180
316	Real Estate Brokers	Contract real estate to clients	181
317	Real Estate Brokers	Prepare sales or other contracts	118
318	Real Estate Brokers	Negotiate prices or other sales terms	182
319	Real Estate Brokers	Supervise sales or support personnel	135
320	Real Estate Brokers	Appraise property values	183
321	Real Estate Brokers	Obtain property information	184
322	Real Estate Brokers	Oversee business processes	185
323	Real Estate Brokers	Review accuracy of sales or other transactions	186
324	Real Estate Brokers	Review laws or regulations to maintain professional knowledge	187
325	Real Estate Brokers	Monitor market conditions or trends	175
326	Real Estate Brokers	Help clients get needed services or resources	188
327	Real Estate Brokers	Create images or other visual displays	189
328	Real Estate Brokers	Enter information into databases or software programs	190
329	Real Estate Brokers	Assess compliance with environmental laws	191
330	Real Estate Sales Agents	Negotiate prices or other sales terms	182
331	Real Estate Sales Agents	Prepare sales or other contracts	118
332	Real Estate Sales Agents	Obtain property information	184
333	Real Estate Sales Agents	Coordinate activities with suppliers, contractors, clients, or other departments	192
334	Real Estate Sales Agents	Develop content for sales presentations or other materials	109
335	Real Estate Sales Agents	Appraise property values	183
336	Real Estate Sales Agents	Coordinate legal schedules or activities	193
337	Real Estate Sales Agents	Gather customer or product information to determine customer needs	116
338	Real Estate Sales Agents	Contact current or potential customers to promote products or services	114
339	Real Estate Sales Agents	Identify potential customers	111
340	Real Estate Sales Agents	Advise real estate clients	194

341	Real Estate Sales Agents	Schedule appointments with prospective customers	195
342	Real Estate Sales Agents	Attend events to develop professional knowledge	126
343	Real Estate Sales Agents	Deliver promotional presentations to current or prospective customers	110
344	Real Estate Sales Agents	Explain technical product or service information to customers	115
345	Real Estate Sales Agents	Develop professional relationships or networks	112
346	Real Estate Sales Agents	Verify customer credit information	196
347	Real Estate Sales Agents	Develop proposals for current or prospective customers	123
348	Real Estate Sales Agents	Recommend products or services to customers	154
349	Real Estate Sales Agents	Examine condition of property or products	152
350	Real Estate Sales Agents	Arrange delivery of goods or services	158
351	Real Estate Sales Agents	Train sales personnel	136
352	Real Estate Sales Agents	Contract real estate to clients	181
353	Real Estate Sales Agents	Direct fundraising or financing activities	197
354	Real Estate Sales Agents	Identify investment opportunities or strategies	198
355	Retail Salespersons	Gather customer or product information to determine customer needs	116
356	Retail Salespersons	Greet customers, patrons, or visitors	134
357	Retail Salespersons	Recommend products or services to customers	154
358	Retail Salespersons	Maintain records of sales or other business transactions	130
359	Retail Salespersons	Process sales or other transactions	120
360	Retail Salespersons	Set up merchandise displays	153
361	Retail Salespersons	Calculate costs of goods or services	129
362	Retail Salespersons	Answer customer questions about goods or services	128
363	Retail Salespersons	Review laws or regulations to maintain professional knowledge	187
364	Retail Salespersons	Reconcile records of sales or other financial transactions	127
365	Retail Salespersons	Prepare sales or other contracts	118
366	Retail Salespersons	Advise customers on the use of products or services	150
367	Retail Salespersons	Demonstrate products to consumers	156
368	Retail Salespersons	Explain technical product or service information to customers	115

369	Retail Salespersons	Monitor inventories of products or materials	171
370	Retail Salespersons	Purchase stocks of merchandise or supplies	96
371	Retail Salespersons	Estimate costs or terms of sales	113
372	Retail Salespersons	Assist customers with product selection	199
373	Retail Salespersons	Package materials or products	200
374	Retail Salespersons	Monitor work areas to provide security	174
375	Retail Salespersons	Arrange delivery of goods or services	158
376	Retail Salespersons	Sell products or services	146
377	Retail Salespersons	Clean work areas	139
378	Retail Salespersons	Arrange services or reservations for patrons	155
379	Sales Engineers	Share sales-related or market information with colleagues	201
380	Sales Engineers	Sell products or services	146
381	Sales Engineers	Implement design or process improvements	202
382	Sales Engineers	Discuss design or technical features of products or services with technical personnel	173
383	Sales Engineers	Gather customer or product information to determine customer needs	116
384	Sales Engineers	Deliver promotional presentations to current or prospective customers	110
385	Sales Engineers	Develop content for sales presentations or other materials	109
386	Sales Engineers	Explain technical product or service information to customers	115
387	Sales Engineers	Contact current or potential customers to promote products or services	114
388	Sales Engineers	Prepare sales or other contracts	118
389	Sales Engineers	Arrange delivery of goods or services	158
390	Sales Engineers	Develop proposals for current or prospective customers	123
391	Sales Engineers	Identify potential customers	111
392	Sales Engineers	Demonstrate products to consumers	156
393	Sales Engineers	Advise customers on the use of products or services	150
394	Sales Engineers	Explain financial information to customers	151
395	Sales Engineers	Recommend products or services to customers	154

396	Sales Engineers	Develop marketing plans or strategies	21
397	Sales Engineers	Troubleshoot equipment or systems operation problems	203
398	Sales Engineers	Maintain records of sales or other business transactions	130
399	Sales Engineers	Monitor market conditions or trends	175
400	Sales Engineers	Prepare financial documents, reports, or budgets	26
401	Sales Engineers	Prepare technical or operational reports	204
402	Sales Engineers	Attend events to develop professional knowledge	126
403	Sales Engineers	Train sales personnel	136
404	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Negotiate prices or other sales terms	182
405	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Purchase stocks of merchandise or supplies	96
406	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Coordinate sales campaigns	159
407	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Monitor inventories of products or materials	171
408	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Set up merchandise displays	153
409	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Stock products or parts	148
410	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Answer customer questions about goods or services	128
411	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Estimate costs or terms of sales	113
412	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Explain technical product or service information to customers	115
413	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Recommend products or services to customers	154
414	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Advise customers on the use of products or services	150

415	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Distribute promotional literature or samples to customers	122
416	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Prepare sales or other contracts	118
417	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Monitor market conditions or trends	175
418	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Study product information to acquire professional knowledge	117
419	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Maintain records of sales or other business transactions	130
420	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Prepare financial documents, reports, or budgets	26
421	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Develop proposals for current or prospective customers	123
422	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Prepare drawings or diagrams of products or services	205
423	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Contact current or potential customers to promote products or services	114
424	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Demonstrate products to consumers	156
425	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Verify customer credit information	196
426	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Order materials, supplies, or equipment	176
427	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Send information, materials or documentation	206
428	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Identify potential customers	111
429	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Arrange delivery of goods or services	158
430	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Negotiate prices or other sales terms	182

431	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Contact current or potential customers to promote products or services	114
432	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Gather customer or product information to determine customer needs	116
433	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Sell products or services	146
434	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Prepare sales or other contracts	118
435	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Process sales or other transactions	120
436	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Maintain records of customer accounts	207
437	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Answer customer questions about goods or services	128
438	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Estimate costs or terms of sales	113
439	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Explain technical product or service information to customers	115
440	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Demonstrate products to consumers	156
441	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Discuss design or technical features of products or services with technical personnel	173
442	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Develop content for sales presentations or other materials	109
443	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Recommend products or services to customers	154
444	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Arrange delivery of goods or services	158
445	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Maintain records of sales or other business transactions	130
446	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Prepare financial documents, reports, or budgets	26

447	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Identify potential customers	111
448	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Share sales-related or market information with colleagues	201
449	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Coordinate sales campaigns	159
450	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Advise customers on the use of products or services	150
451	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Verify accuracy of records	208
452	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Verify customer credit information	196
453	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Appraise property values	183
454	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Study product information to acquire professional knowledge	117
455	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Distribute promotional literature or samples to customers	122
456	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Stock products or parts	148
457	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Attend events to develop professional knowledge	126
458	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Monitor market conditions or trends	175
459	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Monitor sales activities	133
460	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Deliver promotional presentations to current or prospective customers	110
461	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Explain financial information to customers	151
462	Securities, Commodities, and Financial Services Sales Agents	Negotiate prices or other sales terms	182

463	Securities, Commodities, and Financial Services Sales Agents	Monitor market conditions or trends	175
464	Securities, Commodities, and Financial Services Sales Agents	Maintain records of sales or other business transactions	130
465	Securities, Commodities, and Financial Services Sales Agents	Sell products or services	146
466	Securities, Commodities, and Financial Services Sales Agents	Prepare financial documents, reports, or budgets	26
467	Securities, Commodities, and Financial Services Sales Agents	Prepare sales or other contracts	118
468	Securities, Commodities, and Financial Services Sales Agents	Process sales or other transactions	120
469	Securities, Commodities, and Financial Services Sales Agents	Gather customer or product information to determine customer needs	116
470	Securities, Commodities, and Financial Services Sales Agents	Explain financial information to customers	151
471	Securities, Commodities, and Financial Services Sales Agents	Develop proposals for current or prospective customers	123
472	Securities, Commodities, and Financial Services Sales Agents	Identify investment opportunities or strategies	198
473	Securities, Commodities, and Financial Services Sales Agents	Develop professional relationships or networks	112
474	Securities, Commodities, and Financial Services Sales Agents	Customize financial products or services to meet customer needs	209
475	Securities, Commodities, and Financial Services Sales Agents	Review accuracy of sales or other transactions	186
476	Securities, Commodities, and Financial Services Sales Agents	Contact current or potential customers to promote products or services	114
477	Securities, Commodities, and Financial Services Sales Agents	Explain technical product or service information to customers	115
478	Securities, Commodities, and Financial Services Sales Agents	Monitor sales activities	133
479	Securities, Commodities, and Financial Services Sales Agents	Supervise sales or support personnel	135
480	Securities, Commodities, and Financial Services Sales Agents	Analyze market conditions or trends	77
481	Securities, Commodities, and Financial Services Sales Agents	Share sales-related or market information with colleagues	201
482	Securities, Commodities, and Financial Services Sales Agents	Coordinate activities with suppliers, contractors, clients, or other departments	192
483	Securities, Commodities, and Financial Services Sales Agents	Analyze business or financial data	210
484	Securities, Commodities, and Financial Services Sales Agents	Calculate costs of goods or services	129



485	Securities, Commodities, and Financial Services Sales Agents	Estimate costs or terms of sales	113
486	Securities, Commodities, and Financial Services Sales Agents	Gather information in order to provide services to clients	211
487	Securities, Commodities, and Financial Services Sales Agents	Negotiate purchases or contracts	212
488	Securities, Commodities, and Financial Services Sales Agents	Purchase products or services	98
489	Solar Sales Representatives and Assessors	Develop content for sales presentations or other materials	109
490	Solar Sales Representatives and Assessors	Develop proposals for current or prospective customers	123
491	Solar Sales Representatives and Assessors	Prepare sales or other contracts	118
492	Solar Sales Representatives and Assessors	Customize energy products or services to meet customer needs	213
493	Solar Sales Representatives and Assessors	Explain technical product or service information to customers	115
494	Solar Sales Representatives and Assessors	Explain financial information to customers	151
495	Solar Sales Representatives and Assessors	Gather customer or product information to determine customer needs	116
496	Solar Sales Representatives and Assessors	Evaluate potential of products, technologies, or resources	70
497	Solar Sales Representatives and Assessors	Identify potential customers	111
498	Solar Sales Representatives and Assessors	Assess locations for potential green technology installations	214
499	Solar Sales Representatives and Assessors	Take product orders from customers	149
500	Solar Sales Representatives and Assessors	Develop marketing plans or strategies	21
501	Solar Sales Representatives and Assessors	Prepare drawings or diagrams of products or services	205
502	Solar Sales Representatives and Assessors	Demonstrate products to consumers	156
503	Telemarketers	Contact current or potential customers to promote products or services	114
504	Telemarketers	Answer customer questions about goods or services	128
505	Telemarketers	Deliver promotional presentations to current or prospective customers	110
506	Telemarketers	Explain technical product or service information to customers	115

507	Telemarketers	Maintain records of customer accounts	207
508	Telemarketers	Develop content for sales presentations or other materials	109
509	Telemarketers	Identify potential customers	111
510	Telemarketers	Answer telephones to direct calls or provide information	141
511	Telemarketers	Schedule appointments with prospective customers	195
512	Telemarketers	Monitor market conditions or trends	175

Source: own illustration based on the information of U.S. Department of Labor (2022)

## Annex 14: ONET Job Description and Occupational Titles

The job descriptions and alternative job titles were used to offer the research participants further identification of possibilities to select the most appropriate job for themselves provided by the U.S. Department of Labor (2022).

<b>Questionnaire A: Marketing &amp; Sales Management (incl. Communications, Market Research, Merchandising)</b>
<p><b>Public Relations Specialists:</b> Promote or create an intended public image for individuals, groups, or organizations. May write or select material for release to various communications media. May specialize in using social media.</p> <p><u>Sample of related job titles:</u> Communications Specialist, Corporate Communications Specialist, Media Relations Specialist, Public Affairs Specialist, Public Information Officer, Public Information Specialist, Public Relations Coordinator (PR Coordinator), Public Relations Specialist (PR Specialist).</p>
<p><b>Advertising and Promotions Managers:</b> Plan, direct, or coordinate advertising policies and programs or produce collateral materials, such as posters, contests, coupons, or giveaways, to create extra interest in the purchase of a product or service for a department, an entire organization, or on an account basis.</p> <p><u>Sample of related job titles:</u> Account Executive, Advertising Manager (Ad Manager), Advertising Sales Manager (Ad Sales Manager), Classified Advertising Manager (Classified Ad Manager), Communications Director, Communications Manager, Creative Services Director, Marketing and Promotions Manager, Promotions Director, Promotions Manager.</p>
<p><b>Marketing Managers:</b> Plan, direct, or coordinate marketing policies and programs, such as determining the demand for products and services offered by a firm and its competitors, and identify potential customers. Develop pricing strategies with the goal of maximizing the firm's profits or share of the market while ensuring the firm's customers are satisfied. Oversee product development or monitor trends that indicate the need for new products and services.</p> <p><u>Sample of related job titles:</u> Account Supervisor, Brand Manager, Business Development Director, Business Development Manager, Commercial Lines Manager, Market Development Executive, Marketing Coordinator, Marketing Director, Marketing Manager, Product Manager.</p>
<p><b>Sales Managers:</b> Plan, direct, or coordinate the actual distribution or movement of a product or service to the customer. Coordinate sales distribution by establishing sales territories, quotas, and goals and establish training programs for sales representatives. Analyze sales statistics gathered by staff to determine sales potential and inventory requirements and monitor the preferences of customers.</p> <p><u>Sample of related job titles:</u> District Sales Manager, National Sales Manager, Regional Sales Manager, Sales and Marketing Vice President (Sales and Marketing VP), Sales Director, Sales Manager, Sales Supervisor, Sales Vice President (Sales VP).</p>
<p><b>Market Research Analysts and Marketing Specialists:</b> Research conditions in local, regional, national, or online markets. Gather information to determine potential sales of a product or service, or plan a marketing or advertising campaign. May gather information on competitors,</p>

<p>prices, sales, and methods of marketing and distribution. May employ search marketing tactics, analyze web metrics, and develop recommendations to increase search engine ranking and visibility to target markets.</p> <p><u>Sample of related job titles:</u> Business Development Specialist, Communications Specialist, Demographic Analyst, Market Analyst, Market Research Analyst, Market Research Consultant, Market Research Specialist, Market Researcher.</p>
<p><b>Merchandise Displayers and Window Trimmers:</b> Plan and erect commercial displays, such as those in windows and interiors of retail stores and at trade exhibitions.</p> <p><u>Sample of related job titles:</u> Decorator, Display Associate, Display Decorator, Display Specialist, In-Store Marketing Associate, Merchandiser, Visual Merchandiser (VM), Visual Merchandising Specialist.</p>
<p><b>Wholesale and Retail Buyers, Except Farm Products:</b> Buy merchandise or commodities, other than farm products, for resale to consumers at the wholesale or retail level, including both durable and nondurable goods. Analyze past buying trends, sales records, price, and quality of merchandise to determine value and yield. Select, order, and authorize payment for merchandise according to contractual agreements. May conduct meetings with sales personnel and introduce new products. May negotiate contracts. Includes assistant wholesale and retail buyers of nonfarm products.</p> <p><u>Sample of related job titles:</u> Buyer, Grocery Buyer, Procurement Specialist, Purchaser, Purchasing Coordinator, Retail Buyer, Trader.</p>
<p><b>Questionnaire B: Professional Sales (incl. Sales Representatives)</b></p>
<p><b>Advertising Sales Agents:</b> Sell or solicit advertising space, time, or media in publications, signage, TV, radio, or Internet establishments or public spaces.</p> <p><u>Sample of related job titles:</u> Advertising Account Representative, Advertising Consultant, Advertising Representative, Advertising Sales Representative (Ad Sales Representative), Sales Representative.</p>
<p><b>Demonstrators and Product Promoters:</b> Demonstrate merchandise and answer questions for the purpose of creating public interest in buying the product. May sell demonstrated merchandise.</p> <p><u>Sample of related job titles:</u> Brand Ambassador, Demo Specialist (Demonstration Specialist), Demonstrator, Event Specialist, Field Merchandiser, Food Demonstrator, In Store Demonstrator, Merchandiser, Product Ambassador, Product Demonstrator.</p>
<p><b>Door-to-Door Sales Workers, News and Street Vendors, and Related Workers:</b> Sell goods or services door-to-door or on the street.</p> <p><u>Sample of related job titles:</u> Direct Sales Coach, Door-to-Door Sales Trainer, Independent Beauty Consultant, Independent Distributor, Independent Sales Associate, Independent Sales Representative, Sales Representative, Street Vendor.</p>
<p><b>Driver/Sales Workers:</b> Drive truck or other vehicle over established routes or within an established territory and sell or deliver goods, such as food products, including restaurant take-out items, or pick up or deliver items such as commercial laundry. May also take orders, collect payment, or stock merchandise at point of delivery.</p>

<p><u>Sample of related job titles:</u> Delivery Man, Driver, Driver Salesman, Pizza Delivery Driver, Route Delivery Driver, Route Driver, Route Sales Driver, Route Sales Representative, Route Salesman, Sales Route Driver.</p>
<p><b>First-Line Supervisors of Non-Retail Sales Workers:</b> Directly supervise and coordinate activities of sales workers other than retail sales workers. May perform duties such as budgeting, accounting, and personnel work, in addition to supervisory duties.</p> <p><u>Sample of related job titles:</u> Customer Service Department Supervisor, Customer Service Supervisor, Driver Sales Supervisor, Information Center Supervisor, Inside Sales Supervisor, Reservations Supervisor, Sales Department Supervisor, Sales Leader, Sales Supervisor, Sales Team Leader.</p>
<p><b>Sales Engineers:</b> Sell business goods or services, the selling of which requires a technical background equivalent to a baccalaureate degree in engineering.</p> <p><u>Sample of related job titles:</u> Product Sales Engineer, Sales Engineer, Technical Sales Engineer.</p>
<p><b>Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products:</b> Sell goods for wholesalers or manufacturers to businesses or groups of individuals. Work requires substantial knowledge of items sold.</p> <p><u>Sample of related job titles:</u> Account Representative, Customer Account Technician, Inside Salesperson, Outside Sales Representative, Route Sales Representative, Sales Consultant, Sales Professional, Sales Representative (Sales Rep), Salesman, Salesperson.</p>
<p><b>Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products:</b> Sell goods for wholesalers or manufacturers where technical or scientific knowledge is required in such areas as biology, engineering, chemistry, and electronics, normally obtained from at least 2 years of postsecondary education.</p> <p><u>Sample of related job titles:</u> Inside Sales Representative, Marketing Representative, Sales Representative.</p>
<p><b>Securities, Commodities, and Financial Services Sales Agents:</b> Buy and sell securities or commodities in investment and trading firms, or provide financial services to businesses and individuals. May advise customers about stocks, bonds, mutual funds, commodities, and market conditions.</p> <p><u>Sample of related job titles:</u> Broker, Corporate Bond Trader, Financial Consultant, Financial Services Representative, Investment Advisor, Investment Representative, Investment Specialist, Investment Trader, Personal Banker, Stock Broker.</p>
<p><b>Solar Sales Representatives and Assessors:</b> Contact new or existing customers to determine their solar equipment needs, suggest systems or equipment, or estimate costs.</p> <p><u>Sample of related job titles:</u> Energy Consultant, Sales Associate, Sales Representative, Salesman, Solar Consultant, Solar Sales Representative.</p>
<p><b>Telemarketers:</b> Solicit donations or orders for goods or services over the telephone.</p> <p><u>Sample of related job titles:</u> Telemarketer, Telemarketing Sales Representative, Telephone Sales Representative (TSR), Telephone Service Representative (TSR), Telesales Representative, Telesales Specialist.</p>
<p><b>Questionnaire C: Professional Sales: Focus Retail</b></p>

<p><b>Cashiers:</b> Receive and disburse money in establishments other than financial institutions. May use electronic scanners, cash registers, or related equipment. May process credit or debit card transactions and validate checks.</p> <p><u>Sample of related job titles:</u> Cashier, Center Aisle Cashier, Central Aisle Cashier, Checker, Customer Assistant, Sales Associate, Toll Collector.</p>
<p><b>Counter and Rental Clerks:</b> Receive orders, generally in person, for repairs, rentals, and services. May describe available options, compute cost, and accept payment.</p> <p><u>Sample of related job titles:</u> Counter Clerk, Counter Service Representative, Leasing Consultant, Rental Agent, Rental Assistant, Rental Associate, Rental Clerk, Rental Counter Clerk, Rental Sales Representative, Video Clerk.</p>
<p><b>Parts Salespersons:</b> Sell spare and replacement parts and equipment in repair shop or parts store.</p> <p><u>Sample of related job titles:</u> Parts Advisor, Parts Clerk, Parts Consultant, Parts Counter Sales Person, Parts Counterperson, Parts Person, Parts Salesman, Parts Salesperson, Parts Specialist.</p>
<p><b>Retail Salespersons:</b> Sell merchandise, such as furniture, motor vehicles, appliances, or apparel to consumers.</p> <p><u>Sample of related job titles:</u> Car Salesman, Customer Assistant, Retail Salesperson, Sales Associate, Sales Clerk, Sales Consultant, Sales Person, Sales Representative, Salesman.</p>
<p><b>First-Line Supervisors of Retail Sales Workers:</b> Directly supervise and coordinate activities of retail sales workers in an establishment or department. Duties may include management functions, such as purchasing, budgeting, accounting, and personnel work, in addition to supervisory duties.</p> <p><u>Sample of related job titles:</u> Bakery Manager, Delicatessen Manager, Department Manager, Department Supervisor, Grocery Manager, Key Carrier, Meat Department Manager, Parts Sales Manager, Shift Manager, Store Manager.</p>
<p><b>Questionnaire D: Marketing Management &amp; Professional Sales: Focus Real Estate</b></p>
<p><b>Property, Real Estate, and Community Association Managers:</b> Plan, direct, or coordinate the selling, buying, leasing, or governance activities of commercial, industrial, or residential real estate properties. Includes managers of homeowner and condominium associations, rented or leased housing units, buildings, or land (including rights-of-way).</p> <p><u>Sample of related job titles:</u> Apartment Manager, Community Association Manager, Community Manager, Lease Administration Supervisor, Leasing Manager, Occupancy Director, On-Site Manager, Property Manager, Real Estate Manager, Resident Manager.</p>
<p><b>Real Estate Brokers:</b> Operate real estate office, or work for commercial real estate firm, overseeing real estate transactions. Other duties usually include selling real estate or renting properties and arranging loans.</p> <p><u>Sample of related job titles:</u> Broker, Broker Associate, Designated Broker, Managing Broker, Real Estate Associate, Real Estate Broker, Real Estate Sales Associate, Realtor.</p>
<p><b>Real Estate Sales Agents:</b> Rent, buy, or sell property for clients. Perform duties such as study property listings, interview prospective clients, accompany clients to property site, discuss conditions of sale, and draw up real estate contracts. Includes agents who represent buyer.</p>

Sample of related job titles: Real Estate Agent, Real Estate Salesperson, Realtor, Realtor Associate, Sales Agent.

**First-Line Supervisors of Non-Retail Sales Workers:** Directly supervise and coordinate activities of sales workers other than retail sales workers. May perform duties such as budgeting, accounting, and personnel work, in addition to supervisory duties.

Sample of related job titles: Customer Service Department Supervisor, Customer Service Supervisor, Driver Sales Supervisor, Information Center Supervisor, Inside Sales Supervisor, Reservations Supervisor, Sales Department Supervisor, Sales Leader, Sales Supervisor, Sales Team Leader.

Source: own illustration based on the information from U.S. Department of Labor (2022)

## Annex 15: General Communication of Study

**Doctoral Survey about daily tasks of Marketing & Sales employees**

Dear Ladies and Gentlemen,

I am currently pursuing my doctoral studies in social science/ management.

If you are working in the field of marketing and/or sales, it would be very helpful to support the findings of this study with your participation. It is about the tasks performed in your daily business.

5 minutes of your time are already enough.

Choose the professional field that fits your current occupation and follow the survey link.

- Marketing & Sales Management (incl. Communications, Market Research, Merchandising)
- Professional Sales (incl. Sales Representatives)
- Professional Sales: Focus Retail
- Marketing Management & Professional Sales: Focus Real Estate

Thank you very much in advance.

Kind regards,

Sebastian Goldmann



## Annex 16: Special Study Communication at FOM University

**Blackboard** | Meine Hochschule

🔔 02.06.2022 15:12 Uhr - News: Unterstützung gesucht! Arbeiten Sie im Bereich Marketing & Sales?

Liebe Studierende,

was machen eigentlich **Marketing und Sales** Angestellte heutzutage in ihrem Beruf und wie machen sie es? Existieren in diesem Bereich **Effizienzpotenziale**, welche nicht ausgeschöpft werden?

Im Rahmen einer **Doktorandenstudie** wir genau dieses Thema in Bezug auf die Digitalisierung behandelt. Lassen Sie es uns gemeinsam herausfinden, sollten Sie in diesem Bereich arbeiten.

Die Studie dauert ca. 5-10 Minuten und ist auf Englisch.

Mit Ihrer Teilnahme würden Sie einen erheblichen Teil zur Beantwortung der o.g. Frage beitragen.

Wählen Sie einfach das Fachgebiet, welches am besten zu Ihrer aktuellen Beschäftigung passt und folgen Sie dem entsprechenden Umfragelink:

Marketing & Sales Management (incl. Communications, Market Research, Merchandising)

[umfrageonline.com/c/Doctoralsurvey1](https://umfrageonline.com/c/Doctoralsurvey1)

Professional Sales (incl. Sales Representatives)

[umfrageonline.com/c/Doctoralsurvey2](https://umfrageonline.com/c/Doctoralsurvey2)

Professional Sales: Focus Retail

[umfrageonline.com/c/Doctoralsurvey3](https://umfrageonline.com/c/Doctoralsurvey3)

Marketing Management & Professional Sales: Focus Real Estate

[umfrageonline.com/c/Doctoralsurvey4](https://umfrageonline.com/c/Doctoralsurvey4)

Vielen Dank!

Mit freundlichen Grüßen

Sebastian Goldmann

## Annex 17: Task Details Presentation of Sample

No.	Detailed Work Tasks	Occurrences in Job Categories	Frequency in Data Sample	Weighted Frequency in Data Sample
1	Provide educational information to the public	1	11	12%
2	Write advertising or promotional material	1	11	10%
3	Develop promotional strategies or plans	2	13	8%
4	Coach others	1	11	9%
5	Collaborate with others in marketing activities	2	13	9%
6	Write informational material	1	10	9%
7	Edit written materials	1	11	11%
8	Coordinate logistics for productions or events	1	10	9%
9	Conduct market research	2	23	3%
10	Inform viewers, listeners, or audiences	1	11	9%
11	Promote products, activities, or organizations	1	10	8%
12	Develop promotional materials	1	17	3%
13	Examine marketing materials to ensure compliance with policies or regulations	1	18	3%
14	Confer with organizational members to accomplish work activities	4	155	7%
15	Coordinate operational activities with external stakeholders	2	21	4%
16	Evaluate employee performance	3	52	4%
17	Supervise employees	6	146	5%
18	Direct organizational operations, projects, or services	2	21	4%
19	Direct financial operations	2	13	2%
20	Direct sales, marketing, or customer service activities	3	152	7%
21	Develop marketing plans or strategies	7	118	7%
22	Coordinate special events or programs	2	91	5%
23	Implement organizational process or policy changes	1	14	2%
24	Monitor performance of organizational members or partners	1	14	3%
25	Negotiate sales or lease agreements for products or services	3	17	3%
26	Prepare financial documents, reports, or budgets	8	39	3%
27	Prepare operational budgets	4	60	4%
28	Conduct employee training programs	1	15	3%

29	Establish interpersonal business relationships to facilitate work activities	2	65	6%
30	Analyze data to assess operational or project effectiveness	1	18	3%
31	Promote products, services, or programs	2	17	4%
32	Manage organizational or project budgets	1	16	3%
33	Advise customers on technical or procedural issues	2	63	6%
34	Represent the organization in external relations	2	62	6%
35	Manage operations, research, or logistics projects	1	17	3%
36	Maintain knowledge of current developments in area of expertise	1	18	3%
37	Analyze market research data	2	103	6%
38	Analyze forecasting data to improve business decisions	3	99	5%
39	Attend training sessions or professional meetings to develop or maintain professional knowledge	1	19	3%
40	Develop marketing plans or strategies for environmental initiatives	2	78	4%
41	Develop procedures to evaluate organizational activities	1	17	3%
42	Evaluate program effectiveness	2	102	6%
43	Maintain operational records for green energy processes or other environmentally-sustainable activities	1	14	2%
44	Analyze data to inform operational decisions or activities	1	87	7%
45	Estimate cost or material requirements	1	76	5%
46	Determine pricing or monetary policies	2	112	5%
47	Compile operational data	1	83	5%
48	Monitor external affairs or events affecting business operations	1	77	5%
49	Negotiate contracts for transportation, distribution, or logistics services	1	45	2%
50	Conduct opinion surveys or needs assessments	2	111	4%
51	Develop sustainable organizational policies or practices	1	56	3%
52	Recommend organizational process or policy changes	1	65	4%
53	Advise others on business or operational matters	3	127	6%

54	Direct facility maintenance or repair activities	1	2	6%
55	Manage construction activities	1	2	5%
56	Analyze financial records or reports to determine state of operations	2	53	8%
57	Prepare forms or applications	1	2	4%
58	Liaise between departments or other groups to improve function or communication	1	1	1%
59	Resolve customer complaints or problems	2	54	8%
60	Perform manual service or maintenance tasks	1	2	5%
61	Inspect condition or functioning of facilities or equipment	1	2	5%
62	Communicate organizational information to customers or other stakeholders	1	2	5%
63	Evaluate characteristics of individuals to determine needs or eligibility	1	2	4%
64	Maintain operational records	1	2	2%
65	Analyze financial records to improve budgeting or planning	1	2	2%
66	Communicate with government agencies	1	1	2%
67	Purchase materials, equipment, or other resources	1	2	5%
68	Negotiate project specifications	1	2	3%
69	Approve expenditures	1	41	5%
70	Evaluate potential of products, technologies, or resources	2	45	6%
71	Manage human resources activities	1	35	4%
72	Prepare research reports	1	25	10%
73	Analyze consumer trends	2	29	11%
74	Conduct surveys in organizations	1	23	8%
75	Establish business management methods	1	23	6%
76	Measure effectiveness of business strategies or practices	1	25	9%
77	Analyze market conditions or trends	4	35	10%
78	Gather organizational performance information	1	23	8%
79	Analyze industry trends	1	26	9%
80	Monitor business indicators	1	24	8%
81	Discuss business strategies, practices, or policies with managers	2	25	8%
82	Develop business or market strategies	2	26	7%
83	Arrange artwork, products, or props	1	4	12%

84	Discuss production content and progress with others	1	4	5%
85	Maintain inventories of materials, equipment, or products	1	4	10%
86	Train others on work processes	1	4	8%
87	Develop artistic or design concepts for decoration, exhibition, or commercial purposes	1	4	5%
88	Maintain records, documents, or other files	1	4	8%
89	Draw detailed or technical illustrations	1	3	4%
90	Select materials or props	1	4	7%
91	Monitor current trends	1	4	9%
92	Build models, patterns, or templates	1	3	4%
93	Operate still or video cameras or related equipment	1	3	4%
94	Construct distinctive physical objects for artistic, functional, or commercial purposes	1	3	5%
95	Apply finishes to artwork, crafts, or displays	1	3	3%
96	Purchase stocks of merchandise or supplies	6	14	2%
97	Negotiate contracts with clients or service providers	1	3	8%
98	Purchase products or services	2	3	7%
99	Determine the value of goods or services	1	2	4%
100	Confer with personnel to coordinate business operations	1	3	8%
101	Authorize financial actions	2	7	6%
102	Disburse funds from clients accounts to creditors	1	2	4%
103	Obtain information about goods or services	1	3	9%
104	Train personnel to enhance job skills	1	2	3%
105	Create marketing materials	1	3	5%
106	Research issues related to the environment or sustainable business practices	1	3	6%
107	Evaluate logistics methods to reduce environmental impact	1	3	4%
108	Identify strategic business investment opportunities	1	2	4%
109	Develop content for sales presentations or other materials	7	17	4%
110	Deliver promotional presentations to current or prospective customers	6	17	4%
111	Identify potential customers	9	24	5%
112	Develop professional relationships or networks	3	3	7%

113	Estimate costs or terms of sales	5	23	3%
114	Contact current or potential customers to promote products or services	10	31	5%
115	Explain technical product or service information to customers	15	31	4%
116	Gather customer or product information to determine customer needs	11	25	5%
117	Study product information to acquire professional knowledge	4	22	4%
118	Prepare sales or other contracts	12	30	4%
119	Prepare documentation for contracts, transactions, or regulatory compliance	1	2	3%
120	Process sales or other transactions	8	17	4%
121	Present work to clients for approval	1	2	5%
122	Distribute promotional literature or samples to customers	5	18	3%
123	Develop proposals for current or prospective customers	6	11	4%
124	Accompany patients or clients on outings to provide assistance	1	1	3%
125	Schedule operational activities	1	2	4%
126	Attend events to develop professional knowledge	4	16	3%
127	Reconcile records of sales or other financial transactions	2	4	2%
128	Answer customer questions about goods or services	10	32	5%
129	Calculate costs of goods or services	4	3	3%
130	Maintain records of sales or other business transactions	10	32	4%
131	Issue money, credit, or vouchers	1	0	0%
132	Provide customers with general information or assistance	1	0	0%
133	Monitor sales activities	5	23	6%
134	Greet customers, patrons, or visitors	4	6	4%
135	Supervise sales or support personnel	5	12	8%
136	Train sales personnel	6	12	5%
137	Calculate weights, volumes or other characteristics of materials	1	0	0%
138	Prepare cash for deposit or disbursement	1	0	0%
139	Clean work areas	5	6	3%
140	Pay charges, fees, or taxes	1	0	0%
141	Answer telephones to direct calls or provide information	2	1	14%

142	Record sales or transactions data	3	3	12%
143	Package objects for shipping	1	0	0%
144	Prepare outgoing shipments	1	0	0%
145	Communicate with other workers to coordinate activities	1	0	0%
146	Sell products or services	10	23	6%
147	Assist customers to ensure comfort or safety	1	0	0%
148	Stock products or parts	6	7	1%
149	Take product orders from customers	4	0	0%
150	Advise customers on the use of products or services	7	25	5%
151	Explain financial information to customers	5	11	2%
152	Examine condition of property or products	5	10	4%
153	Set up merchandise displays	7	14	4%
154	Recommend products or services to customers	7	26	5%
155	Arrange services or reservations for patrons	2	3	3%
156	Demonstrate products to consumers	8	21	4%
157	Model cosmetics, clothing, or accessories	1	0	0%
158	Arrange delivery of goods or services	7	18	2%
159	Coordinate sales campaigns	5	23	3%
160	Operate vehicles or material-moving equipment	1	3	10%
161	Collect payments for goods or services	1	3	8%
162	Provide transportation information to passengers or customers	1	3	8%
163	Record details of deliveries or shipments	1	3	9%
164	Resolve issues affecting transportation operations	1	3	6%
165	Clean machinery or equipment	1	2	4%
166	Collect fares or payment from customers	1	3	8%
167	Maintain vehicles in good working condition	1	3	6%
168	Load shipments, belongings, or materials	1	3	6%
169	Review customer information	1	3	11%
170	Establish operational policies	2	11	7%
171	Monitor inventories of products or materials	5	18	4%
172	Assign duties or work schedules to employees	2	8	5%
173	Discuss design or technical features of products or services with technical personnel	3	15	3%
174	Monitor work areas to provide security	2	6	3%
175	Monitor market conditions or trends	7	27	4%

176	Order materials, supplies, or equipment	2	6	3%
177	Analyze shipping information to make routing decisions	1	0	0%
178	Calculate shipping costs	1	0	0%
179	Measure product or material dimensions	1	0	0%
180	Repair parts or assemblies	1	0	0%
181	Contract real estate to clients	2	1	4%
182	Negotiate prices or other sales terms	5	22	4%
183	Appraise property values	3	5	2%
184	Obtain property information	2	2	6%
185	Oversee business processes	1	1	3%
186	Review accuracy of sales or other transactions	2	1	8%
187	Review laws or regulations to maintain professional knowledge	2	5	4%
188	Help clients get needed services or resources	1	1	5%
189	Create images or other visual displays	1	1	5%
190	Enter information into databases or software programs	1	1	5%
191	Assess compliance with environmental laws	1	1	3%
192	Coordinate activities with suppliers, contractors, clients, or other departments	2	1	4%
193	Coordinate legal schedules or activities	1	1	4%
194	Advise real estate clients	1	0	0%
195	Schedule appointments with prospective customers	2	2	6%
196	Verify customer credit information	3	13	1%
197	Direct fundraising or financing activities	1	0	0%
198	Identify investment opportunities or strategies	2	1	4%
199	Assist customers with product selection	1	4	7%
200	Package materials or products	1	3	3%
201	Share sales-related or market information with colleagues	3	13	4%
202	Implement design or process improvements	1	1	2%
203	Troubleshoot equipment or systems operation problems	1	1	4%
204	Prepare technical or operational reports	1	1	2%
205	Prepare drawings or diagrams of products or services	2	6	2%
206	Send information, materials or documentation	1	7	4%
207	Maintain records of customer accounts	2	11	4%
208	Verify accuracy of records	1	9	2%



209	Customize financial products or services to meet customer needs	1	0	0%
210	Analyze business or financial data	1	0	0%
211	Gather information in order to provide services to clients	1	0	0%
212	Negotiate purchases or contracts	1	0	0%
213	Customize energy products or services to meet customer needs	1	0	0%
214	Assess locations for potential green technology installations	1	0	0%

Source: own illustration but task information based on the U.S. Department of Labor (2022)

## Annex 18: Efficiency Potential Determination per Observation

No.	EP1	EP2	EP3	EP4	EP5	EP6	EP7	EP8	EP Total
1	0%	0%	0%	0%	4%	20%	0%	0%	24%
2	0%	0%	25%	0%	6%	0%	0%	0%	31%
3	0%	0%	0%	41%	5%	0%	0%	0%	45%
4	0%	23%	8%	27%	12%	0%	0%	0%	69%
5	3%	14%	0%	19%	8%	11%	0%	0%	56%
6	2%	0%	0%	8%	12%	27%	0%	0%	48%
7	0%	33%	0%	40%	0%	0%	0%	0%	73%
8	0%	0%	0%	27%	0%	0%	0%	0%	27%
9	0%	0%	0%	15%	11%	7%	0%	0%	33%
10	0%	9%	0%	39%	9%	0%	0%	0%	57%
11	0%	7%	0%	25%	14%	0%	0%	0%	46%
12	4%	8%	10%	6%	3%	13%	10%	0%	54%
13	0%	5%	3%	0%	12%	0%	15%	5%	41%
14	0%	0%	0%	2%	16%	8%	16%	6%	48%
15	1%	0%	0%	5%	14%	5%	14%	4%	44%
16	5%	12%	0%	9%	13%	3%	16%	0%	59%
17	0%	0%	0%	1%	9%	0%	12%	0%	23%
18	0%	17%	0%	0%	7%	0%	7%	0%	31%
19	0%	7%	2%	11%	12%	0%	18%	7%	56%
20	0%	0%	0%	4%	13%	9%	17%	6%	48%
21	0%	10%	0%	0%	6%	0%	8%	4%	29%
22	1%	8%	2%	2%	15%	7%	19%	3%	57%
23	1%	0%	0%	15%	14%	0%	15%	4%	48%
24	0%	3%	3%	0%	16%	3%	26%	5%	56%
25	2%	3%	6%	6%	9%	4%	23%	0%	52%
26	1%	0%	10%	14%	12%	0%	18%	0%	55%
27	0%	6%	0%	5%	14%	6%	15%	5%	51%
28	1%	3%	5%	4%	13%	0%	23%	5%	53%
29	0%	10%	0%	0%	14%	0%	0%	0%	24%
30	0%	12%	0%	3%	14%	2%	9%	6%	45%
31	0%	0%	0%	0%	11%	0%	0%	0%	11%
32	0%	0%	0%	0%	12%	0%	18%	0%	30%
33	0%	0%	0%	0%	21%	2%	35%	2%	60%
34	0%	0%	0%	0%	21%	4%	32%	0%	57%
35	0%	3%	0%	3%	14%	0%	9%	0%	29%

36	0%	0%	0%	0%	14%	0%	14%	0%	29%
37	0%	0%	0%	0%	13%	10%	13%	0%	35%
38	0%	0%	0%	0%	16%	0%	14%	6%	36%
39	0%	0%	0%	0%	13%	0%	26%	0%	39%
40	0%	0%	0%	0%	11%	0%	52%	0%	63%
41	0%	6%	0%	0%	18%	8%	20%	6%	57%
42	0%	0%	0%	0%	26%	0%	22%	0%	48%
43	0%	0%	0%	0%	3%	0%	41%	0%	45%
44	4%	0%	9%	0%	12%	3%	15%	0%	42%
45	7%	11%	0%	11%	17%	0%	19%	0%	65%
46	0%	3%	0%	3%	25%	0%	3%	0%	34%
47	0%	0%	0%	0%	17%	4%	15%	0%	36%
48	0%	0%	0%	0%	17%	4%	33%	4%	59%
49	0%	0%	0%	0%	7%	0%	29%	0%	36%
50	0%	0%	0%	0%	16%	0%	53%	0%	68%
51	0%	0%	0%	0%	11%	0%	39%	0%	50%
52	6%	0%	0%	0%	22%	13%	16%	0%	56%
53	0%	0%	0%	0%	13%	0%	27%	0%	40%
54	0%	0%	0%	0%	15%	0%	23%	8%	46%
55	0%	0%	0%	0%	13%	0%	34%	0%	47%
56	0%	0%	0%	0%	19%	6%	47%	4%	75%
57	0%	0%	0%	0%	16%	0%	5%	0%	22%
58	0%	0%	0%	0%	16%	0%	26%	5%	47%
59	0%	3%	0%	0%	15%	0%	8%	0%	25%
60	0%	0%	0%	10%	6%	0%	10%	0%	26%
61	0%	0%	0%	0%	29%	0%	17%	4%	50%
62	0%	0%	4%	0%	15%	4%	45%	5%	73%
63	0%	0%	0%	0%	29%	0%	24%	5%	57%
64	5%	0%	0%	0%	18%	0%	42%	5%	70%
65	0%	0%	0%	0%	23%	0%	27%	5%	55%
66	1%	0%	0%	0%	9%	3%	17%	9%	38%
67	0%	0%	0%	0%	6%	3%	22%	0%	31%
68	0%	0%	0%	0%	20%	5%	22%	5%	51%
69	0%	0%	0%	3%	16%	0%	0%	0%	19%
70	0%	0%	0%	0%	16%	11%	14%	8%	49%
71	0%	0%	0%	9%	13%	0%	11%	4%	36%
72	0%	0%	0%	9%	14%	0%	0%	0%	23%
73	0%	0%	0%	0%	16%	8%	16%	0%	41%
74	0%	0%	0%	6%	3%	0%	47%	0%	56%

75	0%	0%	0%	0%	23%	5%	45%	0%	73%
76	0%	0%	0%	0%	22%	4%	4%	6%	35%
77	0%	0%	0%	9%	5%	0%	55%	0%	68%
78	0%	0%	0%	0%	17%	0%	46%	0%	63%
79	0%	0%	0%	0%	30%	0%	32%	0%	62%
80	0%	0%	0%	0%	9%	0%	30%	0%	39%
81	0%	0%	0%	0%	16%	0%	29%	2%	47%
82	0%	0%	0%	10%	10%	0%	31%	0%	52%
83	0%	0%	0%	0%	9%	0%	33%	0%	42%
84	0%	0%	0%	2%	22%	0%	27%	0%	51%
85	0%	0%	2%	0%	14%	4%	13%	0%	32%
86	1%	0%	0%	0%	18%	6%	30%	6%	61%
87	0%	0%	0%	0%	16%	5%	39%	0%	61%
88	0%	0%	0%	0%	21%	4%	46%	0%	71%
89	0%	0%	0%	4%	17%	0%	21%	0%	42%
90	0%	0%	0%	10%	10%	0%	0%	0%	19%
91	0%	0%	0%	0%	14%	0%	24%	0%	39%
92	0%	0%	0%	0%	8%	0%	27%	0%	35%
93	0%	0%	0%	0%	24%	8%	16%	8%	55%
94	0%	0%	0%	0%	11%	0%	50%	0%	61%
95	0%	0%	0%	5%	18%	0%	21%	0%	45%
96	0%	0%	0%	0%	16%	0%	29%	0%	45%
97	0%	0%	0%	7%	12%	0%	20%	5%	44%
98	0%	0%	0%	0%	17%	0%	0%	0%	17%
99	0%	0%	0%	0%	16%	8%	18%	0%	42%
100	0%	0%	0%	0%	16%	3%	37%	0%	55%
101	0%	0%	0%	6%	14%	0%	17%	0%	37%
102	0%	0%	0%	0%	4%	0%	0%	0%	4%
103	0%	0%	0%	0%	15%	3%	23%	8%	49%
104	0%	0%	0%	0%	20%	0%	50%	0%	70%
105	0%	0%	9%	3%	21%	0%	33%	6%	73%
106	0%	0%	0%	0%	11%	0%	22%	0%	33%
107	0%	0%	0%	0%	9%	0%	26%	0%	35%
108	0%	0%	0%	7%	21%	0%	0%	0%	28%
109	0%	0%	0%	0%	8%	0%	42%	0%	50%
110	0%	0%	6%	0%	14%	0%	43%	3%	66%
111	3%	0%	0%	0%	11%	0%	3%	0%	18%
112	0%	0%	0%	0%	8%	0%	29%	0%	38%
113	0%	0%	0%	0%	18%	9%	35%	0%	62%

114	0%	0%	0%	6%	14%	0%	0%	0%	19%
115	0%	0%	0%	0%	17%	0%	17%	0%	33%
116	0%	0%	0%	4%	18%	0%	29%	0%	50%
117	0%	0%	0%	0%	18%	0%	0%	0%	18%
118	0%	0%	0%	0%	7%	0%	10%	0%	17%
119	0%	22%	0%	0%	0%	0%	17%	0%	39%
120	0%	0%	0%	0%	3%	0%	13%	0%	17%
121	0%	15%	0%	0%	10%	10%	22%	0%	56%
122	0%	12%	6%	18%	6%	0%	12%	0%	55%
123	0%	0%	0%	3%	3%	0%	6%	0%	13%
124	3%	0%	0%	0%	0%	4%	24%	0%	31%
125	0%	0%	0%	7%	4%	0%	30%	0%	41%
126	0%	16%	0%	8%	0%	0%	0%	0%	24%
127	3%	0%	0%	5%	7%	7%	14%	0%	36%
128	0%	0%	13%	10%	8%	5%	15%	0%	51%
129	19%	0%	0%	0%	7%	0%	24%	0%	50%
130	4%	0%	9%	9%	9%	0%	18%	0%	49%
131	7%	18%	0%	0%	6%	6%	3%	0%	39%
132	0%	12%	3%	6%	9%	3%	6%	0%	39%
133	0%	0%	0%	3%	3%	0%	11%	0%	16%
134	0%	3%	0%	0%	9%	9%	20%	0%	40%
135	12%	0%	0%	8%	4%	8%	13%	0%	45%
136	0%	0%	0%	0%	0%	0%	18%	0%	18%
137	0%	0%	17%	0%	0%	0%	33%	0%	50%
138	0%	0%	0%	0%	3%	3%	26%	0%	32%
139	5%	0%	0%	8%	0%	0%	23%	0%	35%
140	17%	17%	14%	6%	6%	6%	8%	0%	73%
141	1%	0%	0%	0%	7%	7%	15%	0%	31%
142	0%	0%	12%	5%	10%	10%	7%	0%	43%
143	0%	0%	0%	0%	0%	0%	0%	0%	0%
144	0%	0%	5%	5%	5%	0%	18%	0%	33%
145	0%	9%	0%	0%	9%	15%	24%	0%	56%
146	20%	0%	0%	0%	0%	0%	0%	0%	20%
147	2%	11%	0%	0%	5%	8%	16%	0%	41%
148	0%	0%	0%	0%	0%	5%	14%	0%	19%
149	0%	8%	4%	4%	4%	4%	12%	0%	35%
150	0%	0%	0%	0%	6%	0%	9%	0%	14%
151	16%	0%	0%	0%	9%	0%	18%	0%	43%
152	0%	0%	0%	5%	0%	0%	0%	0%	5%

153	0%	55%	0%	0%	0%	0%	0%	0%	55%
154	2%	0%	4%	8%	4%	0%	21%	0%	40%
155	5%	0%	0%	0%	9%	9%	9%	0%	33%
156	2%	0%	2%	2%	10%	10%	12%	0%	38%
157	0%	0%	0%	5%	0%	5%	41%	0%	50%
158	3%	8%	0%	5%	8%	8%	24%	0%	56%
159	2%	0%	0%	4%	12%	4%	0%	0%	21%
160	7%	5%	0%	0%	0%	0%	0%	0%	13%
161	0%	0%	0%	0%	2%	14%	32%	0%	48%
162	0%	0%	0%	0%	11%	11%	20%	0%	43%
163	0%	0%	0%	0%	5%	10%	21%	0%	36%
164	0%	9%	0%	7%	9%	7%	21%	0%	53%
165	0%	33%	0%	0%	0%	0%	0%	0%	33%
166	3%	32%	14%	0%	0%	5%	23%	0%	75%
167	0%	8%	0%	5%	8%	0%	25%	0%	45%
168	0%	0%	0%	14%	6%	0%	26%	0%	46%
169	0%	5%	0%	9%	7%	7%	5%	0%	32%
170	0%	0%	16%	5%	5%	8%	13%	0%	47%
171	0%	0%	4%	0%	7%	0%	11%	0%	22%
172	0%	0%	0%	11%	14%	7%	32%	0%	64%
173	0%	0%	0%	0%	17%	14%	43%	9%	83%
174	0%	0%	0%	13%	20%	0%	27%	0%	60%
175	0%	0%	0%	4%	21%	4%	38%	4%	71%
176	0%	0%	0%	0%	15%	12%	58%	8%	92%
177	0%	0%	0%	0%	20%	20%	15%	0%	55%
178	0%	0%	0%	0%	15%	17%	24%	7%	63%
179	0%	0%	0%	3%	22%	8%	22%	3%	58%
180	0%	0%	0%	11%	16%	11%	0%	11%	49%
181	0%	0%	0%	20%	7%	0%	7%	13%	47%
182	0%	0%	0%	0%	7%	29%	64%	0%	100%
183	0%	0%	0%	9%	5%	0%	23%	18%	55%
184	0%	0%	0%	0%	17%	12%	46%	7%	83%
185	0%	0%	0%	0%	16%	8%	35%	8%	68%
186	0%	0%	0%	0%	5%	0%	0%	5%	11%
187	0%	0%	0%	0%	15%	8%	38%	0%	62%
188	0%	0%	0%	8%	8%	0%	32%	4%	52%
189	0%	0%	0%	13%	0%	13%	25%	19%	69%
190	0%	0%	0%	7%	15%	0%	41%	11%	74%
191	0%	0%	0%	0%	5%	0%	20%	15%	40%

192	0%	0%	0%	11%	11%	16%	11%	0%	47%
193	0%	0%	0%	13%	17%	0%	0%	0%	29%
194	0%	0%	0%	20%	17%	0%	37%	0%	73%
195	0%	0%	0%	0%	12%	19%	23%	12%	65%
196	0%	0%	0%	0%	19%	9%	9%	13%	50%
197	0%	0%	0%	15%	26%	0%	33%	0%	74%
198	0%	0%	0%	0%	16%	4%	40%	8%	68%
199	0%	0%	0%	26%	16%	0%	13%	11%	66%
200	0%	0%	0%	11%	21%	16%	0%	0%	47%
201	0%	0%	0%	0%	17%	11%	11%	11%	50%
202	0%	7%	0%	0%	12%	24%	7%	7%	59%
203	2%	6%	0%	23%	6%	11%	31%	0%	79%
204	0%	5%	0%	0%	11%	30%	24%	0%	70%
205	0%	0%	4%	0%	12%	31%	4%	0%	50%
206	0%	0%	0%	0%	5%	18%	20%	0%	43%
207	2%	0%	0%	11%	6%	0%	19%	0%	37%
208	0%	0%	0%	0%	0%	17%	7%	0%	23%
209	0%	0%	0%	0%	0%	22%	13%	0%	35%
210	3%	0%	0%	12%	0%	16%	12%	0%	43%
211	0%	0%	10%	2%	7%	14%	12%	12%	57%
212	0%	0%	0%	0%	10%	0%	10%	0%	21%
213	0%	6%	0%	2%	6%	9%	15%	13%	51%
214	0%	0%	0%	14%	5%	0%	0%	0%	20%
215	0%	7%	0%	7%	10%	0%	7%	5%	37%
216	2%	0%	0%	0%	13%	0%	9%	6%	30%
217	1%	0%	0%	4%	2%	0%	5%	0%	12%
218	0%	0%	0%	1%	0%	10%	14%	5%	30%
219	4%	0%	31%	0%	0%	17%	21%	13%	85%
220	0%	0%	0%	0%	0%	4%	15%	0%	19%
221	0%	0%	9%	0%	0%	3%	27%	9%	48%
222	5%	5%	11%	0%	0%	9%	5%	5%	40%
223	0%	0%	0%	0%	0%	11%	2%	4%	17%
224	4%	10%	10%	14%	0%	6%	6%	2%	51%
225	4%	0%	0%	0%	0%	9%	6%	0%	19%
226	10%	7%	0%	3%	0%	12%	4%	4%	40%
227	23%	12%	18%	5%	0%	13%	3%	3%	78%
228	0%	0%	0%	6%	0%	12%	4%	0%	22%
229	9%	0%	0%	4%	0%	9%	8%	0%	30%
230	0%	0%	0%	0%	0%	14%	18%	9%	42%

231	0%	0%	0%	7%	3%	7%	9%	6%	33%
232	4%	46%	0%	8%	1%	8%	10%	6%	83%
233	7%	14%	0%	18%	0%	0%	0%	4%	42%
234	29%	0%	6%	12%	0%	8%	12%	14%	81%
235	14%	19%	0%	3%	0%	18%	5%	13%	72%
236	0%	5%	1%	0%	0%	20%	13%	13%	51%
237	6%	0%	0%	19%	3%	0%	0%	0%	28%
238	0%	0%	0%	0%	0%	14%	0%	0%	14%
239	15%	8%	4%	0%	4%	10%	12%	24%	76%
240	0%	2%	2%	0%	10%	10%	12%	14%	50%
241	3%	0%	8%	8%	8%	0%	8%	29%	64%
242	0%	0%	0%	0%	0%	6%	0%	26%	32%
243	1%	0%	7%	0%	3%	10%	10%	21%	52%
244	2%	2%	0%	4%	0%	8%	4%	14%	34%
245	0%	0%	8%	10%	0%	8%	4%	4%	33%
246	1%	0%	0%	0%	0%	17%	6%	4%	28%
247	1%	11%	4%	0%	0%	23%	11%	4%	54%
248	0%	0%	0%	4%	5%	5%	27%	4%	46%
249	0%	0%	0%	15%	2%	7%	8%	7%	38%
250	0%	0%	0%	0%	11%	8%	11%	18%	47%
251	3%	2%	9%	9%	4%	0%	7%	11%	46%

Source: own illustration



## Annex 19: Efficiency Frequency Distribution on Task-Level

Task No.	EP1	EP2	EP3	EP4	EP5	EP6	EP7	EP8	EP Total
1	0%	36%	0%	0%	0%	0%	0%	0%	36%
2	0%	0%	0%	64%	0%	9%	0%	0%	73%
3	0%	0%	0%	0%	100%	0%	0%	0%	100%
4	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	0%	0%	0%	80%	0%	10%	0%	0%	90%
7	0%	0%	0%	55%	0%	36%	0%	0%	91%
8	0%	0%	0%	0%	0%	0%	0%	0%	0%
9	0%	0%	0%	48%	0%	22%	0%	0%	70%
10	9%	18%	18%	0%	0%	0%	0%	0%	45%
11	10%	20%	10%	0%	0%	0%	0%	0%	40%
12	0%	0%	0%	0%	0%	0%	53%	0%	53%
13	0%	0%	0%	0%	0%	0%	0%	44%	44%
14	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	0%	0%	0%
16	0%	0%	0%	0%	100%	0%	0%	0%	100%
17	0%	0%	0%	0%	0%	0%	0%	0%	0%
18	0%	0%	0%	0%	0%	0%	0%	0%	0%
19	0%	0%	0%	0%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%	0%	0%	0%
21	0%	0%	0%	0%	100%	0%	0%	0%	100%
22	0%	0%	0%	0%	0%	0%	0%	0%	0%
23	0%	0%	0%	0%	100%	0%	0%	0%	100%
24	0%	0%	0%	0%	0%	0%	0%	57%	57%
25	12%	12%	12%	0%	0%	0%	0%	0%	35%
26	0%	0%	0%	0%	0%	0%	82%	0%	82%
27	0%	0%	0%	0%	0%	0%	58%	0%	58%
28	13%	20%	27%	0%	0%	0%	0%	0%	60%
29	26%	17%	5%	0%	0%	0%	0%	0%	48%
30	0%	0%	0%	0%	0%	0%	67%	0%	67%
31	0%	35%	12%	0%	0%	0%	0%	0%	47%
32	0%	0%	0%	25%	0%	44%	0%	0%	69%
33	11%	21%	17%	0%	0%	0%	0%	0%	49%
34	23%	19%	5%	0%	0%	0%	0%	0%	47%
35	0%	0%	0%	47%	0%	18%	0%	0%	65%

36	0%	0%	0%	0%	0%	0%	0%	0%	0%
37	0%	0%	0%	0%	0%	0%	56%	0%	56%
38	0%	0%	0%	0%	0%	0%	56%	0%	56%
39	0%	0%	0%	0%	0%	0%	0%	0%	0%
40	0%	0%	0%	0%	100%	0%	0%	0%	100%
41	0%	0%	0%	0%	0%	0%	53%	0%	53%
42	0%	0%	0%	0%	0%	0%	55%	0%	55%
43	0%	0%	0%	43%	0%	29%	0%	0%	71%
44	0%	0%	0%	0%	0%	0%	60%	0%	60%
45	0%	0%	0%	0%	0%	0%	46%	0%	46%
46	0%	0%	0%	0%	0%	0%	45%	0%	45%
47	0%	0%	0%	0%	0%	0%	51%	0%	51%
48	0%	0%	0%	0%	0%	0%	0%	31%	31%
49	22%	11%	11%	0%	0%	0%	0%	0%	44%
50	0%	0%	0%	29%	0%	41%	0%	0%	69%
51	0%	0%	0%	0%	100%	0%	0%	0%	100%
52	0%	0%	0%	0%	0%	0%	26%	0%	26%
53	0%	0%	0%	0%	0%	0%	0%	0%	0%
54	0%	0%	0%	0%	0%	0%	0%	0%	0%
55	0%	0%	0%	50%	0%	0%	0%	0%	50%
56	0%	0%	0%	0%	0%	0%	72%	0%	72%
57	0%	0%	0%	0%	0%	0%	50%	0%	50%
58	0%	0%	0%	0%	0%	0%	0%	0%	0%
59	9%	13%	13%	0%	0%	0%	0%	0%	35%
60	0%	0%	0%	100%	0%	0%	0%	0%	100%
61	0%	0%	0%	0%	0%	0%	0%	100%	100%
62	50%	0%	0%	0%	0%	0%	0%	0%	50%
63	0%	0%	0%	0%	0%	0%	50%	0%	50%
64	0%	0%	0%	50%	0%	50%	0%	0%	100%
65	0%	0%	0%	0%	0%	0%	50%	0%	50%
66	0%	0%	0%	0%	0%	0%	0%	0%	0%
67	0%	0%	0%	0%	0%	100%	0%	0%	100%
68	0%	0%	0%	0%	0%	0%	0%	0%	0%
69	0%	36%	0%	0%	0%	0%	0%	0%	36%
70	0%	0%	0%	64%	0%	9%	0%	0%	73%
71	0%	0%	0%	0%	100%	0%	0%	0%	100%
72	0%	0%	0%	0%	0%	0%	0%	0%	0%
73	0%	0%	0%	0%	0%	0%	0%	0%	0%
74	0%	0%	0%	80%	0%	10%	0%	0%	90%

75	0%	0%	0%	55%	0%	36%	0%	0%	91%
76	0%	0%	0%	0%	0%	0%	0%	0%	0%
77	0%	0%	0%	48%	0%	22%	0%	0%	70%
78	9%	18%	18%	0%	0%	0%	0%	0%	45%
79	10%	20%	10%	0%	0%	0%	0%	0%	40%
80	0%	0%	0%	0%	0%	0%	53%	0%	53%
81	0%	0%	0%	0%	0%	0%	0%	44%	44%
82	0%	0%	0%	0%	0%	0%	0%	0%	0%
83	0%	0%	0%	0%	0%	0%	0%	0%	0%
84	0%	0%	0%	0%	100%	0%	0%	0%	100%
85	0%	0%	0%	0%	0%	0%	0%	0%	0%
86	0%	0%	0%	0%	0%	0%	0%	0%	0%
87	0%	0%	0%	0%	0%	0%	0%	0%	0%
88	0%	0%	0%	0%	0%	0%	0%	0%	0%
89	0%	0%	0%	0%	100%	0%	0%	0%	100%
90	0%	0%	0%	0%	0%	0%	0%	0%	0%
91	0%	0%	0%	0%	100%	0%	0%	0%	100%
92	0%	0%	0%	0%	0%	0%	0%	57%	57%
93	12%	12%	12%	0%	0%	0%	0%	0%	35%
94	0%	0%	0%	0%	0%	0%	82%	0%	82%
95	0%	0%	0%	0%	0%	0%	58%	0%	58%
96	13%	20%	27%	0%	0%	0%	0%	0%	60%
97	26%	17%	5%	0%	0%	0%	0%	0%	48%
98	0%	0%	0%	0%	0%	0%	67%	0%	67%
99	0%	35%	12%	0%	0%	0%	0%	0%	47%
100	0%	0%	0%	25%	0%	44%	0%	0%	69%
101	11%	21%	17%	0%	0%	0%	0%	0%	49%
102	23%	19%	5%	0%	0%	0%	0%	0%	47%
103	0%	0%	0%	47%	0%	18%	0%	0%	65%
104	0%	0%	0%	0%	0%	0%	0%	0%	0%
105	0%	0%	0%	0%	0%	0%	56%	0%	56%
106	0%	0%	0%	0%	0%	0%	56%	0%	56%
107	0%	0%	0%	0%	0%	0%	0%	0%	0%
108	0%	0%	0%	0%	100%	0%	0%	0%	100%
109	0%	0%	0%	0%	0%	0%	53%	0%	53%
110	0%	0%	0%	0%	0%	0%	55%	0%	55%
111	0%	0%	0%	43%	0%	29%	0%	0%	71%
112	0%	0%	0%	0%	0%	0%	60%	0%	60%
113	0%	0%	0%	0%	0%	0%	46%	0%	46%

114	0%	0%	0%	0%	0%	0%	45%	0%	45%
115	0%	0%	0%	0%	0%	0%	51%	0%	51%
116	0%	0%	0%	0%	0%	0%	0%	31%	31%
117	22%	11%	11%	0%	0%	0%	0%	0%	44%
118	0%	0%	0%	29%	0%	41%	0%	0%	69%
119	0%	0%	0%	0%	100%	0%	0%	0%	100%
120	0%	0%	0%	0%	0%	0%	26%	0%	26%
121	0%	0%	0%	0%	0%	0%	0%	0%	0%
122	0%	0%	0%	0%	0%	0%	0%	0%	0%
123	0%	0%	0%	50%	0%	0%	0%	0%	50%
124	0%	0%	0%	0%	0%	0%	72%	0%	72%
125	0%	0%	0%	0%	0%	0%	50%	0%	50%
126	0%	0%	0%	0%	0%	0%	0%	0%	0%
127	9%	13%	13%	0%	0%	0%	0%	0%	35%
128	0%	0%	0%	100%	0%	0%	0%	0%	100%
129	0%	0%	0%	0%	0%	0%	0%	100%	100%
130	50%	0%	0%	0%	0%	0%	0%	0%	50%
131	0%	0%	0%	0%	0%	0%	50%	0%	50%
132	0%	0%	0%	50%	0%	50%	0%	0%	100%
133	0%	0%	0%	0%	0%	0%	50%	0%	50%
134	0%	0%	0%	0%	0%	0%	0%	0%	0%
135	0%	0%	0%	0%	0%	100%	0%	0%	100%
136	0%	0%	0%	0%	0%	0%	0%	0%	0%
137	0%	36%	0%	0%	0%	0%	0%	0%	36%
138	0%	0%	0%	64%	0%	9%	0%	0%	73%
139	0%	0%	0%	0%	100%	0%	0%	0%	100%
140	0%	0%	0%	0%	0%	0%	0%	0%	0%
141	0%	0%	0%	0%	0%	0%	0%	0%	0%
142	0%	0%	0%	80%	0%	10%	0%	0%	90%
143	0%	0%	0%	55%	0%	36%	0%	0%	91%
144	0%	0%	0%	0%	0%	0%	0%	0%	0%
145	0%	0%	0%	48%	0%	22%	0%	0%	70%
146	9%	18%	18%	0%	0%	0%	0%	0%	45%
147	10%	20%	10%	0%	0%	0%	0%	0%	40%
148	0%	0%	0%	0%	0%	0%	53%	0%	53%
149	0%	0%	0%	0%	0%	0%	0%	44%	44%
150	0%	0%	0%	0%	0%	0%	0%	0%	0%
151	0%	0%	0%	0%	0%	0%	0%	0%	0%
152	0%	0%	0%	0%	100%	0%	0%	0%	100%

153	0%	0%	0%	0%	0%	0%	0%	0%	0%
154	0%	0%	0%	0%	0%	0%	0%	0%	0%
155	0%	0%	0%	0%	0%	0%	0%	0%	0%
156	0%	0%	0%	0%	0%	0%	0%	0%	0%
157	0%	0%	0%	0%	100%	0%	0%	0%	100%
158	0%	0%	0%	0%	0%	0%	0%	0%	0%
159	0%	0%	0%	0%	100%	0%	0%	0%	100%
160	0%	0%	0%	0%	0%	0%	0%	57%	57%
161	12%	12%	12%	0%	0%	0%	0%	0%	35%
162	0%	0%	0%	0%	0%	0%	82%	0%	82%
163	0%	0%	0%	0%	0%	0%	58%	0%	58%
164	13%	20%	27%	0%	0%	0%	0%	0%	60%
165	26%	17%	5%	0%	0%	0%	0%	0%	48%
166	0%	0%	0%	0%	0%	0%	67%	0%	67%
167	0%	35%	12%	0%	0%	0%	0%	0%	47%
168	0%	0%	0%	25%	0%	44%	0%	0%	69%
169	11%	21%	17%	0%	0%	0%	0%	0%	49%
170	23%	19%	5%	0%	0%	0%	0%	0%	47%
171	0%	0%	0%	47%	0%	18%	0%	0%	65%
172	0%	0%	0%	0%	0%	0%	0%	0%	0%
173	0%	0%	0%	0%	0%	0%	56%	0%	56%
174	0%	0%	0%	0%	0%	0%	56%	0%	56%
175	0%	0%	0%	0%	0%	0%	0%	0%	0%
176	0%	0%	0%	0%	100%	0%	0%	0%	100%
177	0%	0%	0%	0%	0%	0%	53%	0%	53%
178	0%	0%	0%	0%	0%	0%	55%	0%	55%
179	0%	0%	0%	43%	0%	29%	0%	0%	71%
180	0%	0%	0%	0%	0%	0%	60%	0%	60%
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183	0%	0%	0%	0%	0%	0%	51%	0%	51%
184	0%	0%	0%	0%	0%	0%	0%	31%	31%
185	22%	11%	11%	0%	0%	0%	0%	0%	44%
186	0%	0%	0%	29%	0%	41%	0%	0%	69%
187	0%	0%	0%	0%	100%	0%	0%	0%	100%
188	0%	0%	0%	0%	0%	0%	26%	0%	26%
189	0%	0%	0%	0%	0%	0%	0%	0%	0%
190	0%	0%	0%	0%	0%	0%	0%	0%	0%
191	0%	0%	0%	50%	0%	0%	0%	0%	50%

192	0%	0%	0%	0%	0%	0%	72%	0%	72%
193	0%	0%	0%	0%	0%	0%	50%	0%	50%
194	0%	0%	0%	0%	0%	0%	0%	0%	0%
195	9%	13%	13%	0%	0%	0%	0%	0%	35%
196	0%	0%	0%	100%	0%	0%	0%	0%	100%
197	0%	0%	0%	0%	0%	0%	0%	100%	100%
198	50%	0%	0%	0%	0%	0%	0%	0%	50%
199	0%	0%	0%	0%	0%	0%	50%	0%	50%
200	0%	0%	0%	50%	0%	50%	0%	0%	100%
201	0%	0%	0%	0%	0%	0%	50%	0%	50%
202	0%	0%	0%	0%	0%	0%	0%	0%	0%
203	0%	0%	0%	0%	0%	100%	0%	0%	100%
204	0%	0%	0%	0%	0%	0%	0%	0%	0%
205	0%	36%	0%	0%	0%	0%	0%	0%	36%
206	0%	0%	0%	64%	0%	9%	0%	0%	73%
207	0%	0%	0%	0%	100%	0%	0%	0%	100%
208	0%	0%	0%	0%	0%	0%	0%	0%	0%
209	0%	0%	0%	0%	0%	0%	0%	0%	0%
210	0%	0%	0%	80%	0%	10%	0%	0%	90%
211	0%	0%	0%	55%	0%	36%	0%	0%	91%
212	0%	0%	0%	0%	0%	0%	0%	0%	0%
213	0%	0%	0%	48%	0%	22%	0%	0%	70%
214	9%	18%	18%	0%	0%	0%	0%	0%	45%

Source: own illustration

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Annex 20: Qualitative Expert Interview Transcripts

**RP\_01**

**1 Research Participant 1**

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**2 Which tasks do marketing and sales teams perform nowadays?**

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3 It is a variety of tasks. In a nutshell, marketing and sales have the main task to create value to maximize that value, and how to split a task that marketing is trading brand desire towards consumers, which in the end helps the sales team to position the brand in the market accordingly. Also, to ensure to get the value out of it, supporting the brand creation in the market via distribution via sales increasing activities. That is it in a nutshell about the tasks in marketing in sales. However, in the end, it would go beyond the purpose of the interview of what the tasks really are like the launch of new products, launching campaigns in the marketing field, also making sure to be involved in market research to get an understanding of the market and on the sales side, it is also a huge variety of tasks.

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**4 What are the five to ten most important tasks that you and your team are performing, as precise as possible?**

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5 I would start with strategic planning. It is about creating a one-year plan, which we call a brand plan, which outlines our strategy. Based on that, it continues with going into the campaign plans, briefing agencies, deciding upon key visuals, media formats, and how to support an omnichannel matter together with the commercial colleagues. You also must organize campaign trackings, so you are going into data analysis, which is also something happening on a monthly level when you go into the monthly performance reviews, and of course, in order to do so, you have to plan your budget accordingly, phase it accordingly, all in alignment with the finance department. These would be the five most important tasks in a nutshell.

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**6 How do you, if at all, quantify the tasks performed?**

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7 It is probably easier from the commercial perspective if we think about the field force because it is a smaller and more repetitive set of tasks. They can explicitly plan on how many outlets are visited, what the to-dos are in those outlets, what materials are supposed to be placed, what data is supposed to be put into "greatvines," a sales force tracking app, and make sure to get better visibility. When it comes to marketing, it is a wide set of tasks because it always depends on new input from the global brand teams. Are there any new strategic decisions that need to be followed? The most repetitive task, in my opinion, would probably be budget management, tracking, and purchase order (PO) creation, but also something which will happen every month is the data analysis of the brand data we have at hand.

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8 **Do you have any category system allocating the tasks according to certain task attributes?**

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9 No, not from that aspect. If I look at my team, there is one category for me: the "mandatories", things that need to be done to perform any strategic marketing activity. This is just at the baseline, but I need to block some time for budget management and data analysis, and then it is really about being flexible, depending on what time of the year which brand is supported. That means one brand manager will have another stress level at a certain time of the year than another one. That is building upon that, but no such quantification concept exists.

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10 **How do you, if at all, determine tasks as high-value versus low-value tasks?**

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11 In the end, from the marketing perspective, the high-value tasks reach the consumer. Something the consumer can feel. Low-value tasks are tasks that are manual work, repetitive work, which is, however, needed to do the job. So, in the end, I would like my team to be able to work 100% on any consumer-facing activities, but that, of course, is not possible if you are not getting the mandatories right. That could also mean any political task. Certain tasks from global brand teams, specific side projects which would

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get a good standing in the global brand teams, to go for other ideas for which we would like their support. Such political activities, which are not 100% about the consumer, can, however, be very value-driven for the long term, even if you are going to say that this is just for the sake of doing it in return.

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**12 To what extent do you eliminate low-value tasks and foster high-value tasks?**

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13 It depends. If we are creating a one-year or five-year plan, every activity supporting this long-term strategic plan or the following year's plan is always a high-value task. Sometimes you really just have to prioritize and phase projects within the course of the year to make sure not to put too much effort into a certain time of the year, and if some side-tasks are coming across, which can always happen, life happens, something is messed up in the warehouse, the agency is having some issues, or whatsoever, or there are just some global tasks coming along. It is all about prioritization. We have to think about, what is the most important task we have to perform right now and what can wait or also be canceled, which might lead us to look into certain tasks or requests coming in, what is repetitive work which can be either neglected because it is not important or where you can get similar results from something which was already created or will be created in the near future.

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**14 You mentioned that the most critical tasks deal directly with the consumer. Is there somehow a category system in which the most important, crucial, and high-value tasks are allocated, for example, consumer tasks, and are there further task categories that you can determine?**

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15 Just very genuine. Per brand, it differs from what is important. However, the consumer is always at the core, but whatever that means, per brand, it might differ just because every brand might have different issues or is just at a different life stage. We got reoccurring tasks that might be something we just deal with ourselves, for example, setting up a PO to be able to pay a note to do something. However, it is also doing alignment meetings. Of course, I

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have to ensure that there is an alignment in the organization and that other departments are fully involved in the whole commercial planning aspect to ensure that every stream of the company is moving in the same direction. That is something somewhat repetitive, requiring much time, but it is something necessary which is also something that I would put into a separate category. The third category is hard to categorize because it is very individual. It is about creative problem-solving for which you have an issue or a consumer, for example, trying to find a solution to the consumer's perception. That is something that is, at least in marketing, strongly individual.

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**16 Which of the stated tasks already involve the application of digital technologies (digital tasks)?**

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17 Basically, all of them. Just looking at the fact how we communicate right now, even the alignment meetings have a digital aspect. You are using platforms like IFS for project management, which makes the alignments also very digital. Nowadays, even on the commercial side, there are just a few tasks left that are non-digital, and I could imagine that some of the tasks, which are not yet digitalized, especially in commercial departments, will be soon.

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**18 You just mentioned many digitalization aspects within the daily processes. The counterpart of digital is doing it non-digital, for example, physical, and you also said there are just a few tasks left. Could you specify, if possible?**

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19 Physical tasks are everything you can handle without the support of a technical solution. My communication with people is done via email. It is a digital task, and it is digitally enhanced. My meetings are for 1.5 years via Microsoft Teams, which is digitally enhanced. You get some support when I compare the task to when it was not digital yet, for example, when you are still receiving faxes or letters. A secretary happened to get that in order for you. Now, you have Microsoft Outlook as a system that permanently does

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that for you, planning the meetings you are having. It reduces a lot of manual and physical work done by a personal assistant before. In the end, I would say it is hard nowadays that any tasks involved in marketing, at least something reoccurring, are not digitally enhanced.

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**20 Which of the stated tasks can be replaced by digital technologies and why?**

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21 Today, frankly speaking, I am limited by my lack of knowledge of solutions. It is very fragmented in marketing. You got a lot of different suppliers with different services. If you have someone doing the consultant part, which can be done, it would be a lot. In a nutshell, I can even tell you what is not able to be digitalized, but I am very sure about the fact, moving to the future perspective, that every task can be digitalized, that is not requiring human interaction or creativity. So, in my opinion, the whole topic of artificial intelligence will evolve very quickly, and we are already at quite an advanced place right now, which is sometimes not fully recognized by society, and this will now just become even faster. Because we now have the first artificial intelligence, it will start learning and can be optimized. In my opinion, the future will eliminate many tasks and jobs that do not require what is not replicable by digital technology: human interaction and creativity. One example doctors, I am 100% certain that in twenty to thirty years, the job of a doctor will be needed anymore because you will just need a supervisor and machines. There is no human failure involved, but machines can actually execute those tasks perfectly, spot certain symptoms that a human might not be able to realize due to human mistakes. Those are all elements that can be excluded by automatization.

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**22 You mentioned two categories, human interaction, and creativity. Suppose we follow up on these two categories. What is a human task in marketing and sales?**

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23 A human task in marketing is having empathy for the consumer. That is something very human that you need to do to understand the consumer at the core because otherwise, you are at least partially ignoring him. Creativity

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is about problem-solving. It is not about having the funkiest visual, but it starts with finding something going in the direction of consumer psychology, resonating with the consumer because you have that empathy. Moreover, I know that there is much progress in artificial intelligence, that even songs are composed by artificial intelligence. We are moving in that direction, but so far, there is still a high dependency on creative input coming from external, but the future might be different. The second category for me in human interaction is building up trust and likely of something or somebody due to the contact you have. Explicitly when looking in the commercial direction, I am 100% sure that the direct personal contact with, for example, an Edeka store employee will not be replaced due to any kind of artificial intelligence optimization unless, at some point, it is two interfaces speaking to each other.

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**24 What is the general impact of digital technologies on tasks and human labor?**

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25 It can make life way easier if it is working right. It can make your life complex if it is not well executed. For example, the interface is not easy to understand, creating more complexity because people have to get used to more interfaces. Microsoft leap-frogged the whole digitalization work field because they managed to create a system that is fully and independently working together with tools, coming from one source, from one supplier. So, it is quite easy to get used to it. That makes life a lot easier and gets more complex in the case of more companies and providers offering their services, and you have to get used to the interfaces. It can also create complexity. In a nutshell, I think I can remove a lot of repetitive tasks to get time for the really important stuff.

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**26 In current performance management, time is a coefficient of efficiency. Is there anything you would like to elaborate on by making it easier or any other coefficient besides time?**

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27 It can be efficiency, but it can also be quality if you think, for example, about the sales force tools the field force currently has in hand. At some time back,

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you had, for reporting purposes, if you were lucky, an iPad or a hard copy. Nowadays, you have apps that screen the shelf to identify which products are there, so such tools already do many routine jobs. That gives you more time to visit, for example, more customers, so you are becoming more efficient. On the other hand, if you have more time to focus on what is important, coming back to your high versus low-value tasks, you got more energy and mental capability to put focus on high-value tasks, and therefore the quality will increase and hopefully also the overall impact for the company.

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**28 How far are digital technologies substituting or complementing human labor in performing tasks?**

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29 I think it depends. Also, coming back to what I would see, the two categories that are hard to replace, I think that technology can help with certain tasks, making them faster and better. I am pretty sure that technology will create new tasks, not for the same person, but for another person, but I more strongly believe, and that is also something you can read in some books in that direction, that technology will eliminate many tasks, and therefore jobs. So, the bigger challenge in the future will be not to find a new workforce, which is currently rather scarce but to occupy the society.

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**30 How far do you assess the skills of human labor to perform certain tasks, especially digital tasks?**

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31 It is hard to tell. If you are not talking about the creation of the technology or the maintenance of the technology, which would be like creating new jobs, rather talking about what skills my team would need to work with technology on their job, correct?

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**32 Exactly. It is all about the skills your team might have or need to be able for you as head of marketing. I am asking for a specific process or methodology how do you assess the tasks to identify the people you are**

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**employing who can perform the tasks, especially if there are new tasks which are not reoccurring?**

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33 In the end, for every task, you need to understand what you have to put into the task. For example, when it comes to digitalization, what kind of data is fed to the program or in terms of a support function, how to manage a certain tool that supports you in your job, and also having a clear understanding of how that is translating into a certain output which you can make actionable by decisions or which is actionable by itself. For me, they should be able to understand this kind of flow, but they do not have to understand every bit and bite of communicating. They need to know what needs to get in and what needs to get out.

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34 **What knowledge and skills do marketing and sales professionals need about digital technologies?**

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35 When it comes to such digital support tasks in that field, it is much analytical thinking, so understanding the task you have in hand and the pool of resources you have to reach a better or faster result. In the end, coming back to what I said, it is having the understanding of how to use it by what data needs to be input, what is the results and how will that help you in the end to form your overall tasks, which can be for example reaching a certain market share, getting better consumer liking, so in the end, it would be for me just about those.

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36 **You described the possibility of knowing the task which needs to be performed and analytical thinking, which might fit more into the perspective of human capabilities, therefore social tasks, and the ability that they have been gained through a lot of learning and education. Is there any digital knowledge that might relate more to hardware or software? The first one is more cognitive, and the second one I am asking for is whether there is anything you can specify in terms of hardware or software-related digital tasks.**

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- 37 Hardware-related tasks?
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- 38 **Using a computer would probably be one, but is there anything else you deem mandatory or reoccurring in marketing and sales? For example, are there technologies that are absolutely mandatory and very important to use to be successful and to exploit several possibilities?**
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- 39 Regarding hardware, it is the laptop and the mobile phone. Regarding software, as I said, I do not have full transparency of what is possible, but what you would need is all the standard tools, mainly coming from Microsoft, and anything on top might be something driven by technological evolution. This is also something where you need to be flexible and adjust to certain tools, maybe even hardware, something which is, however, at least currently out of my scope for imagination because a mobile phone and laptop are what we use for work
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- 40 **If I summarize what you just said, it is ongoing learning to fulfill the requirements of the latest technologies, correct?**
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- 41 Yes, that is correct.
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- 42 **Do you measure the digital technology impact on performance measurement?**
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- 43 Constantly. Campaign measurement, every kind of channel we use. We are not very restricted in the channels. We can use communication, any new digital ad that might fit into the category, any new e-commerce platform channel, any support, or invest in digital marketing. This is something you can very easily track. We got good performance tracking in place together with an internal consulting team. We are constantly getting tracking what worked and what did not work. Also, looking at a glance, for example, what can be optimized, and what not, in the end, every kind of campaign tracking, which also includes "Kantar" research of the own campaigns, is getting many insights, as long as you are willing to try new things out. That is something
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where we are trying to get a lot of internal learnings stored in the headquarter, to also mention an internal consulting team, that consults other markets about the learnings we gathered.

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44 **You firmly focused on the consumer perspectives and performance measurement on consumer-related activities. Suppose we try to transfer the current perspective to the internal performance measurement. Is there any impact of digital technologies which you try to measure when it comes to the impact on human labor in marketing and sales?**

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45 Not that I am aware.

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46 **You said that if we are faster than we actually are, we could execute more tasks because digitalization improves performance. From my perspective, I would summarize it as an impact on human labor. There are the tasks that you perform today, now, you are adding digital technologies, and tomorrow the performance will increase. Is there anything in place that you try to measure?**

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47 Marketing is always an individual mix of activities you are doing. It is hard to isolate that certain factor of having a new tool. We only measure what we can get as feedback from the consumer side. If you look at the commercial side, you can use "greatvines," which helps you to increase the rate of visits per day, per week, and how the distribution build-up was increased since using this overall route-to-consumer approach with the new technologies. That is something where you can look at it in isolation, but not in marketing, in my opinion. As mentioned in the commercial aspect, it is easier because you have more repetitive tasks than in marketing, but due to a variety of tasks in marketing and any support tools, which would be imaginary right now because I do not have the status quo of all available digital tools, I can only look at the status quo. So, if I imagine any tool would help me perform certain tasks more intensively, it is hard to imagine how I can measure that real impact in the marketing field. It is not repetitive tasks that you can do

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more. It is more about measuring the quality of results, which is, in the end, the echo coming from the consumer.

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48 **If yes, what are the measurement criteria?**

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49 *Question not asked.*

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50 **How do you use digital technologies to exploit the full performance potential?**

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51 I am still not sure if I get this question 100% right. In the end, everything we are using as technology is helping to optimize processes, link departments closer to each other, and get better tracking and alignment in a certain project or task. Whatever the current standard at the market, we use everything that goes beyond. As said, there is a certain spectrum of suppliers offering something special, and that is why you do not have complete visibility, but I am not sure if I get this question 100% correct.

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52 **You said optimization of processes. We talked about time, so we are faster in doing some processes, but is there anything you might be able to relate to marketing or processes that are impacted by digital technologies?**

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53 Anything which is automating repetitive tasks. For example, when trying to ensure that people are informed, having follow-ups with the people because there were tasks to complete. This is already the case in new project management tools for optimizing and automating such tasks.

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54 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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55 I think so because, especially in marketing, it is all about getting the best understanding of the consumer, the market, and the needs. You can execute accordingly. So, you got a massive amount of data, information, and insights we want to get for the company, or are not yet gathered, which, if you put

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this into context, could give you a clear picture of who your consumer is. Everything already going into digital marketing and e-commerce will give you a better understanding. That already helps from an overall understanding of the consumer, which will help you execute as a marketer accordingly. However, I will also definitely support your commercial colleagues because if you just exclude a particular element of the commercial exercise, classical off-trade, the e-commerce part will significantly increase. This is also from the commercial function, which will highly benefit from our learning potential in that channel because you get all the trackings from the consumer.

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56 **Suppose we link the performance to a marketing professional's tasks. We talked about brand building, alignment, strategic plans for one year, reoccurring budget planning, and several other things like repetitive sales tasks from your commercial colleagues. You build the anatomy of the task with input and edit the input and the output of a task. Which impact could digital technologies have in 2030 on this task process?**

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57 The impact is a key part of artificial intelligence for self-learning. The output automatically becomes the input. This is also how we try to replicate technologies, but you need manual labor. Suppose you think, for example, about a strategic plan. Strategic planning can only work if you do the research right. You need the understanding first, and you input that into interpretative tools. You must consider a fully optimized and automated system that takes all available data. The quality of data will determine if you are getting the best possible result, and it will write for you, for example, a one-year plan, telling you what brand to activate, how, and where, and also making sure this is directly linked to commercial tasks and briefing them when to execute which task. Then, in the end, you just press the button, and the whole calculation starts. Just the creative aspect remains. Getting all this kind of data and applying the creativity of what data sources might be needed to exploit the potential fully is something I could imagine for 2030, but we are not there yet. It is just a kind of self-learning tool.

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**RP\_02****1 Research Participant 2**

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**2 Which tasks do marketing and sales teams perform nowadays?**

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3 It varies across different disciplines. From the top of my mind, I would start with the overall brand-building activities, which include most probably campaign management and execution, media planning and booking, brand building, program development, and also deployment and execution, and that can even vary between promotions, temporary promotions, ad hoc promotions, and campaigns. The next big area is portfolio management which is conducted both in marketing and sales, and there it varies between packaging to design pricing and promotions. Then you go more toward the sales area, channel management, and account management. It starts with sales and volume planning, account planning, contracting, supply chain management, logistics, returns, and replacements. A more developing area is the so-called consumer journey management, or more in traditional terms, the sales and marketing funnel management, in which it starts with analysis across the entire journey, from awareness building to the learning phase, to find, try, buy, and use, as well as the corresponding resource allocation which is defined and derived from the analysis in the first place. The other area coming out of the consumer journey consideration is prioritizing different commercial and communication channels, for instance, CRM, out-of-home, point of sale, and more. The last area I could think of is the deployment and program delivery of all the mentioned programs developed across the commercial arena.

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4 **Talking about the tasks you just mentioned, there are a few categories, e.g., merchandising deployment. Thinking about the execution of this holistic task, who is performing the deployment of merchandising-related activities nowadays?**

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5 For the time being, it is more or less exclusively done by the commercial field force, who are visiting the point of sales, which we call retail. They execute merchandising activities such as in-store communication, POSM placement

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(point of sale material), racking and shelving, and defining the right place for our portfolio.

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6 **Talking about the field force, they are deploying, for example, merchandising activities. Do they perform any specific activities besides merchandising and marketing at the point of sale?**

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7 Yes, of course, there are a couple of other things. There is the engagement of the corresponding retailers and staff members at a particular account or point of sale. To define and prepare the retail platform, where merchandising takes place, and the programs, which also require at least an agreement or sometimes even a longer-term contracting.

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8 **One of the tasks you mentioned is commercial and program delivery. What is the task of the related employees or department in detail, and what is requested by them to specify this task?**

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9 Program delivery would encompass, for instance, conceptual thinking, the creation of programs, which normally aim to trigger additional acquisition or offtakes/sales. Later, the corresponding planning of the execution of that particular program across a retail network, in our case, accounts in total for 100 thousand outlets which require segmentation, targeting, and the corresponding definition of the right geographies and probably even the right accounts.

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10 **How do you, if at all, quantify the tasks performed?**

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11 There is certainly a more profound way of looking at the tasks, thinking about them, and defining different tasks. We allocate and differentiate tasks between physical visits to the retailer, and at the same time, you can think about doing those interventions, as we call them, not only physical, which requires more time, effort, and resources. You can do that also remotely, for instance, via the telephone, or you can digitally do that. Quantifying those tasks or interventions is simply done by counting them, depending on for instance potential send-outs, certain visits and interactions on a digital platform, or by the number of physical visits with the corresponding

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estimation of time spent per visit. Then you can start to measure the corresponding return of those investments.

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12 **I will summarize the measurements you just mentioned. You apply the criteria of measurement of time per intervention and the measurement of frequency per intervention. Is that correct?**

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13 That is correct, and there is even, or there should be, at least a third dimension, which is kind of the desired impact or the desired return of those activities.

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14 **What you just mentioned in terms of physical, digital, and remote sounds like being related to the field force. Is there any mechanic that you also apply for the employees working in the headquarter related to tasks or only field force?**

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15 For the time being, I only look at the differentiation of tasks and the orchestration of tasks with the limitation to the field force. I can not think of any initiatives which we are applying on headquarter level. Nevertheless, there is one more point of consideration. If we talk only about labor-related tasks as execution, the summary is spot on. You can apply more or less the same thinking, of course, to digital activities, meaning email send-out, and there you also have the corresponding measurements down the communication funnel, meaning awareness, opening rates, reaction rates, time spent on webpages, and more. So there is a certain parallel, but this is not labor-related.

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16 **How do you, if at all, determine tasks as high-value versus low-value tasks?**

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17 A low-value activity does not necessarily mean that it can be cut. How do we differentiate high-value activities from low-value activities? We are simply applying two simple questions. Can an activity be outsourced to a third-party organization? Yes or no. If yes, it would most probably qualify as a low-value activity. Going even further, can that activity be digitalized entirely, meaning there is no labor involved? Then I would conclude that this

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is a low-value activity. On the contrary, the high-value activities are what we call “mission-critical” for the entire organization, requiring a face-to-face intervention with a retailer or customer. A face-to-face intervention becomes typically crucial when there needs to be either a negotiation in place or a physical and personal engagement for a lasting impact on the lasting conviction of a certain customer. That is how we differentiate low- from high value.

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18 **A further question on what you called outsourcing and digitalization of activities in terms of low-value. Is it correct to assume that there is a kind of evaluation of skills applied to assume that it can either be outsourced itself because of its anatomy as the task is built like it is built and second because it can easily be outsourced or digitalized due to the task capability demand of human labor?**

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19 I think it is the first part that you suggested. The skill assessment is not an integral part of concluding that it is a low-value activity; hence, it can be outsourced. Simply racking and stacking of activities means you just have to visit a customer and do this and that which is agreed, for instance, in key accounts with the corresponding headquarters of that customer. That would be a low-value activity. As soon as there is a human interface in between, you need to convince, onboard, and engage for a certain task or activity, which requires, as I said earlier, a certain negotiation skill.

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20 **To what extent do you eliminate low-value tasks and foster high-value tasks?**

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21 As I said earlier, to my understanding, it is not about eliminating low-value tasks because as soon as we can eliminate them, it is a no-value task. Indeed, exactly as you already suggested, we would like to put more effort and focus on the high-value tasks requiring a certain level of education and training, which equals investments. The area which I would like to stress is the technology or the digitalization area because technology may further enable us to perform lower or more simple activities at a large scale in no time, and that is huge leverage that we will have there.

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- 22 **What is the general impact of digitalization on human labor? We are talking about doing it even faster, but are there also tasks that arise in terms of being a new task due to digitalization, which was probably not even there before such as an extended or completely new task?**
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- 23 Additional or new tasks are certainly found in the areas we are now developing, for instance, customer relationship management or consumer relationship management at a large scale with the help of online or digital marketing. For additional tasks in field force execution topics, I can not think of something completely new. What technology is doing in that sense is that it helps us to manage the ever-increasing level of complexity. Our world is becoming more complex, and, in our business, we are moving towards a multi-category company, and here technology is crucial to at least be able to manage additional platforms, get various products, customers, and more. The second thing is that it helps us to manage and take out the complexity of certain and different tasks, and you look at it again from a journey perspective. It is not like replacing one on one certain tasks from physical to digital interventions or remote interventions. It is more like the proper orchestration of tasks. It may start with a personal visit to build a certain platform or common understanding between the corresponding customer and us. The technology helps us follow up closely on that particular topic, and then you visit the customer physically for a second time to catch up if everything is under control. If there is progress, there is a certain period or the second period of digital or remote follow-ups. In addition, the entire market penetration of the entire retail network becomes much more focused and concentrated.
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- 24 **Summarized in one sentence: achieving a transition from more time-consuming interventions today, for example, allocated physically, towards, in terms of orchestration, a less time-consuming task execution, for example, digitalized or remotely.**
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- 25 Yes. It is an amplification of your physical tasks provided by technology. You can look at it as a ripple effect. If you throw a stone into the water, the
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corresponding ripples are then provided by technology to have an impact on a more lasting basis. That is probably the best way to put it.

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26 **Which of the stated tasks already involve the application of digital technologies (digital tasks)?**

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27 Quite honestly, and if you stick to the picture I gave you earlier with the amplification or even the ripple effect I was talking about, then the only area which is not necessarily impacted by the digitalization or technology of certain tasks is the negotiation and contracting part. Everything else I can think of is not replaced by digitalization but certainly enhanced. For me, it is not a black-or-white decision, whether it is a physical, digitalized, or remote task. For me, it is an orchestration of the journey as such, or maybe even an interplay of the three different disciplines when it comes to tasking to maximize the impact on the customer/consumer.

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28 **You were talking about the ripple effect and following up with digital technologies to be even more efficient, for example. What technologies do you exactly apply, which do you use very often, or are already integrated into task orchestrations?**

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29 It can be digital marketing, emails, or our digital platform. You can look at it as an extranet, where we get together with our customers on a digital platform, where you can permanently engage with customers/retailers at a large scale, 24/7.

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30 **Is there also technology or digital technology that you apply, close to artificial intelligence or machine learning, to once integrate data and finally reduce the effort needed by human labor because the machine is learning by itself?**

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31 That is an ongoing exercise, and there are a couple of projects on machine learning where we are already quite advanced. However, we are also trying to use artificial intelligence to anticipate and forecast certain customer behaviors and instantly learn what activity works in which segment of customers the best.

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32 **Which of the stated tasks can be replaced by digital technologies and why?**

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33 It is less aimed at replacing and substituting for me, but it is like how you phrased it in your question. It complements and then, therefore, enhances the output of all of our activities and being able to allocate higher-value activities to the best-educated people.

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34 **What is the general impact of digital technologies on tasks and human labor?**

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35 It is not necessarily big leverage to bring down certain costs or the number of employees. It is more being able to manage the increasing complexity, and on the other hand to make the best use of existing resources, and also human resources to let them perform the highest-value activities, which probably comes hand in hand with the jobs enrichments as kind of thinking, and more.

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36 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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37 *Question not asked]*

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38 **How far do you assess the skills of human labor to perform certain tasks, especially digital tasks?**

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39 At a broader level, we conduct regular analyses and assessments of our workforce, for instance, with an external service provider, but that is more of a profiling exercise to understand better which skills are available in the workforce and derive individual development plans per employee. Of course, if you start to develop those people on an individual level, you have a common goal in mind: technology-driven to prepare them for a future where digitally savvy and tech-savvy play a more crucial role. Nevertheless, not neglecting the necessary capabilities out of the current situation, being able to engage with retailers, negotiate, see the bigger context of activities, and more. We do this regularly by trying to develop our people in that overall direction.

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- 40 **If you would need to name a category for skills, which category might that be? I will give you an example. Scientific literature dealing with labor market topics applies, for example, the annual wage as an idea of who is high-skill and who is low-skill. If you earn more, you are high-skill and have more capabilities. Is there any category when you think of the skill assessment of employees?**
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- 41 We are trying to keep, on the one hand, a certain diversity, at least in the field force, from a commercial apprenticeship up to a university degree, but that is not driven by the fact that we have a clear target that we want to have any percentage of our people with a degree. That is happening how we observe it, but that is overall development in German society. I think there is no clear connection between a certain job profile and to corresponding needs of an educational level.
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- 42 **If I summarize it correctly, there is no interface or mechanic where you have a certain education. Can you only be responsible for certain task categories?**
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- 43 No, there is no categorization of people and degrees, and I am completely against it. Because we still believe in this company, that people develop over time, and we are giving the best possible support to help them develop themselves as long as they are interested and motivated.
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- 44 **What knowledge and skills do marketing and sales professionals need about digital technologies?**
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- 45 Interest, openness, and a bit of digital or tech-savvy. When we get to the point of defining a certain skill set in which we aim to find people, the moment we define that is already outdated.
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- 46 **Do you measure the digital technology impact on performance measurement?**
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- 47 Of course, we have certain approaches for performance measurements in place across the entire organization. Starting at the field force, you can
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measure the sheer number of visits they conduct daily, not limited to physical visits, but also remote calls meaning remote interventions, and also in terms of digital interventions. It becomes not more difficult to measure but becomes more distant towards the individual employee. However, we define certain KPIs which measure the digital penetration in a certain territory per employee, meaning how many customers are going to our digital engagement platform. That can be measured, but this is only the first layer of KPIs. Then you have more contributory objectives and main objectives, like the corresponding effect on the acquisition and the corresponding effect on offtakes and user conversion, meaning how many new users are developed or converted in a certain territory. This is all measurable, and this is all that we are doing in the area of the field force. A broader view across the organization, more towards marketing and corresponding communication efforts starting with CRM, is completely transparent, and everything can be measured. Of course, we have defined KPIs for every email send-out, and we have, on a broader or more aggregated level, many defined KPIs across the entire consumer journey. If the idea of the consumer journey is not yet well known, then you can best compare it with the more traditional sales and marketing funnel from awareness building, to understanding, to the desire of the respective consumer to learn more about the product, to try it, to buy it, to live with to use it and at the very end of the funnel to advocate for it. That is what we are measuring across the board.

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48 **You are elaborating on a point you mentioned, which you called digital penetration. Suppose we would try to identify the measurements that you use. Please add what is missing: you use the frequency of certain tasks performed, defined as digital tasks, and the time of how long certain tasks last. Is there anything else that you measure in terms of digital penetration?**

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49 Measurement of the communication platform as such means the percentage of customers in a certain territory, who are digitally engaged with us, such as the weekly visiting frequency of our webpage, how much time is spent there, and how many tasks they conduct. The idea is actually that the retailer

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goes to that webpage and applies for a certain task to participate in a certain program to present the corresponding proof of performance of a given task to finally get rewarded, more or less instantly.

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50 **If yes, what are the measurement criteria?**

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51 *[Question not asked]*

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52 **How do you use digital technologies to exploit the full performance potential?**

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53 It is probably a summary of what we have discussed so far. Trying to do that in a one-sentence summary: it is complementing, it is enhancing, it is amplifying, it is replacing each and every task over time. I think we should not be shy of renaming it and putting down the overall objective for the upcoming years. What we define today as high-value or medium-value activities, our ambition should be to eventually conduct those activities and execute those activities with limited investment in human labor. Not saying that I want to replace an existing physical field force, but I would like to develop a field force over time, and that requires taking out the complexity of their daily routines, freeing up time and resources of a given field force to make them ready to perform even more task or higher value.

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54 **You are trying to put tasks in those proposed categories to see whether they are amplifying, enhancing, or replacing, for example. If I translate it into a category approach, would you agree?**

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55 Yes. I can even quickly give it a try. Enhancing is enhancing a certain task. For instance, if a field force colleague is physically visiting a retailer trying to educate them on a certain program, or a certain product out of our portfolio, where we expect him to transfer that message to his consumers, the enhancement part is then an ongoing and lasting training, task or program which can be conducted digitally. The first intervention is physical, and then we invite them to go online, and there are certain training or modules, and you can participate in that curriculum and educate and enhance yourself over time. That is, for me, an enhancement of a given task.

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56 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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57 If it were foreseeable, then it would be already there. Indeed, my expectation for the future is that it will explode actually that we will see a much faster penetration of technology and digitalization in sales and marketing. Your question is whether there is an increased or improved performance of marketing and sales driven by technology, and for me, it is a clear yes. Efficiency gains and effectiveness drive it. Efficiencies we discussed: we can do more interventions for more customers with the same level of investments at better effectiveness. The effectiveness is driven by better learning and understanding through maybe artificial intelligence or machine learning. To summarize, each and every sales and marketing organization can do more of the right things at the same level of investments in ten years.

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**RP\_03****1 Research Participant 3**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 I will answer your question in two parts. First, as you know, we look at brand stores in a geographical area, which means we are responsible for sales in a designated area. We talk about tasks other than, for example, in our central marketing department. First of all, regarding tasks in our stores, human labor runs the tills, which means scanning products and supervising and performing the cash procedures. Then we have the ordering and stock replenishment, and to a minor extent, because this is combined with the format of our business as a discounter, we answer customer inquiries but, as said, this takes only a minor part of the typical tasks performed in stores. And then with regards to the marketing department in our head office, they do brands and campaign planning, cooperate with agencies, look after customer inquiries that come via mail or partly by phone, and supervise social media channels and content creation. Since a few years, they have been responsible for product delivery and handling. These are, in general, the main tasks that human labor does nowadays.

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**4 Which tasks do digital technologies in marketing and sales perform nowadays?**

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5 To talk about the current status, we have digital technologies in use. Again, looking at stores, the scanning of products is done with technology. There is a system for the whole procedure of scanning that processes POS data, which works with PLUs (price look-up code) to catch the product that the consumer wants to buy and refer it to more data stored in the system. For ordering and stock replenishment, we are already using a program called "computer-generated ordering for stores" that supports the store manager in placing the orders. There are different levels to what extent the program can run, and you can do it on autopilot or get some ideas of what the program suggests as order quantities for the different products. We also have random things like the identification for new phone users, iPhone cards from our company, or

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starter sets, but this is probably to a minor extent only. Technology is used for the identification of personal data and more. In the section of customer interaction or marketing in the head office, we just started using a higher level of digital technology in September last year, but before, the planning and running of campaigns were done with the help of Microsoft Excel or other standard software. Now we have two standard software programs in place: "workfront," which plans or helps to plan, monitor, and execute marketing campaigns. We also have "salesforce" to work on customer inquiries or complaints and administer these proceedings. We also installed a mobile app that allows our customers to check the availability of certain products. We also use Adobe analytics or target an audience manager for personalized advertisements, as you see, to a quite broad extent today, that we use digital technologies, especially in our central department.

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6 **I understand that the tasks you just named have a high enhancement of digital technologies, and the tasks performed are complemented and enhanced by digital technologies.**

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7 **One further question, in general, about the quantification of those tasks. Is there any categorization of tasks in place that you apply?**

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8 No, it is not. You will probably find that higher-level jobs when you look at them in terms of remuneration, ask for more digital knowledge and are at a higher digitalized level. In contrast, we still have physical jobs like stock running, for example, or replenishment, where it is not worth investing in automation or digitalization from an economic point of view. To answer your question, we have, regardless of what jobs you look at, parts that are done with the help of digital technologies and parts that are still completely up to human tasks like collaboration or physical tasks. There is no black and white, you always have a mixture, but the proportions may differ.

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9 **You mentioned the economic feasibility of task digitalization. I understood that you only categorize certain tasks or digitalize certain tasks if it makes sense based on, for example, the ROI (return on investment). If**

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**the task is not economically useful to become digitalized, you do not do it. Basically, do you do a cost analysis before you digitalize tasks?**

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10 Yes, that is true. This is a general approach that our company uses to look at the return on investments. There may be one exception if we expect a higher output or outcome, for example, higher customer satisfaction. As long as we do not see any economic advantages, we would not take that path and invest in digitalization or digital technologies.

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11 **If you have certain tasks and you have the idea of its digitalization. How do you become aware of the fact that certain tasks are subject to digitalization possibilities?**

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12 Well, I think it is a measure of looking at technologies you can get on the market, let us say. For example, when we talk to companies like SAP or any other software distributor, they can tell us what their programs have on potential savings, cost savings, time-saving, and more. Next, we estimate the effect of introducing the standard software, e.g., ordering. We analyze what time we need nowadays to place an order, and then we try to compare the quality of the orders, the data accuracy, and the quality of the forecast. Afterward, we calculate a business case and decide, based on the business case, which is always led by assumptions, whether that makes sense for us. That is estimated on the economic value, the return on investment we calculate from that business case.

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13 **Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**

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14 For us, it is pretty simple because human labor is part of our cost structure, and labor cost is the main cost driver in our business. When we talk about cost savings, it includes 99% cost savings for human labor, and for us, it is probably the same. Of course, you can also talk about avoiding wastage, maybe higher sales, that is still in the whole business case, but if we talk about savings, time savings for us mean, on the other hand, savings of personnel costs.

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15 **If you try to digitalize tasks, it is supposed to target cost and time savings. Is it correct to say you are trying to save human labor?**

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16 I would not say it like that. I think we have come to an extent where we have a higher level of specialization. So, the knowledge in different areas has become much more sophisticated, also the techniques and skills that we use, and I would say that if we would not use digital technologies to do some jobs or tasks for us, we probably need to effort much more human time and human labor to get the work done. It is not that we want to make our people redundant and to work with half of the workforce. We would probably use digital technologies to reach a more sophisticated level of our business, which means better decisions and insights into customer demands. We try to get this higher level with the same or a little less personnel effort.

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17 **Our focus is on output, correct?**

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18 It is both. It is output, but it is also input. Looking at our product range, I still remember times when we did not sell any chillers. When we introduced the chiller, fresh meat, bakery, and more, it required more human labor, time, and personnel costs to get the jobs done and grow our business. To compensate for this and to become not too costly in our structure, because this, on the other hand, has an impact on our prices and price ranges, we have to try to be as efficient as possible. We, of course, would use digital technologies to make our business more efficient and to reduce the amount of time of human labor that we need to put into this, but on the other hand, of course, we want to benefit from better decisions by the use of digital technologies. Therefore, it is probably both, but it is an interesting question. I have thought about him just during the last few weeks. Our main driver to invest in standard software is what we are doing now in the enterprise. I could not answer this question if this comes from the hope or expectation that we do a better job for our customers in terms of better service, better insights, customer beliefs, customer demands, and more, or if it comes from the chance to be much more efficient in our procedures. It is probably a mixture.

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19 **You mentioned putting the consumer at the core. Based on what technologies are currently doing, we talked about efficiency and effectiveness related to the coefficient of time and costs. Is there also a digitalization driver that you apply for the consumer, or is your pure focus of digitalization on the improvement of performance indicators?**

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20 No, I would say the first is probably right. This also comes from the market. We are looking at what our competitors do. We cannot afford to say we only made our procedures more efficient. That is not enough. We have to improve and do a better job for our customers. Our competitors will force us to go this way. So, it is both. It is efficiency in terms of investing less time and fewer resources and doing a better job for our customers to increase our output or stay competitive in the market.

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21 **How do you, if at all, quantify the tasks performed?**

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22 Would you count one task, the scanning of a product for one customer, and the scanning for the second customer as task number two? I probably could not quantify this because there are so many different aspects that you need to look at. To give you an understanding of how we work in our stores. We probably have job profiles. Let us say an employee that is responsible for running the tills, he or she will probably spend 90% of the time doing the work at the cashier, and how many customers he/she can proceed with during that working shift, I cannot tell you since it depends on so many different factors like how many products does on customer buys and more.

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23 **May I reask the question? Do you count that?**

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24 Yes, we do. We count probably everything done at the tills because we have an IT system behind it. Well, we count the number of orders in some terms but not the time spent on it. We do not count conversations with customers or anything because there is no system to catch that, and I think in our marketing or sales department in our central office, they do count at least the number of customer inquiries, and probably the campaigns, and more.

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- 25 **If you have tasks and you count them, and they are not digitally impacted, and tomorrow these tasks are digitally impacted by the coefficient of time, the number of tasks within one day would increase. Is the digitalization of tasks also having a purpose, as just described?**
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- 26 I would probably say we will get fewer customers because we introduce self-checkouts, which would not be why a customer comes to us. So, if you look at the count from a perspective of how many employees I roster for the shift to get the job done, yes, the tasks per employee, for example, would probably increase, but we would not have more tasks just by digitalization.
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- 27 **Maybe not more tasks. They stay probably the same, but you reduce the time per task from 10 to 5 minutes, and therefore you need less human labor. Is that something that makes sense in your specific case?**
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- 28 Well, not in total. I would say that for the cash procedure, for example, I would expect a customer to need more time for a self-checkout than our cashiers do to get the job done. However, if you look at ordering, for example, an automated ordering system would save time. You can probably place more orders. So yes and no.
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- 29 **If you have a self-service tool, it will not save time because the cashier is faster. However, you pay the cashier. A self-service tool is a tool you would introduce with a one-time cost effort, and after eight months, you will have a return on investment?**
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- 30 The person who is helping the customer do the checkout. You will probably have one cashier supervising three self-check-outs, and by that, you save time.
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- 31 **Is that a methodology or strategy that you have already thought about? Maybe not in this specific case, but is there anything similar you apply?**
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- 32 No, I think this is probably the only procedure or task where this could be applied. In terms of customer self-service, whether in-store or online, the customer needs to do more parts of the job.
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- 33 **If I think about your bakery shop, nobody is handing out the bakery products like in a usual bakery, but it is self-service. Do you have a self-service cashier system in any of your shops?**
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- 34 Not in our region, but tests are running in some regions with self-checkouts.
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- 35 **How do you, if at all, determine tasks as high-value versus low-value tasks?**
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- 36 We do not use that expression in our company when we talk about tasks, but I understand it as the extent of an impact on a specific task or action. I would say that ordering is a high-value task because the time to determine the demand and to place the order, as well as the accuracy of that task, has a significant impact on product availability, enhanced customer satisfaction, losses due to overstocking, efficiency, and good handling at stores. However, also in our distribution center, where the procedure of running the tills or working with one customer at the till the impact and extent of a single transaction is far lower. We also have to look at the multiplier by our customer count per day, per store, and so on, which makes a huge impact as well. We fail to scan all products a customer wants to buy. Let us say there is still something in the bag, for example, and we overlook it, and if that happens with every customer. This sums up a huge amount of inventory loss. Nevertheless, I would still count this as a lower-value task because the impact of one single transaction is not that big compared to ordering stock.
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- 37 **Am I right in proposing the following: high value could also be determined as directly producing output because the average purchase value per customer increases and low value could be solely supporting high-value tasks?**
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- 38 Well, this would not be the intention. I intended to say that you have some tasks or jobs that have a huge impact, not necessarily on sales, more like what other departments and thereby following tasks settle on this. Again, if I say a store manager places an order that's just out of place, you probably end up having huge losses because products run out of date, or you have overstock,
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and you cannot put this all on the shelves. The impact of a wrong decision during that task is much bigger, in terms of cost and maybe lost sales, than a task that I would describe as a low-value task, like one single transaction at the cashier desk.

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39 **Can we try to categorize that coefficient accompanying impact? You just partially named saving cost, causing high cost due to wrong orders, but how do you understand the high impact for high value? How do you determine impact?**

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40 The number of people and tasks in consequence that go back to that one high-value task.

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41 **You could say that a high-value task could be a task of which many different interventions, activities, or tasks follow and refer back to that single task?**

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42 Yes, that is probably a better definition. You could probably also use that idea that I have in mind for other areas as well. If someone makes a wrong decision, that could be devastating because you have, like other areas, society, political issues, climatic issues, and more, that go back to that one wrong decision versus things that just happen and do not matter for any following task, decisions, and developments.

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43 **To what extent do you eliminate low-value tasks and foster high-value tasks?**

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44 It probably really depends on the business case, as I said. Right now, I cannot imagine investing in any technologies that would wrap out physical tasks because it is not a static system in our stores as people need to come to the stores, and the investment that you would need to have robots doing the jobs, is in comparison right now to the cost savings we could achieve with that. On the other hand, self-checkouts or "pay-as-you-go" are probably things that might make sense from an economic point of view, and I am sure that our company will go this way if we think we can benefit from it. If we look at high-value tasks, yes, wherever human mistakes can be avoided by

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technologies, we will do this. Ordering is one of the classical fields, where we believe technology or big data and data analytics can probably do a better job than we do right now, but always based on correct data entry. This is where we struggle most concerning the standard software programs we plan to implement in the company, like SAP or any tools like forecasting replenishment. The amount of data required to get the systems running properly to get real proof is huge, and we need much effort to install that system. So yes, we would go this way, regardless of low-value or high-value tasks, always depending on the business case, so the return on investment, and the question if we could do a better job in terms of quality, like more exact forecasts, better customer insights, and more.

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45 **You collect several attributes. High value is not only the high impact through several tasks and people impacted, but also increased quality and the accuracy of following tasks like forecasting and more., correct?**

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46 I would count forecasting as a high-value task; if we do wrong forecasting, it has a huge impact. In terms of where we would invest in digital technologies, we would invest in high-value and low-value tasks, no matter what. It depends on the business case and the benefits that we expect.

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47 **What is the general impact of digital technologies on tasks and human labor?**

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48 I think digital technologies make some very repetitive tasks redundant. Again, you have to look at the return on investment if it is physical labor, but on the other hand, I think the usage leads to a deeper dive into expert knowledge or, let us say job specialization. So, the more accurate or more data we can proceed, the better decisions we can make, on the more details we can look at. It is also a question of who our suppliers are. We can approach you as a supplier you probably have through digitalization, leading to more specialization and the possibilities to go into niches. Repetitive tasks become redundant. On the other hand, you have better data and better decisions through business intelligence.

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49 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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50 You probably find businesses that have just been transformed through disruptive technologies. Of course, you would have that as well. That is probably nothing we think about every day because we believe in our business model, but still, I am sure there would be other business models or disruptive technologies like we have seen with the car-sharing market, Uber, and more. That would probably force us to think about our business model at all. For example, quick and collect is probably not disruptive, but any other streams where people would buy their goods, any other distribution technologies, and more.

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51 **How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**

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52 We do performance reviews. It starts with recruiting people, and we try to make sure that somebody is capable of the job he is applying for, and then we do performance appraisals. Moreover, we also notice by looking at what people do and what the outcome is if someone is not capable of performing the job or task.

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53 **What are the main drivers for especially digital tasks that you have in your company? What are the drivers of education or skills people need to have to succeed?**

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54 It probably depends on what job or job profiles you look at. In our central marketing department, I would say yes, probably you have some more specific expectations, or applicants, or people that perform the tasks there, but talking about our stores, or running the stores, I would say that anyone who has any education should be able with interest and motivation to learn how to do the job. Using digital technologies in our stores, what we currently find and probably will have in the future is nothing you need a specific education for. You just need the willingness to learn, look at it, and have more general capabilities.

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**55 Is there anything besides that?**

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56 Maybe resilience because my experience with digital technologies is that they do not always work as you want, and the capacity to handle ambiguity because it is not all for good, also the digital technologies. Having different things running and supervising them simultaneously, if I think about self-checkouts and more, and probably a solid understanding of how data work, which I mentioned earlier, the accuracy of data will play a role big role for us. You need to understand that it makes a difference if I catch a "single" or if I catch the product code. If you look in the system for yogurts, strawberries, vanilla, and more., and if they are in the same carton, they have the same product code but are four "singles." Furthermore, today our cashiers just put it as one, which is all the same product code. They would need to scan every "single" in the future because we will get it with the singles and not with the product codes anymore. This is just one example where our people must learn that data accuracy is very important, and it is the foundation to make all the other systems work and give us these benefits.

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**57 Regarding my initial question, how do you assess if people can have those skills?**

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58 We are trying to figure it out during our interviews with people. We look at the outcome and how capable they are, how many mistakes were made, and how people's productivity is. We look at the results and the reason one employee performs better than the other and talk to them; we have no metric to measure those skills.

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**59 Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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60 In 2030, we will certainly use a lot more digital technologies, and to a wider extent, it brings some benefits. Still, asking myself how successfully we make the cutover to new standard software in our business. I think we will see some efficiency gains in terms of cost savings, and as I told you, for us, that

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also means savings on human labor, but also better outcomes, such as higher quality, doing a better job for our customers in terms of forecasting demand, having the right products at the right time and the right offers.

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61 **You again emphasized efficiency. What is the key driver of that efficiency impact?**

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62 From what we can see now, besides efficiency gains, we believe we will make better decisions. This could also be better decisions regarding what products we want to offer in which stores. There are many fields where we can make better business decisions by using digital technologies and big data, which is probably the most relevant field for us.

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63 **Am I right in saying it is predictive segmentation based on data?**

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64 Yes, I think that comes pretty close to it.

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**RP\_04****1 Research Participant 4**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 I think that marketing and sales, in general, are performing nowadays very similar things like ten or twenty years ago. At the end of the day, marketing and sales start with strategy and concept development, idea generation to start with new things such as new launches, and furthermore, it goes into the planning area. Later on, sales is much more related to the deployment area, and when looking at a big company, especially the different marketing and sales functions, you can already translate those sales functions into content; this is what human labor is doing within different companies.

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**4 You distinguished between marketing and sales. What is the interplay between these two functions?**

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5 Marketing is more conceptual and more strategic in general. To make it concrete, we are launching a food and beverage product, for example, and at the beginning, once you want to start with your business, you need a product development department, and in close collaboration with them, you need your marketing department to review the packaging and marketing mix, and more. Consequentwise, the marketing department is engaged in an earlier stage, and the sales department is in the general terms deployment area. Once the product is ready, and the marketing department supports the cost spendings on social media, for example, the sales department has to bring the product to the customers. However, at the end of the day, we should always see marketing and sales as a commercial approach; everything goes together hand in hand.

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**6 Which tasks do digital technologies in marketing and sales perform nowadays?**

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7 When I started with sales from my experiences in the past, let us go back ten years, there was much manual work for the field sales employees. When the field sales employees were working in the field and launched products at the customer, they were in charge of everything. The paperwork, maybe the merchandising, they did the compliance checks, and more. This has significantly changed nowadays. From year to year, everything is getting more digital, and from my perspective, low-value activities such as performing the compliance check on the shelf to see if the product is in the right place. This can be done more and more with digital tools. Moreover, high-value activities are negotiation skills, strategic areas, and more, which need to be done by human labor. That is it from the sales area. In marketing, I think there are a lot of new developments through digital tools when you look at marketing support and again from where we come from, from classical marketing, which was a lot about general media and point-of-sale marketing. Nowadays, it is much about social media. When I think about marketing where I work now, the first thing is social media like Instagram, Facebook, and LinkedIn, creating postings, and working with influencers. There is a shift, and digital tools, like digital Apps on mobile phones, can help a lot, and this did not exist ten years ago. That is a different area now.

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8 **Especially in sales, you differentiated between low-value and high-value tasks. The low-value task you have categorized as easier to replace by digital technologies. What do you think is exactly the driver for its digitalization possibility?**

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9 I would describe it as tasks that are very competitive, not very complex, and easy to translate into technology. To make a simple example: maybe ten years ago, when we wrote invoices, we wrote them manually on the computer as a word document, and we did them one by one. Nowadays, we have invoicing tools where everything is prepared, and we just have to put in the address. That is a simple thing, and it is a repetitive task because a company usually, for example, does 500 invoices a month. Based on that, you can easily calculate how much time you save in labor hours when you do the invoicing with more sophisticated technology. Alternatively, in the sales

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area, again concerning the compliance check, human labor had to capture the shelf if the product was in the right place, and now the retailer can do it himself by uploading a picture, which saves much human labor. At the end of the day, I think that low-value tasks can be more digitized. The more digital technology is advanced, the better it is, and, in the future, it can replace labor and will save costs.

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10 **For the high-value tasks, you raised the example of negotiation. Why do you think that, for example, negotiation is a high-value task that is difficult or cannot be digitalized?**

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11 I would not see it as that extreme, and I would also not say that they cannot be digitalized at all, but it is hard to imagine that those tasks can be digitalized in ten or fifteen years. I do not believe it, and it is far away from my imagination power. Every situation, which is my main argument concerning a customer negotiation, is different because there are multiple variables when it comes to negotiation that technology cannot cover. If you want to do this with technology, you are talking about artificial intelligence. It all depends on how you can program artificial intelligence. Artificial intelligence is taking the learnings from the past, but you cannot look into the future. In my opinion, you can take the learnings from the past and try to estimate the future but not in the most accurate way. To be honest, at the end of the day, we are human beings and what happens in the world now is that normal face-to-face conversations or via phone are diminished by technology. If you put it to the extreme, it would mean that robots are doing negotiations. Chatbots on the internet, for example, are very helpful in customer service. If you have questions, they are simply answered. Nevertheless, a chatbot cannot replace labor in negotiations in the next thirty years. The competition is increasing year by year. For example, a B2B customer has much more complexity in his environment than ten or twenty years ago. There are more industry players in the market with different products, and the complexity is increasing; therefore, technology cannot replace it. Technology can support acknowledgment management,

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databases, market share figures, and more. However, I do not think that human labor can be replaced here.

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12 **How do you, if at all, quantify the tasks performed?**

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13 What do you mean by quantifying tasks? What can be saved by doing it digitally versus physically with human labor?

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14 **How do you try to identify the number of tasks performed? Do you count the tasks per day? Do you try to achieve your target, or do you try to measure what you have done by counting tasks?**

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15 In my current job, I do not quantify the tasks at all because I am currently in a start-up business which means either we succeed or we do not. So, everything is very explorative, and everything relates to revenue. The only benchmark we have is the monthly revenue generation. If there is no revenue or only a little revenue, then there is an immediate discussion need, but the quantification of tasks I would need to apply in my former job when I worked for a bigger company because then the business is set, the business is running, and then you can look for efficiencies. In the start-up where I am now, I am not looking for efficiencies but revenues. Once the business is settled, you can look into quantifying tasks, reduce the labor tasks, focus on digital tasks related to saving headcounts, and leverage a shift of headcounts to another area where needed.

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16 **When you talk about saving headcounts, how do you measure that? Does it mean that you try to save time? Can you elaborate more in detail?**

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17 Let us take sales as an example. Field sales is always the most obvious, and I believe that the low-value task, as described before with compliance checks, simple conversations with the retailer, and more, the more the industry can replace human labor with digitalization, the cheaper it will get. You can save those tasks if we translate them into a number of headcounts. That is what you should do. It does not mean that a company needs to cut its headcounts.

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It can, and if it is the case, we should not close our eyes, but there will be other departments or areas where the headcounts are needed. I think it is a normal process to replace headcounts through digitalization, and this needs to be done to succeed in this big competitive environment.

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**18 How do you, if at all, determine tasks as high-value versus low-value tasks?**

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19 Maybe I put it differently. A low-value task is defined by the tasks that need to be done. If you look at those low-value tasks and realize that three out of ten defined tasks are unnecessary because there is no business need, I would even argue to skip those tasks. Sometimes in business, companies do tasks for the sake of doing tasks, but no one questions the tasks. The first thing is to skip tasks, but then, for example, probably seven out of the ten tasks remain low-value tasks, which are competitive but are more business support tasks from my perspective. The classical sales fundamentals that, for example, when we do a secondary placement with one of the beer products, we have to find a placement area where 260 bottles can be placed, and this is a low-value task where for example, the store can do a picture and upload it on a system, and we have the proof of performance that the products are placed as agreed. The low-value tasks are more about business support and sales fundamentals. When you need your brain to think more strategically and conceptionally, generate ideas, and apply problem-solving skills, I would call it high-value tasks. This is the differentiation I do.

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**20 To what extent do you eliminate low-value tasks and foster high-value tasks?**

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21 As I said, if there is no business need, then you skip the task. I think here we are clear. If there is a task that does not make sense, skip it. I assure you that in big companies, 20% of the tasks can be skipped, and no one is challenging it. Every task, which is, according to our definition, a low-value task, which is still performed, needs to be discussed in the business context if even a low-value task is adding a certain value. There needs to be a management

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decision with the key stakeholders responsible for this task if the task brings at least a minimum of value, and then you can say if the value is high enough, you keep it. You may challenge later, but this is the flow of decision-making. Talking about fostering high-value tasks, everyone knows that all our resources are limited, and the issue in the marketing and sales area is, which I have experienced for twenty years now, that the resource is always the bottleneck. Human labor as a resource also represents the bottleneck because there is so much to do nowadays. The more you can eliminate, the better it is, and you should try to free up resources for the high-value task. Many managers today are stuck in the day-to-day business, which, either way, also do low-value tasks to a certain extent depending on the management position and are overpaid for what they are doing. They are only paid for the brainpower and should free up the resources to put more brainpower into their daily work. That is fostering high-value tasks.

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**22 You said the low-value tasks are still adding certain value. What exactly is value in this context for you?**

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23 An example is invoicing. If you have manual invoicing and the assistant invoicing manager is working twenty hours monthly on manual invoicing, now you have a digital tool that is not expensive, and you can reduce the twenty hours to ten hours due to digitalization. The result is a value of ten hours of workforce saving. The task itself is defined as a low-value task, but this definition needs to be done at a certain point in time. This definition is subjective. However, once you have decided which tasks are low-value in a company, it is a philosophical question for me. Invoicing is a low-value task because it is repetitive. Nevertheless, this low-value task can be digitalized, resulting in generating value because you save manpower, and at the end of the day, saving manpower means saving costs.

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**24 A general definition of value is also efficiency? Is the summary correct to say that time savings equals efficiency increase?**

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25 Efficiency savings, yes.

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26 **What is the general impact of digital technologies on tasks and human labor?**

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27 First of all, I think the impact is positive to have digital technologies; overall, digital technologies are getting more advanced each year. I mean this, we realize, and the impact is that digitalization is supporting the business, and, again, is eliminating certain human tasks, and human beings can do other things, and it is something which is supporting our overall business, free up resources, and you mentioned the word efficiency. This is what I was looking for. The impact of digital technologies on tasks and human labor is efficiency gains. In a nutshell, that is the summary.

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28 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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29 Suppose you think of a salesperson going into a shop and being responsible for the beverage products of a company. If this person has all the information about the market, segments, available products, competitors, and consumers in a digital tool, this salesperson is better prepared to negotiate with a customer. I would say knowledge management, and in the good old days, like twenty years ago, we had knowledge management on the overhead projector, and later we got computers, including PowerPoint. However, I think nowadays, and this has already been established for years, that many management dashboards and summary tools can complement human labor. That also supports your daily business strategically because you get knowledge management through digital tools. This is only one example of complementing human labor.

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30 **We are freeing up resources by substitution. We can achieve advanced knowledge management to have more impactful tasks resulting in complementation. Is there maybe a different perspective, like creating completely new tasks by launching new technology?**

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31 Mabe in marketing. If you think of social media, Instagram is an example. It is a new tool, a new way of doing marketing, and when you think of a company leveraging Instagram, the tool has forced the company to install human labor. Because the Instagram channel as such needs to be hosted to be put into context, and there also needs to be much content created with photos, videos, questions, and answers. Instagram is the first, and Facebook is another example. These digitalization tools approached the industry, and suddenly, no one could deal with it. You have created a human position, new work for someone in marketing, which is totally different from before.

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32 **We need to differentiate not only between the impact but also between the technologies as such. We have the effect, and there is a need to cut down on digital technology in more detail?**

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33 This is a good point because, in this interview, we talked about efficiency gains and low and high-value tasks. If a digital tool has been launched and successfully launched, and the industry jumps on it and uses it, that also means that you need someone. It would help if you had human labor to work with that tool. Maybe the tool and human labor are added, as an example, in a marketing department, or on the other hand, you say that we can move away from a classical marketing approach. It depends. Nevertheless, new digital tools are also responsible for generating new ways of working and new human labor in different areas. I am considering the sales area if we have a similar example. Customer support, if you think of chatbots in the B2B area. These digital tools came up, and where you need people to steer those tools and to feed those tools with content, I think this is also important.

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34 **How far do you assess human labor skills to perform certain tasks, especially digital ones?**

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35 I think this topic also relates to different generations of people, and I realized that now also in the start-up company I am currently working in. I think the younger generation grew up with digitalization much more than older people. However, even though they grew up with it, the technology is such

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advanced year by year and is developing over time. Therefore, even in my new company, I work with people around the age of 33, and even they told me that they are not experts in social media anymore because they are already 33 years old. I was laughing about that. Nevertheless, that also brings me to the point that the development of digitalization as such is increasing in such an intense way year by year that the capabilities of people cannot catch up accordingly. I think the skills, in general, not necessary to relate to age, are not good enough to fulfill the needs required for digital tasks. I would always look to align the level of digitalization advancement with the level of people's capabilities. Every industry player needs to reflect that, regardless of the age of someone. The regular work, the day-to-day work, is not changing as much and quickly as digital tools develop. From one day to the other, they are developed, to put it to the extreme, and it puts everything upside down. If people are not equipped with these skills, it will not work. In general terms, this is a watch-out, but it can be easily trained, and I am always a big supporter of training people in the areas where they need to be trained. I will give you an example. If I am not using SAP for my expenses or only use it twice a year, it does not make sense to give me training on SAP. However, if I am the responsible person for the social media channel Instagram, I should get some training to be proficient in the Instagram channel. Align the need of the tasks to the skills.

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**36 Moreover, how do you identify if the person or employee has these skills?**

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37 First of all, the job description needs to be aligned. What often happens is that you have traditional job descriptions that do not match the job anymore. The job description is the theoretically perfect candidate, and then you need to look if the person can deliver against requirements. For example, look at his or her general skills and the kind of training this person did. If there was no digital training within the last five years, but the level of digitalization has increased, you can already be sure there is a mismatch unless it is a natural talent. Nevertheless, I think it is all about transparent communication, and nobody should be shy to do training and equip the people. It does not mean people cannot do digital tasks, but it is a watch-out.

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38 **Is there anything in addition that you could think of when talking about the assessment of skills? Is there a measurement, concept, or category which could assess skills for especially performing digital tasks?**

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39 I think that digital tasks are much more technical than any other tasks. First, the question is also, what is the definition of skills? First of all, we need to consider bringing the salary together with the level of performing tasks. You are probably paid as a leader if you have a very high salary, and I imagine you earn 200.000,00 EUR and more, it is probably much about leadership skills. Consequently, you would say leadership skills are more important than other skills. Moreover, if you are a digital expert, you will not gain a 200.000,00 EUR salary, depending on your job, but it is difficult. It is really difficult to determine.

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40 **Is it possible to receive a high salary with an increased likelihood of performing more social tasks?**

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41 Nowadays, in management, it should be that way that the higher you are paid, the more you should apply social skills because it is more about leadership. The business world is very complex, and we know that especially top managers are not experts anymore because the complexity has increased so tremendously. Thirty or forty years ago, those big guys were more technical experts and could still do the sales representative job if needed, but nowadays, it is more evolved, and in the top management, it is therefore much more about leadership, about social skills, and this is what is required.

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42 **Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**

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43 Thinking about field sales employees, you can easily apply measurements. Usually, a sales representative performs ten visits daily, and you can determine what tasks are performed. Today, digitalization is in place, and from the ten tasks, three or four can now be performed by a digital tool. You can measure the efficiency gains. Perhaps you do not need ten field sales

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employees anymore. You can do it with seven. Thereby you have the impact of digitalization on efficiency calculations. This is how I see things. I am strongly thinking about facts and figures. We should not launch digital tools for the sake of doing it. We should also analyze the business need and how we benefit from it. This also relates to the stage of the process. Sometimes you might decide to launch a digital tool three years later because you can still do it with manual work. In other companies, it might be different, but in the long run, digital tools should replace more low-value tasks, which should relate to efficiency calculation.

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44 **You also highlighted the measurement criteria of the time to save headcount. Are there any other criteria besides time?**

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45 I think quality is very important. Because digital tools can also increase your quality and reduce your failure rates, and more, it is not only about time, but we should not neglect the quality. The quality of work. If you think of an invoicing tool with 99 % accuracy, and before that, the people were tired of doing the invoicing and had a mistake rate of 10 %. Quality is also very important and has an impact on your business.

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46 **Do you have sales and marketing examples where quality has increased, decreased, or has been stable after the implementation of digital technologies?**

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47 Let us put it in a different context because we are always discussing that digital is improving everything. It can also go in the wrong direction. From my experience, concerning the compliance check, we tried many things, and for ten years, we tried several digital tools. Everyone told us that this is very helpful and the other day we realized that the quality is not good enough. That means when you have digitalized the compliance check, but if you have to visit thirty or forty percent of your compliance check customers again, you have many discussions between the industry player and the customer. This is also a negative example. Sometimes, digital tools are oversold, and they are not ready. So we need to balance that. However, even though you have

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digital tools which are helping you in the long run, in the first to three years, you typically need more human labor to install the digital tools to train everybody on the digital tools.

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**48 How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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49 I do not know if I fully understand the question, but as I mentioned already, it is important to identify the tasks. Furthermore, if there is a task that can be replaced by a digital tool and if the digital tool can deliver against the requirements of the work that needs to be done, then we should do it and exploit the full potential. If we realize this tool cannot deliver, it is not exploiting its full potential. Exploiting the full potential means maximizing revenue at the end of the day. That is the full exploitation. Every department must decide whether to invest in the digital tool now or later. Maybe we are working in parallel, the human labor and digital tools. It is not one way or the other. At the end of the day, it is all about efficiency and making the work efficient and organized. The digital and the labor work together most efficiently and effectively to do the right thing. When you achieve the most effective and efficient way, you achieve the highest revenue, which is the maximum potential exploitation you have in marketing and sales.

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**50 First, identification of tasks. Second, the definition of the requirements of those tasks. Lastly, is it about revenue. Can you define the step-by-step approach until revenue is generated?**

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51 The first step is defining the tasks. The second is defining the requirements. The third is analyzing digitalization to determine if technology can deliver against the requirements, a so-called fit-gap analysis. Moreover, fit-gap analysis means very often that we will have some gaps because you usually will not have a 100 % fit, and at the end, you have to identify the gaps and whether this works for you. If you still believe you can increase overall efficiencies and, finally, revenue. That is step three, a fit-gap analysis. Step four is applying a management decision for the digital tool. Step five is

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implementing the tool. Step six is training the people and making the whole thing work. Moreover, step seven is an ongoing analysis of whether that was the right decision to implement the tools. You can either keep going, change it or adjust something.

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52 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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53 I think overall performance will increase over time because digital tools can replace many tasks that people perform today. If you now free up those resources and are smart by not always cutting the resources in an organization, which would be a short-term perspective, but maybe leverage these resources for the higher-value tasks where you need more brainpower. In many companies, people do not have enough time to work strategically, which is always neglected because of daily business. If the company is smart and keeps, to a certain extent, manpower but shifts the manpower from low-value tasks to higher-value tasks, the overall performance in marketing and sales increases.

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54 **At the beginning of the interview, you said that low-value tasks that digital technologies might replace are very repetitive. Do you think there is a possibility that more task categories can be replaced or complemented by technologies? Do you think that there is something different than today when digital technologies have significantly developed?**

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55 Yes, I think, as discussed, every year, new digital tools are developed, for example, social media. Ten years in the past, we would not have imagined what these tools require in terms of maintenance and what these tools would have an impact on. In the future, I think there will probably be many more digital tools available, and they can perform different things, which I could not imagine today what they could do. So I believe that in general terms the advancement of technology will increase year by year. Moreover, the development we have seen over the last twenty years we can project to the

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next twenty years. Digitalization will increase and will be more advanced in 2030 than in 2020. Furthermore, there will be new things created that I cannot imagine today. However, my personal view is that digitalization has a certain limit when it comes to brainpower. I think the most advanced technology we have in digitalization is artificial intelligence. However, artificial intelligence can only work if you feed the artificial intelligence with much data from the past, and then they take this data from the past and try to project the future. However, what I believe is that the future gets many more external variables that are different from the variables from the past. I think the better solution is always from the brain of human beings. Also, artificial intelligence has certain limits. You can support your business, and it can support you in your business decision. It can be supportive, but it can never project the future, and therefore I think we also reach a limit, and if you also think of the number of people working in marketing and sales, the number in, for example, Germany will be the same in 2030 because if you look to the industry you have so many new companies, also start-up companies, they need employees. Maybe the bigger companies release people who change to smaller companies. Overall I think it is a wash because digitalization helps to perform better in marketing and sales, but I do not believe that we will replace all human labor through digitalization. I think the manpower is needed but in a different way as described the last hour.

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**RP\_05****1 Research Participant 5**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 This area is very much about creativity. That is the main task, which definitely hovers over the marketing area. If we also talk about the sales area, it is, of course, very much about relationship building. Yes, we are active in the B2B sector. Yes, we as a company also sell software solutions, but it is also always very much about the people who sell the products, and relationship building must not be disregarded under any circumstances. Otherwise, the focus is also on target-group-specific content, which must be created, placed in the right places, and analyzed and measures which content actually performs how. Based on this, further measures are introduced.

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**4 What are the duties of an average marketing employee at your company?**

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5 Different people are working in my team. I have the actual content employees who write for all media, whether we are still in trade media, e.g., print or online. These employees write for our presence, and here Google, SEO (search engine optimization), and SEA (search engine advertising) play a very big role. However, also following that, social media managers are strongly represented in our field. We also work with inbound marketing methods. There is a lot to do here regarding data grouping, which has to be transferred into prepared campaigns and automated workflows. That is one area. Nevertheless, I also have employees who are responsible for fairs and events. Here the focus is very much on organization and event management. I also have the graphics area in my team. The graphic designers take care of the design, our brand, our web presence, and all the materials we create.

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**6 What are the tasks of an average sales employee in your company?**

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7 We distinguish between the office sales staff and the classic salespeople in the field. The office staff deals with the contacts we generate through inbound marketing, our tools, and, of course, the trial to further qualify leads. They analyze which projects have urgency and potential and take care

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of the initial contact. They also support our field staff in starting a project, preparing meetings, preparing offers, and more. The field staff takes care of tenders, and pre-qualified contacts, which we do not call leads at this point, to get into the project, which often starts with a first web demo. Because we sell software products, we analyze our potential customers' "coat-burning factors" because we do not create the software solutions for us but for the potential customer. That means we evaluate which challenges the customer should be solved through our solution. This is important to know to present the solution accordingly. Based on this, we then conduct follow-up meetings in various constellations, for which we use a digital tool in the background to support the field service, to document the contact intensity with companies or persons, and how high the actual sales opportunity is. In other words, the representation and tracking of a network of relationships and the like.

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- 8 **Which tasks do digital technologies in marketing and sales perform nowadays?**
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- 9 Without human intervention, nothing at all in our case. We are a medium-sized company, so maybe that is the reason. Maybe it is also because the solutions we sell need to be explained. It is not a product I can just put in my shopping cart online and get started. There is a bit of work to be done. In marketing, we work with the tool "Hubspot" to cover the section of inbound marketing. Of course, we know our product and specific target groups have experience with this, and we have set up certain workflows accordingly. If contacts flow into the system from a certain direction, then it is just a click to the left or right to receive a certain campaign to simply further qualify and prepare the data received piece by piece since we also handle data in a very data protection-compliant manner, so that our sales department can work with it. In addition, we can further cover our social media area with these tools to plan and pre-scatter posts so that not everyone has to do it themselves. Other than that, I have to say there is very little automation going on in our marketing department without human intervention. In sales, we use the sales solution "Appointment." Here, it is about guiding the salesperson through his contact with a company, answering certain
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questions, what do I know about the company, the person, and the project, and that nothing is forgotten to be asked when interacting with the customer. At the same time, an algorithm in the background of "Appointment" tells you how high the sales opportunity percentage is. The algorithm also tells you that it may not be worthwhile to keep processing with the company if certain factors do not meet the minimum requirements. In addition, our cooperation is still very much dependent on personal interaction. For the incoming contacts, a report can be pulled from "Hubspot," which differentiates between very specific inquiries, such as a company that has seen a certain software solution and is interested in a web demo, which again is very close to a real lead. There is also the ability to see who is engaged with specific downloads on a specific product from us. These are then, in turn, also classified into certain areas and receive automated advertising support from us in the marketing department. For the sales department, however, it is classified how the status of the respective company is and which topics they are currently dealing with.

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10 **To what extent can these aspects be summarized if we distinguish between a complete substitution and support of the human workforce utilizing digital technologies?**

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11 I agree with the support aspect, but I do not yet see a substitution in our area of creativity. New tasks are being created. Much face-to-face conversation is being shifted to the virtual space, and you have to deal with that differently. Social selling, for example, was not a big issue for us until 1.5 years ago, and the main task of social media was to show presence, build up the image, and do image work. In the meantime, you have to be present and work differently, especially on LinkedIn, which, according to our experience, is at least necessary to succeed. This is a new task that has arisen for us. Use social media to build up a network of relationships. This is not only to stay in contact, as it was perhaps common in the past via Xing, but also to stand for specific topics and perceive a certain "thought leadership" and gain contacts through it, which are then converted into leads. At this point, Corona has acted as a booster, and much has been shifted to the virtual space, from which LinkedIn has undoubtedly benefited. Otherwise, in marketing, this

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has had the effect that we have to operate the channels differently and be present in a different way, but I do not think that completely new tasks are emerging or will in the near future.

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**12 How do you, if at all, quantify the tasks performed?**

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13 We quantify tasks per se by regularly performing ABC analyses to see what brings us forward or how useful certain tasks are. We do not yet distinguish between the actual quantification of tasks performed by human labor and those performed by technologies because it is simply too intertwined for me to say, if I summarize, which tasks we can perform digitally. The argument to say whether a corresponding number of people at our company can be replaced is not applicable, because the human being is simply still too important at our company.

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**14 Do you differentiate between marketing and sales, or is that still so similar for you that no distinction can be made here either?**

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15 It is actually very similar. In our sales area, the human element still predominates too much. Here, digital technologies are used as a support to work more efficiently, such as having a guideline for the customer or potential customer, but the rest is tailored to the person sitting in front of someone, either virtually or in reality. Of course, offers are sometimes generated digitally, but even here, some aspects have to be selected to tailor the offer to the customer in the best possible way. Therefore, the human component in the sales area is still very strong, and in the marketing area, we can automate certain things, but to use and carry out this automation, creativity, and target group analysis are required beforehand. These are all things that must be created, be it the content or the workflows and the distribution of the contacts into the right path.

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**16 How do you, if at all, determine tasks as high-value versus low-value tasks?**

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17 Yes, in fact, once a year, we are required to take a critical look at our area and look at what happened during the year, including what worked and what

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did not with, for example, an ABC analysis of the existing employee tasks. What is particularly important and also has a certain priority in the daily business, and what is perhaps only "nice to have"? In the sense that it is performed, it is no longer as important as it was once classified.

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18 **What is particularly important to you?**

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19 With a focus on our industry and the fact that we are a software company, the Internet has always played a major role for us. When I learn about a new topic, I research it on the Internet. SEO and SEA play a very big role, and we advocate the "content is king" approach. These are very important tasks.

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20 **This means: Content-related tasks, such as content creation and benefits for your B2B customers, are particularly value-adding activities for you due to their character traits?**

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21 Yes, exactly.

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22 **We are looking from the other perspective in terms of non-value-added tasks. Is there a particular character trait here that you can define?**

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23 Routine diligence tasks are what I call them. We are ISO (International Organization for Standardization) certified, and data protection plays a huge role. Of course, this means that we only record data that has been approved for this purpose, but beyond that, we could also clean up the system in terms of data. That is good and would also create data hygiene, for example, but the fact that we do not record the data if we do not have approval is not particularly important. Whether this data is there or not, nobody enjoys it, but of course, you still have to do it regularly because you are simply obliged to delete it after a certain time. By the way, we are currently working on automating this. We still have a system that cannot do that, but we are changing it right now so that if we do not get the clearance in 18 months, this data cleansing will be executed. This is the data protection-compliant "double-opt-in" for which we can submit information to the particular contact. Currently, people still have to solve this manually.

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- 24 **Particularly value-adding tasks are related to content and B2B consumers. Less value-adding tasks are an administrative necessity, do not bother anyone, but have to be fulfilled due to legal circumstances?**
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- 25 Exactly, but hopefully, it can be fully automated soon.
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- 26 **To what extent do you eliminate low-value tasks and foster high-value tasks?**
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- 27 Employee appraisals, in which you deal with the respective employee at least once a year, to a large extent, and then get to hear about it in the conversation. My job is to be responsible for all areas and know the contents, while my respective employees are very specialized. In the conversation with the respective employee, we try to find out how he or she is aware of things, what could have been done better, and what could have been done more efficiently, and then develop ideas together, even if something did not work at all, and of course the fun factor. I think also concerning the just described topic. Nobody has fun with it. Everyone would see that as punitive work, which also plays a big role. However, the fact that we have a system for employee evaluation still runs on the human level.
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- 28 **Could you imagine if you had such a system that includes an algorithm, some scale or labeling in which you put tasks and their characteristics, and that tool would give you a recommendation? Like what you said for your sales force, calculate some success chance. What would you think of such a solution or model?**
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- 29 It sounds like it could be good additional support for now. I would not want to let this tool decide completely on its own. For example, a task would be omitted if a certain category were selected or classified by this tool. However, as support and recommendation, I could imagine it.
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- 30 **What is the general impact of digital technologies on tasks and human labor?**
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31 Support. Nevertheless, perhaps that is also due to the area where we operate. Perhaps also for you to explain. The area that you consider as marketing and sales, we consider very much in the industrial environment, because we are much in the topics of Industry 4.0, and more. Here there are many studies about the replacement of human routine tasks, but no deserted factories and the like, and we once created an approach, which is called "Industry 4 Human". Work tasks can change through digitalization because technologies can take over routine tasks. However, the value-adding, more creative tasks with human occupation have become much more important, i.e., there are fewer and fewer "low-level tasks," and more and more emphasis is being placed on the qualification of people.

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32 **You have highlighted, for example, that routine tasks can be replaced. Are there other tasks that you could categorize in some way?**

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33 In addition to these administrative topics in the area of marketing and sales, automated advertising support. Otherwise, I would not think of anything, no, which tasks could be completely replaced.

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34 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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35 Complementation of technology in the area of sales? Everything to do with lead management is supplemented. Because we work with inbound marketing tools, there are reports and simply very specific inquiries that serve certain topics. If you are in the research phase, e.g., in the initiation phase, and someone is still at the very beginning, has not yet consciously handed over the data, and is simply looking around on the website, here a value is automatically assigned to the processing of the contacts for sales, so that a distinction can be made. The first group, which I have described, would be very quickly addressed in the processing, whereas the automated advertising support would first serve the other groups until a certain point is reached and the group moves up to the next higher category.

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- 36 **You have just touched on a category in how you provide information to your customers. I would describe it as a kind of sequence of tasks that changes. One customer can be left alone on a website, the second contact might be by phone, and the third contact might be a face-to-face meeting. This would theoretically represent a sequence that the task "lead management" or "establishing contact" would change. That means, depending on how far the contact has progressed, there is a change in how it is played. Can you think of another example of exactly this change in a task or sequence?**
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- 37 Cold calling has changed, of course; that might be another example. On the one hand, by data protection, but also by the fact that nobody does it anymore. There are no long lists with several companies that call in irregular cycles and ask whether something is needed. Here, other sources, such as social media, are used in advance to research new contacts, integrate them into their network, and convince them through knowledge and content. Piece by piece, build up the relationship business and analyze whether a project could perhaps arise here.
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- 38 **How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**
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- 39 I do not have a single employee who only has to work with a certain tool or something similar. The industry in which we operate means we all have to have a certain affinity for software. After all, we have to sell a highly complex software product that plays a role in the application process.
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- 40 **This means that the assessment takes place in an application process. How do you evaluate the skills you consider necessary for a particular specialist?**
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- 41 If someone is so convincing in an application process that we think it could work with this person, we hold trainee days in which we get to know the potential employees, but also the potential employees get to know us. There they already get certain tasks that they have to solve. Whether it is to deal
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with a system with which we work, write or prepare something for social media and more. There, the skills are tested, and also, with the software solution that we offer, which requires much explanation, a blog article is to be created in a certain time. However, here it is more about understanding our software. Otherwise, from the tools we use, be it "HubSpot," "appointment," social media channels, or graphical tools, it is difficult to use them as an exclusion criterion for employees.

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42 **Do you have a certain categorization of your employees through which you determine whether an employee is particularly qualified, is in the midfield, or is more suitable for administrative activities?**

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43 In the area of marketing, I only employ "high-skill" employees. I have a relatively small team of seven people, and they are all people with a degree, with a master degree, and we also kindly perform the administrative work. Nevertheless, everyone in my team focuses on so-called high-skill activities.

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44 **I take two points from your response. The first point is that you evaluate a person's actual skills based on practical tasks before hiring, and the second point is the pre-qualification through university degrees. Do you have a third aspect that you use for hiring or classifying your employees?**

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45 No, if it is not about whether a new colleague fits into the team but purely about classification, we expect a certain level of education, work experience, and practical skills for which we are looking for the specific position. That means if I am looking for a content manager, I want to find someone who can write and work with Typo 3. However, if an applicant is convincing in all points and the Typo 3 knowledge is less pronounced, I get him in 3 days to the appropriate level for Typo 3.

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46 **You have just addressed the point of whether someone "fits into the team." To what extent would you feel a loss of performance in your team if you hired a highly qualified specialist who did not fit into the team at all?**

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47 If someone does not fit into the team, especially in such a creative structure, and there is a high potential for conflict because it does not fit at all, I think

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you would put many obstacles in your way. That is part of our hiring process that the team structure has to be correct, especially because we are also structured in such a way that we deal with things like new work and a certain type of work, and that is where feeling good, being with each other, also plays a role. We do not all have to be best friends and go out for coffee with each other every day, but there has to be a certain harmony to be able to function, and someone could still be so convincing on a professional level. However, if it did not fit on the human level right from the beginning, it would not work either.

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48 **What does "does not fit" mean?**

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49 If the work ethic is not appropriate and 90% of the team is very helpful and service-oriented. Of course, it is also about strengths and individual advancement, but it is also about joint success. If you have a solo fighter who boycotts or does not support others, and if there is more work than usual before special events, it would not work. If you have a case like that in the team, it affects the entire morale of the whole team. Despite that very skilled worker, you have the challenge of everyone else from the team doing less work than usual because they are very upset about it.

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50 **In a modeling exercise that tries to calculate efficiencies, could this be called a variable that needs to be determined and evaluated individually and can also change?**

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51 Sure, absolutely.

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52 **What knowledge and skills do marketing and sales professionals need about digital technologies?**

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53 It depends on the respective task. If I take the content manager as an example again, it is the knowledge of Typo 3 systems, how to build a website, Google, SEO, and SEA to work with the appropriate suites here. An event manager does not need this knowledge. If one can do this supplementary temporarily, should a colleague be out for a longer time, that would be a good supplement? However, this is not needed on a day-to-day basis.

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- 54 **Are there other areas at your company, especially in sales, field sales versus office sales, where certain prior knowledge of digital technologies is required?**
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- 55 Because we are active in the software sector, these are very special software solutions. On the one hand, we have solutions for the industrial sector to increase the transparency and efficiency of production, and on the other hand, for the human resources sector for workforce management, e.g., personnel planning, time recording, and more. When we hire new field sales colleagues, these are the things we look for. Are the particular industry's needs understood, and what can our software achieve in this area? If we do not select the person ourselves through a "work and study" model and develop them towards that approach, we hire new colleagues only from those industries.
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- 56 **Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**
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- 57 When we look at the sales area, we try to compare whether one of our sales colleagues is performing better by using our solutions because he might cancel projects earlier than before and realizes earlier that it does not make sense to pursue this project any longer. I.e., also "Mock tenders," which already target a particular service provider, because one is more confident to make these decisions and whether this has had a positive or negative effect, because, at the end of the year, just correspondingly more or fewer deals were achieved. However, there are other factors at play. What is the current economic situation, and which effect had Covid-19? You have to take that into account as well. To break it down purely to whether a colleague was more successful because of the benefits of the technology is not something we could answer 100%.
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- 58 **Aborting a contact of a tender or a customer contact earlier because it was realized that one would not be successful. Based on which criteria does this evaluation take place?**
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- 59 This evaluation takes place with the tool used. The tool asks certain questions for each customer or potential customer contact, which must be answered. These are aimed at whether the field sales colleague has become acquainted with certain key positions of a company, whether certain questions have been answered, and more. Based on these aspects, an algorithm calculates the sales opportunity and also makes recommendations about how high the sales opportunities are.
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- 60 **From what they derived, the questions asked whether the chance of success is high or low. How did you define them?**
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- 61 Partly, the tool offers these questions from a certain standard set because the company that developed this tool has also thought about something in the algorithm. Here and there, of course, these aspects could be adapted with regard to our customers, depending on the area. If I accompany an industry project, it is something different than a human resources project, I have to get to know other people, and there are other key positions. You can customize that to a certain extent.
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- 62 **This means that you not only have to determine the basic success of the deals, which is classic performance management from sales but also calculate the chances of success based on machine learning. Is there anything else comparable?**
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- 63 No. We have only been using this solution for 1.5 years.
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- 64 **How do you use digital technologies to exploit the full performance potential in marketing and sales?**
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- 65 This is aimed at the point of our conversation with the topic data. There was a need, which was also discussed in the management team, to change the tool to exchange this task. Otherwise, on a comparable level, I do not have another example for you. We deal more with the topic of "outsourcing" in this regard, so we do not replace it with technology but give tasks to agencies.
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66 **Would you like to see more areas at your company, if any, that can be replaced by digital technologies to exploit much more potential?**

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67 The inventory solution in the area of inbound marketing. Intensive use always reveals aspects that could be refined, and this could take much work off our hands. However, in terms of completely handing over tasks to digital technologies, I am not missing anything because I rank human creativity higher. With the existing things around data and inbound marketing, one or two things could still be refined, but I do not want to replace even more tasks.

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68 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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69 That depends a bit on how we develop. In the field of law, more and more is being replaced, but on the other hand, the flood of offers to win new customers, especially in the virtual space, is so great that you have to differentiate yourself more as a company. If we all relied on digital solutions, we would probably all use similar tools with similar algorithms and insights. The differences will then no longer be noticeable. I can rather imagine that at some point, the human component will have to be incorporated more intensively again to be different and to attract attention.

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70 **Do you think there will be a limit concerning data flow?**

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71 When I look at our industry, I say no, because more data and artificial intelligence result in everything getting nicer, bigger, better, and further. Nevertheless, when I look at the B2B business and creativity, which plays an important role, you cannot look at everything in a blanket way, and you cannot categorize everything. I think it is possible to a certain extent, but then it comes down to the human touch, being different, creative, and performing well. There are things that machines cannot do.

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**RP\_06****1 Research Participant 6**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 These are primarily tasks that combine both digital and analog information to the greatest possible extent, draw their conclusions or derive their actions from it, and then implement these actions more or less analog but also with the support of digital devices.

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**4 What is the daily business of a specific employee in your sales department? What specific tasks does he or she perform?**

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5 If you take a sales clerk, for example. He or she has to record orders on a daily basis, carry out customer communication and look after the sales representatives assigned to his or her area, e.g., everything they have to do with communication, everything the customers have to do with communication, which he or she looks after, he or she has to process through and through. Here, too, digital information comes from outside the company, certain order processes are already fully digital, but they have to be checked internally again and again. The systems do not automatically do that for us, which, as we are now probably moving into the future, would be one approach. These things affect our customers as well. All of the statistics associated with this are created digitally somewhere, but they are still handled manually, assessed, and combined with other information in order to ultimately draw conclusions and make decisions.

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**6 You have talked about the one clerk in the office. If we do the same exercise for a sales representative at your company, what are the specific tasks in the daily business?**

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7 At our company, this person's job is to travel directly to the POS (Point of Sales), to the stores. He has a guideline, a so-called visit report, which he has to work through so that he has a record of the circumstances found at the

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POS and how this information is to be entered into the report. However, of course, it is much more important for us that he meets the appropriate contacts on-site at the POS, e.g., his interlocutors, the store manager, or the department manager. Following this, the contractual aspects, which we want, are implemented on-site. Today, it is not so much the naked collection of orders that takes place there, but rather a purely preparatory business so that the consumer ultimately perceives us optimally at the touchpoint and then logically also reaches strongly for our brand.

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**8 Which tasks do digital technologies in marketing and sales perform nowadays?**

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9 Related to us directly, of course, we have the digital visit report, which is available online. On-site, the information is still entered manually and then forwarded to us digitally. We then derive evaluations and statistics from this according to specific requirements. However, it is still very rudimentary. In the future, it will certainly be possible to formulate completely different requirements that can be filtered out of the data.

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**10 Is this done by your office staff?**

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11 If necessary, the office staff can and does draw certain information from these visit reports, which are ultimately mass data. This can be done on a monthly basis, or several periods can be processed comparably, and this is done on demand and not automatically, as a monthly or quarterly report of any kind. There is certainly potential for optimization here in the future.

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**12 I want to go into the concrete example that you highlighted in the very first question. A sales representative of yours physically visits a customer with a visit guideline. Could you imagine, for example, such tasks being completely digitized?**

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13 That is generally conceivable. This is already being done to some extent by retail companies today through so-called electronic queries. The retail center

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makes certain product ranges available online, and the responsible store manager or the contact person, in our case for the spirits department, works through the orders and ultimately places his orders at the end of the day or not, based on the offers submitted to him. Of course, this has the very big disadvantage that the spoken word of the people on-site is still an aspect that can represent or influence things very well and individually. Of course, one can now say the other way around that if this is not desired, then one can also neutralize this with a sober guide, so to speak, which is oriented only based on certain information.

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**14 How do you, if at all, quantify the tasks performed?**

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15 Yes, we do that in principle. The number of visits is counted. The tasks carried out at the POS are recorded, e.g., the various surveys, which are an absolute must. Otherwise, a visit report is not complete. Which prices were found, is the assortment complete, and which do we want to find there? Are the facings on the shelf? Is the shelf position correct? Is it top, bottom, or middle? However, it is predefined. It has to be confirmed or marked differently. What placements are found? Placement means naked second placement, but we have a higher claim. If possible, we would like to be in four or five departments in addition to the spirits department simply to have more touchpoints. If someone only goes to the spirits department, then this person intends to buy a spirit or a liqueur today. We want to pick that person up at the use occasions. We are then found at the ice cream counter, at the dessert shelf, if possible, still at the fruit shelf, at the fruit department, possibly at the coffee, or at the baking ingredients. In other words, everywhere where our product is used. To a large extent, we know how the consumer uses our products. Of course, we would like to know from the sales force whether they are on-site, how they are placed, how many product units they have, and at what price. If necessary, still with a beautiful photo that everything is also represented to us in the correct surrounding field.

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**16 To what extent could you imagine a human workforce being completely eliminated for the tasks you just mentioned but still performing that task?**

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17 I could imagine it. I was thinking about this as part of the lead-up to this interview. There is RFID (Radio-Frequency Identification) technology, which dictates, and this should certainly be possible in a few years when the merchandise is placed everywhere in the store. Either I can determine it through geodata, so I know how many facings I am placed with on the shelf because every single bottle has a frequency chip. I also know which item it is. I know where it is still located everywhere in the market. Is it still in the previously mentioned section? If it were not there, I would not get any feedback. I could imagine that up-to-price information according to the pricing by the retailer. That would be quite conceivable up to possible video facilities of the market, which I can look at. That should be feasible. Of course, as we know, this is all very matter-of-factly sober. There are not quite so many emotions, which must be generated differently if necessary.

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18 **How do you, if at all, determine tasks as high-value versus low-value tasks?**

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19 The pure visit is clearly valuable, and it has to be done. We have valued that with a percentage commission, which is 75% of the total compensation earned on a POS visit. So, if one is really physically on-site, the actual tasks should be carried out in addition to the 25%. Product placements, too, so you can increase from the original 25% to 100% of the total compensation per visit.

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20 **Perhaps moving away from compensation and towards the pure classification of tasks. For example, if I am a sales representative, am at the POS, do a facing check, and check the placements. Do you evaluate on task level that, for example, a facing check is particularly value-added? So the actual evaluation of pure tasks for you as a company with the classification of high-value and low-value?**

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21 The one classification is the standard classification. It is for me to know that we are placed in the standard spirits department, but what I still evaluate on top is particularly high-value and also additionally remunerated. We find

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our brand in several touchpoints in the store, and they can be bought because that is what makes it. What boosts sales? The impulse purchases, so to speak. We hope that we have the planned purchase under control, but we would like to bring the unplanned purchase particularly forward.

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22 **Particularly value-adding activities, especially in the field, are activities that lead to increased visibility at the POS and stimulate impulse purchases?**

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23 Exactly, as many display placements as possible in the most diverse areas of the market outside the spirits department.

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24 **If we now look at the opposite. Tasks that have to be performed, which are mandatory, but do not really create value. Are there any tasks that you can name here?**

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25 Some things lead to customer satisfaction concerning the market, for example, if goods are broken. Things that have to do with the processing procedure must be solved satisfactorily by the store manager. These are important tasks, but they do not add much value. Of course, you want to create satisfaction to have the opportunity to create visibility in other areas of the store.

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26 **Does that mean that in this specific example, you use less value-adding tasks, such as administration, clean processes, and more, as a basis and door opener actually to be able to carry out particularly value-adding tasks?**

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27 Yes. If you are already the second winner at this point, you will not be able to open the door at another point.

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28 **To what extent do you eliminate low-value tasks and foster high-value tasks?**

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29 That is always our focus. We have two sales managers, north and south, who deal with this issue permanently, together with our field sales force and the district managers. I must mention here that we have sales agencies as our field sales force. These, in turn, have so-called sub-district managers in their clearly defined districts and work together with our sales managers. That is the main focus on which they are measured, and they are also constantly trained to put the main focus on value-adding tasks, which brings us forward. Everything else must be done, though, sure, that is basic. One is a duty, and the other is freestyle.

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30 **Do you take measures to eliminate or minimize the so-called duty, such as low-value activities?**

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31 These are the processes by which we can influence ourselves. Timely delivery to central warehouses and clean as well as orderly delivery of goods focusing very few complaints in this direction from the outset. That is what we simply have to offer from the brand and the company. As a company with branded products, we have to be able to make a good impression on the market, and then there will be hardly any cause for complaints. Of course, this is also an important focus, and we want to spend as little of the sales force's time as possible in this direction. Also, we support the sales force by giving them a financial advantage if they are particularly diligent. On the other hand, we support them by providing the right tools, such as the appropriate placement materials for special areas. There are various display aids that we provide to the sales force to be best positioned at the checkout, on the dessert shelf, and in the fruit department. We have a wide range of tools that we can provide.

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32 **What is the general impact of digital technologies on tasks and human labor?**

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33 If you manage to connect more digitally solved tasks that already exist today, of course, more and more human tasks will disappear because you can preset them. You just have to create reasonable connections that result in

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meaningful effects. Humans normally bring together a wide variety of information in areas and generate consumer or market research, for example, from this wealth of information. This is also what I receive from the market. I have to bring it all together somewhere in the end and make my decisions for the future from this entire pot of information for further brand management and sales strategy. I could do that, of course, if it were all brought together intelligently. Much human labor would be dispensed, perhaps even through self-learning systems.

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**34 How far are digital technologies substituting or complementing human labor in performing tasks?**

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35 It certainly cannot be ruled out that with better digital technologies, information can, of course, also be better understood and better used on the human side when things are interconnected. I was already squinting at the fact that you referred to 2030. Of course, I thought that so much would be possible but then humans would become dispensable at one point. Nevertheless, it is complementary, and someone can handle much more complex systems. What may have been provided in the past or is now still provided by various experts can be merged to receive information and draw conclusions much more quickly.

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**36 You believe that if technology develops even further and becomes even more complex but significantly more effective, and thus even replaces tasks that ten people and tomorrow previously performed may still be performed by one person, that one person will simply have a control function in case the machine or technology fails. Is that summarized correctly?**

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37 If he or she has the appropriate training, this person can also bring things together in a networked fashion to act in a results-oriented manner.

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**38 How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**

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39 You have to see that in the daily process. There are no tools with which we can measure this now. It is a matter of determining whether someone can cope with systems in the daily routine. If he could not cope, he would quickly be at the end of his rope and unable to work at all, or almost not at all. In this respect, it is almost self-explanatory. He would be out of place if someone could not handle the technologies. In the future, it will be possible to bring technologies even closer to people with foresight. Many things arise because people have noticed something, but we consciously move more in a certain direction. We have to train more so that we become even fitter. There is nothing in place like that.

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40 **I conclude that you evaluate employees based on how they perform their tasks, i.e., professional experience. Are there other metrics you apply, such as university degrees or work experience?**

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41 I do not see it that way now. If someone is working for us as a key account manager, or using my position as an example, then simply a broader educational spectrum or basic knowledge is fundamentally necessary, preferably also from different disciplines. Not just purely marketing and sales, but a technical background is also an advantage because today, you are confronted with completely different things than purely the sales process. That is my experience from many decades of working.

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42 **What other tasks are you confronted with as a sales manager besides your basic sales and perhaps also marketing activities? You have addressed technical know-how?**

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43 I am a graduate engineer and businessman. However, I also learned a technical profession at the very beginning, and then you naturally have a completely different spectrum. You can have a completely different effect on the customers - mainly food retailers, but also industrial customers - and also internally if you understand and speak the language of various departments. This will be a topic of the future when we have many more people who can think in a networked way and are trained in a networked way and ultimately

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master the various disciplines. That does not just apply to sales, and it applies just as much to purchasing and production. Ultimately, they must think about sales because that is where our products go.

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**44 What knowledge and skills do marketing and sales professionals need about digital technologies?**

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45 On the one hand, topics related to product development, packaging, and design. These must be mastered by the basic technologies. How do I produce packaging today, regardless of the material? How is it designed and printed? How is it later staged so that the consumer takes a look at it somewhere, at whatever touchpoint, and feels addressed by it? What has to be mastered is very interdisciplinary. Is that always the case, or do people acquire it bit by bit and learn it on the job? Nevertheless, employees who have worked in different disciplines before are, of course, very advantageous for the entire company and communication. It is a completely different kind of networking because you can speak different languages in different departments, as I said, whether that is purchasing or logistics. These are the topics that we in sales already have to deal with strongly again and again without saying that it is none of my business because it is all about logistics. No, I am the link to the customer, just like logistics. I have to be just as in the picture and move forward in a moderating and acting manner.

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**46 Would you say that any worker can perform any task? If not, what are the specific triggers for an employee not being able to perform a task?**

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47 Why can someone not perform something? Because he does not know or understand certain basic technologies, or however it would be possible to fathom why certain tasks are not performed. Either no basics, not enough basics, or only certain basics but other aspects are not understood.

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**48 However, the basic trigger for you in this consideration is work experience?**

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49 It is strongly related to work experience, that is right. The training, how one is or was introduced to the topics.

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50 **Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**

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51 It is measured knowingly, actually not. In the end, the systems have developed strongly, and it is great to have these systems. This tool is becoming increasingly widespread, and as a result, I do not need any more people in the future. If that had been the case with old technology, and we had developed in the same way as we have, then we would have had to increase our staff much more, and we would have avoided it. These technologies, or digitization, have resulted in hiring more people as our revenue and sales grow. There were no fixed costs that might have arisen. That is hypothetical, but that is the way it is.

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52 **You argue that you do not necessarily measure that consciously. Is the fundamental aspect the reduced time that is required? Can you confirm, or do you deny that time is saved?**

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53 That is one way to put it. Time is saved. Yes, you can put it that way. Absolutely correct.

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54 **How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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55 At the moment, I have to say, quite deliberately not, except for what I told you at the beginning, that we have simply noticed empirically where it brings us particularly forward. Now that I am looking in certain directions, applying certain technologies, I'm honestly a bit out of my depth on it, and you have to look at it in more detail. I would have to look at more applications to be able to recognize the potential for myself or the company. I think we are in a transitional phase at the moment, and certain things are not yet made recognizable. Maybe that is also a shortcoming of the people

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who develop the corresponding digital technologies: they do not yet get their horsepower on the ground. You hear a lot left and right, and you get many offers every day, but it is not applicable. However, I am sure that in the future because development is just increasing exponentially. It will have taken on completely different dimensions in one, two, or at the last three years.

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56 **You said that you miss the transparency of today's possibilities to have the ability to evaluate which practical technologies could perhaps be implemented. However, a prerequisite for that is to identify the potential first. How helpful would you find a model for marketing and sales in which you enter information such as the number of employees, number of tasks, categorization of tasks, and more and obtain, for example, a percentage rating of the digitization possibilities for increasing efficiency?**

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57 Such a model would be very interesting if it is plausible and shows that digitization can be increased as a percentage. That would be very nice support.

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58 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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59 What our trading partners and end customers want. That is the maxim for all of us. Effective connections from the available information from consumers, the direct consumers, and what our retailers give us. What they experience at our POS and other touchpoints such as online sales. There is a wide variety of topics on bringing our brand closer to the consumer, from traditional advertising to promotions. This feedback should be obtained through social media channels and well-evaluated according to certain questions. That would be perfection. To get back the topics from different areas in a channeled way, but also already interlinked. As I said, self-learning systems so that the individual feedback loops cross-fertilize each other in order to get pre-sorted conclusions. Certainly, one must still verify these, where the human being will be necessary, in order to create plausibilities at

the end. It would help immensely to bring together the information that is already available today but not in a connected form.



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**RP\_07****1 Research Participant 7**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 My main focus is sales, so I can talk more about sales than marketing because that is where I am the expert. In the B2B sales area, a lot is still done via one-to-one interaction. Let us start by identifying prospective companies. When I look at our company, you mainly set up Excel sheets where you analyze who are the companies I want to target, identify the point of contact, and get in touch. That is the pre-work for sales which many companies do differently. Some companies have specific people doing that, but it is all, at the moment, very manual labor. The downside is that there is a human factor involved. Many errors can be made, and it is very time-consuming. Doing the interview, I will always refer back to how we do it to give you a good understanding. We are a recruitment company, and first of all, we need to identify companies who hire in the markets we provide our services with. I will use the example of someone who places Java candidates in Munich. He goes on various job pages and looks step by step for the companies hiring, and they type them manually in our CRM system. The company name, address, phone numbers, point of contact, and hiring positions. Especially when you are not working in an established market, that is very time-consuming.

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**4 In the beginning, you mentioned that one-to-one interactions are very time-consuming and, for the time being, very manual. Could you orchestrate step by step which tasks the sales team performs to start and finally also complete an exemplary one-to-one interaction?**

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5 Sure, I can do that. Let us take an exemplary company. You identified the company as a potential customer and had never had contact with them. It starts with doing your research which is manual work, and you have to put the data into the sales or CRM system you are using. At this point, you do not know who your potential points of contact within the company are, and

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then it continues with getting in contact with these people by calling the front desk or reception. Maybe I also find a direct line. The same goes via email. The way we do it, there is no automation behind that, so you have to set your reminders, and it starts with having six to eight points of contact before the sale actually happens. Before you go into conversations, most events happen to be one time, two times, or three times contacts before people do not follow up with you. That contact happens before the real interactions with someone who is a decision-maker and a candidate of interest in the service we are providing. There is a very long process before you actually start negotiating and go into the actual sales process.

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6 **That sounds very manual. Do you have any idea of how the orchestration you just elaborated on could be digitalized?**

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7 Yes. There are a couple of points, and that is my opinion about data collection. If you would have software for data collection and import them into the CRM system, that would be the first thing that would help me. We are constantly facing the GDPR (General Data Protection Regulation) issue, especially in Germany. There is always a debate about if it is accessible public data. You can use it, yes or no. However, that is up for lawyers to argue. Nevertheless, as long as a company has a website with an Impressum or imprint, we can use that as everything is openly accessible. However, having an automated system that would do that for me would be the first big step, and not one of my employees has to do that manually. In the second step, as I mentioned in the beginning, you have to set up organigrams of certain companies like the people in the technical department, the procurement department, in the human resources department that is of interest to me and that need to be involved in the process. Employee data is set up in an organigram. Super useful. However, going to the following steps, if you are creating touchpoints with these people like automated emails, this is where marketing can be involved, which would be a great thing. I am still a strong believer that the first point of contact should be via phone. Afterward, I write a personal email, and therefore my system should be set up in a way that I get automated reminders that this person has not been contacted or the

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system should create content. In the beginning, it could be tested because I do not have enough information, but creating content will start an engagement with that person. I am not a marketing expert, but I am a strong believer that the more relevant the content you provide to the person, the easier it is for the person to reply to you. I will give you a practical example from recruitment. If a company uses Java as a programming language, they are not interested in PHP (Hypertext Preprocessor) programming because it is either-or. I am receiving feedback from clients that they are happy to receive marketing materials if it is relevant to me. However, I think that needs to be on point that an automated system has the ability that the company is an automotive company, they use Java as a programming language, they are building up a data science department at the moment, and the person that I am targeting is the head of IT. The information that this person receives should be targeted toward these three factors.

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**8 Which tasks do digital technologies in marketing and sales perform nowadays?**

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9 I think it depends on which kind of company you are working in. There is a lot out there at the moment, but our company is using very little of that. Today, we are manually driven because our system is no system for the future, which is my personal opinion. Alternatively, there are just not enough providers in the recruitment business to help. I mean, who are the big companies? It is Google and Amazon when it comes to automation. They are providing examples: if you are interested in that product, click on the product, and I think that is where every sales process should lead you, that these rhythms provide you a better service that you can connect the dots. I do not think that Amazon does a great job on that. I would love an algorithm concerning, for example, watching a TV series. You might like it, not just based on what other people are interested in, but on understanding my needs. It is based on algorithms right now that do not take into account the other side and I think that's where automation can become better if we could include the target group in a better way. If the target group could say, "Hey, I know that I am in your database, and I have the opportunity to tick certain

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opt-ins that I am interested in certain products rather than the company taking wild guesses based on the position or the company you are working in, "I think that would help automation. To give the customer a voice in the process because they know what they are interested in and what they need. Again, we are talking about B2B because we often think about how the targeted person performs at the moment. It could be that the manager I am targeting is about to set up a new venture within the company or is asked to change the department. Whenever something changes, you can reach out to the targeted person because, at the moment, he is responsible for software development within a certain company, but he is changing departments, and he will be responsible for data science from now on. So, he is no longer interested in any software development but in the data science departments. Looking back on how we work, it is all manual by speaking to these people, gathering information, and putting it into the system. I think automation can also be that targeted emails say we have spoken to you within the last eight weeks, and we understand that you are responsible for certain things. Is that still correct, or do you want to update your preferences?"

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10 **For example, there is a self-learning or machine learning mechanism behind certain activities. If you have not done certain tasks or exercises for a few days, weeks, or months, please follow up on these activities, automated updates, or certain reminders, or also involve the consumer already in the sales process through bottom-up evaluation and not top-down cold acquisition. Is that summarized correctly?**

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11 To add to the machine learning part, much information is accessible but very difficult to gather. I will give you an example. A manager is in our database, and we are not informed if the manager leaves the company. You now receive an out-of-office email that says that he leaves the company or they have updated their Xing or LinkedIn profile. A machine learning tool that would go through all the available public databases and either update my system automatically or at least send me a reminder that it has realized that the manager does not work for the respective company anymore. Based on the LinkedIn profile, he just added a new position at another company.

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Should the profile be updated, yes, or no? That happens in every sales company, where you have all the sleeping members, making the sales process much more difficult. In our database, only 20% of the data is currently relevant. Much data is just invalid, and it does not help you anymore.

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**12 How do you, if at all, quantify the tasks performed?**

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13 Yes. What is very common in the sales business are certain key performance indicators. We do not measure everything yet, certain things are also hard to measure based on the system we are using, but we measure the main activities that our people perform.

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**14 Can you elaborate on this point if you say "main activities"? What is the main activity?**

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15 Sure. I think it starts with your first question, the manual labor. How many new managers and candidates were added to the database, which we can break down on a daily basis? We are working on a monthly cycle, and we do monthly reviews, so I am looking at the last thirty days. People are targeted with a certain number of measurements on candidates to be added to the database depending on the job level. It is all individual, and there is no one size fits all approach. That is the manual part, and in an ideal world, I should not need to look at it because it is an ongoing process. We also quantify how many people you have spoken to. How many existing and new clients have you called, how many cold acquisition calls have you done, how many candidates have you spoken to, how many candidates did you qualify (you had an interview with), how many new jobs from clients did you pull (actual assignments you can work on), how many candidates did you put in front of the client, how many interviews result out of that, how many offers and finally contracts have been created.

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**16 Do you send them through a funnel?**

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- 17 Yes, this is actually how our system works. You can do a funnel.
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- 18 **What you emphasized is especially related to the activities performed based on the funnel you presented. Is there anything else based on the tasks that you measure?**
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- 19 Kind of. One thing is that it is very hard to find a system that can measure everything. I think that is the challenge in automation. You are always dependent on the software or provider you are using. You can also have one provider who is doing everything for me. In our role, again, manual labor, how many people do I contact, for example, on LinkedIn or Xing? My systems cannot measure that because the systems are not interlinked, and those providers do not allow that most of the time, so I have to go individually and manually into their reporting tools, for example, send out a manual report of how many messages have you sent out on LinkedIn, e.g., InMails. That is something you can quantify. For the quality aspect, LinkedIn provides you reports on how many people accepted or declined your message, but that is manual work again. It would be nice if there would be automation behind that. I think that is the whole crux of the automation process. It is always based on the tool you use. The DACH region is funny because we have Xing and LinkedIn, and every German sales business relies on both of those tools. How can I ensure that the person I am targeting has not been contacted on both platforms with the same or different messages? I think that is one of the major challenges. It is easier if you have one market leader, let us say it is LinkedIn, and everything happens on LinkedIn. You would at least only need to look at the quantities of one platform. If you use various platforms, it becomes very difficult. Elaborating on recruitment again, but I know other sales businesses work similarly. You have different tools to collect your data for. If I want to find a candidate, it is one of the most manual things at the moment. I can use Xing, LinkedIn, and many different databases such as freelance.de and the people in my database. I can contact the same person via four or five different channels.
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- 20 **How do you, if at all, determine tasks as high-value versus low-value tasks?**
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- 21 Low-value tasks are manual labor, like writing messages on Xing and LinkedIn, which is basically something a working student could do. Just saying, e.g., that this is the template, this is the list, process the list, and send 100 messages a day.
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- 22 **Do you argue that a low-value activity is linked to the skillset of your employees?**
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- 23 Skillset but also the cost that I pay. I will give you an example. My top performers make revenues of approximately half a million euros a year. If you break that down to the daily costs, it is more expensive if they are doing manual labor than getting a cheaper workforce.
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- 24 **Having defined low-value tasks, what are high-value tasks? Is it possible to detail?**
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- 25 High-value tasks in the sales process are human interactions like identifying the need and requirements of a client, negotiation processes, and objection handling, where you need to be experienced and highly skilled.
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- 26 **To what extent do you eliminate low-value tasks and foster high-value tasks?**
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- 27 We are in the process of identifying that at the moment. We are not doing it. It is more on a one-to-one basis to understand where people stand at the moment and set clear focus points, but I do not have anything in place yet to eliminate the manual tasks. It has to happen because otherwise, I cannot grow my business, but you do not need to have a clear plan yet on what is happening, but I think it is way better for the organization when low-value tasks are eliminated from the daily workforce. People are not excited about
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doing it because it is super boring, and I think it is a waste of time and energy, and I think it is also a waste of money.

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28 **You are currently not doing that differentiation at the moment, but what would help you is a tool or model which tells you which tasks are based on certain qualifications and criteria for low-value tasks and the same for high-value tasks. Additionally, the determination against certain coefficients like time, money, and more. Basically, a model you can fill in and reveal results about how efficient, effective, or successful you are and where certain potentials are.**

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29 Yes, and I think what would be really interesting in the sales and marketing department. I hope you agree with me when I also add content. I find the touchpoint, and I send out messages, but which message gives me the best result is super difficult to measure. I think the better an algorithm is, the more people will get back to you. If you send out 1.000 messages with one content and 10%, getting back to you is less successful than another content resulting in a 50% return rate. Big market providers like LinkedIn can give you estimates, but they cannot give you detailed guidelines, which surely will lead to success.

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30 **What is the general impact of digital technologies on tasks and human labor?**

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31 People will spend less time on manual repetitive tasks and focus more on high-value or quality tasks. That means for me that people have to work less. I am serious. If I have the right tools in place, and my employees work 40 hours, some work a little less, and some work more, because they spend two hours just writing Xing messages. You should not do that. So, if people work less, they will feel more engaged because the boring, repetitive tasks will cease, which no one enjoys. If you have been doing the job for twelve years and never liked certain tasks, you will have no fun at work. Moreover, people will have more time to focus on core things which will increase quality. To be successful, I think my business has proven that you do not have to work

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60-70 hours per week. The smarter you work, the more successful you are, and I think that will have a massive impact in the future. Digitalization can support us. I think that car manufacturers are the best example. In the past, it has all been done by manual labor, which is no longer the case. There is much automation in robotics. The quality increased. Robots do not have human error, but that labor force does not exist anymore, and you need to create new jobs. Old jobs will die for 100%. New jobs will come up.

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32 **Motivation is a new variable that you especially argue for smart and effective working. Suppose people are busier with high-value tasks that they deem very interesting, not boring. Not only the quality increases but also the effectiveness. Is that summarized correctly?**

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33 A very good example is health care. A nurse needs to work with many documents, which is not part of her job description, but she is a nurse and does not work in administration. The less she has to do administrative work, the more she can work with patients, the more she will enjoy doing her job, the less stress she will feel, and the higher the quality concerning her patients. The same applies to sales. Sales is about building relationships. The more time I can spend with people in real interaction on the phone, in a face-to-face meeting, or meeting them at a convention, the better my relation to that person and the company will be, rather than filling in excel sheets.

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34 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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35 I believe the next ten years will show a massive increase. I think we are just at the beginning of what is possible. The current crisis has shown us what can be done. When Covid-19 hit us, and we were in lockdown, I was in all the clients' meetings when they did the stress test on their VPN (Virtual Private Network) because they were not ready to work remotely. Two years ago, many companies said there would be no remote work. They have an office, and people come to the office. That was the old way of working, and very few companies, even the tech sector, were open to remote work. Two

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years later, it is the new normal, which has helped us in digitalization, but Germany is only at the beginning, whereas the next ten years will hopefully show us what is possible and how we can implement that.

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36 **When talking about digitalization and the example of remotization, which you just emphasized, do you think that digital technologies can complement every human labor, or would you differentiate between human labor and the impact of digital technologies?**

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37 I would very much differentiate. Sales is the best example. In Sales, it is all about building relationships. I have always been in sales, but I also want someone to understand my needs and tell me that this product is good because they are experts. I do not have the time to do all the research myself. They can understand what your pain points are. This is the offer I can make to solve your problem. That has to work on human interaction. People buy from people in the sales business. However, to have more time to spend on this interaction, the manual tasks, mainly administration tasks, need to cease, and quality needs to increase by having more information available that I can use in building those relationships. I think another example is the following: my wife is a teacher. I do not think that digitalization will ever replace a teacher because students are human beings that have different needs, and you need to understand where they are. A machine does not have the empathy to do that, and machine learning is always based on an algorithm, but again they could focus a lot more on their actual job if digitalization were more supportive.

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38 **How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**

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39 We do not. We are not talking about digitalization. We are talking about using a computer. We assume that everybody can use a computer, sometimes, I was wrongly proven that I should not take it for granted, but someone with a university degree can use all the tools. It depends on their personal interest in studies. In sales, we hire more for attitude. Are the people

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relationship builders? Are they motivated? Rather than for hard skills. I do not think that digitalization will replace recruitment or sales because those personal attitudes are so important, but part of it is that we sometimes assume that they can work with technology. Regarding algorithms, Google search is a classic in our daily routines. Not everybody is aware of what Google Search is. Just as great as Google is, people are used to typing in what they want, and Google does the rest for them. That is because it is one of the best search algorithms, if not the best. The majority does not have that, so you need to have the algorithm and understand what I search for.

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**40 What knowledge and skills do marketing and sales professionals need about digital technologies?**

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41 Let us start with marketing because that is the area I do not know enough about, but I think they should know how search engine optimization works, the very basics. How do I make my website most efficient with the best tools? This is for me hard skills, and they change daily. Nevertheless, what does digitalization actually mean? How can it help me to do my job better? This is for marketing. We never had a good marketing department, and it took us ages to get an acceptable website online. It looks easy, but it is difficult to build a great website and represent your brand. Furthermore, that is, for me, very important in the skillset. That is where marketing and development need to work together because the UX (User-Experience) and UI (User Interface) are easier said than done. If you want a good website, the front-end and the back-end are very important on the marketing site. Not just to understand what we do today but what the plan is for the next five years because I do not want to have a website that is state of the art today, but in theory, it should help me to get state of the art in the upcoming year. On the sales side, every experienced salesperson I have hired and met only knows the tools they have worked with. If you are at the university and you have a major in marketing and sales, I do not think that they study that, but they do not even compare what tools are currently in the market, what the structure is, and what are pros and cons. Every time a sales company evaluates the tools available, it is about the price and what they can offer, but there are

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preferences. I have worked with that tool before, I am used to it, and I am happy to use it again.

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42 **From your perspective, which knowledge and skills do marketing and sales professionals need to have, especially for sales, attitude, motivation, and relationship building? Marketing is very provider-related, based on what you have worked with before, what you are familiar with, and more. Based on digital technologies, it is not the case that you hire for degrees, mandatory experience, or certain digital technologies. You hire for different skills. A task, especially an abstract task, is not mandatory to be fulfilled by somebody with a high skill set based on the degree or digital technologies, but on certain knowledge needed for the specific tasks, motivation and attitude. Correct?**

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43 To add, it depends on what is very important in sales is that you understand your product. If I sell a car, I need a basic understanding. I do not need to be a car manufacturer, but having, and that is for me, just the general part of the skillset, the understanding of complex situations, and finally transferring my knowledge. I do not have to be able to build the car, but I have to understand what the car is made of, basically transfer thinking.

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44 **Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**

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45 Not enough. For example, you made a sale, and afterward, we can evaluate the source of the sales, but that is it. I do not know anything if I don't know the source. When it is said that the candidate applies to a LinkedIn advert, that is all information I have, and that is very top-level. Currently, I know LinkedIn adverts provide 20% of my revenue in sourcing candidates. There is no more quality behind that. There is no information about the vertical market, the region, or the target group, and I would be very interested in these attributes because I would know what to do more and what to do less.

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**46 How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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47 At the moment, we do not even use it for 5%. The way we do our day-to-day business is manual labor. 5% is about people being aware of us, seeing our website, or seeing a job ad. 95% of everything we do is without digitalization. The full potential for me lies in analyzing the data I have in a better way. I will give you an example. Digitalization is a big word. It all starts with how good the CRM system you use is. The CRM system we are using is a little bit like having many boxes in which you enter data, and afterward, you open these boxes and get the information you need, but there is no plausibility check. I will give you an example. I add a new manager at a certain company in a certain department, and the system cannot say whether this might be the colleague of another manager. If you call the one, you should also call the other one. I have to make all those connections by myself. That is where it all starts. At the moment, we are not a digital company. For 100%, we are not. I think the potential is huge. I think of a database of 100.000 records. 90% of these 100.000 records have not had a single touchpoint within the last three months. I guess 60% had only two touchpoints during the whole time they were in our database.

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**48 Is the full potential exploitation only the performance of low-value tasks by digital technologies, or is it also high-value tasks performed by digital technologies?**

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49 Also, high-value tasks. I will give you an example. Pre-Covid, I started with meetups. You categorize your clients. A low-value client is somebody you never interacted with, which means there is no potential. With high-value clients, I have made more revenue. They should be treated differently, but digitalization from a marketing perspective should be very tailored for that person, not general newsletters. For example, our company is hosting an event in which the client might be very interested, but that happens very manually. If I remember that I have to invite that manager, the manager will hopefully get a call from me. However, if I forget that, because I am a human

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error, in that case, the manager will never know about that. Maybe I will meet him in three months, and the event is mentioned while also asking why he was never invited. Digitalization should categorize your target group into high-level, mid-level, and low-level engaged customers. That is where marketing and sales have to work closely together. Marketing also has to create relevant content for specific target groups and is in charge of whether you keep the customers in the high-engaged box or transfer them to the low-engaged box. A 100% digitalization is not only about manual labor, but the better it is, the more you can use it on high-value tasks.

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50 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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51 Definitely a yes. I would be very disappointed if it would not be the case. At the moment, we are very much at the beginning of digital marketing and digital sales. I am 42 years old, and even when I was a student, you had the local newspaper to find a job. We had access to a very small pool of information, and jobs have been on-site, and again what we discussed in Covid and remote work, you had bigger access and a bigger target group from various information. Digital technology is just at the beginning, and not about recruitment, but in general, in the future, I can use my phone if I am interested, and that is where the consumer will have to commit. I can walk around the city, and my phone can inform me that I have just passed a place where the products you are interested in are available. For example, if I am interested in records and go to Hamburg, my phone tells me there is a record store five minutes away from my location. This is very much the end consumer, but I also see the bigger picture of marketing digitalization having more data available, can work more with these data and being a lot more tailored. You get tons of newsletters, and you have algorithms at the beginning of what might be possible, but I think many people's frustration is that online marketing is not tailored. Why do I get many adverts about new cars? I just bought a new car, and your algorithm picks up the searches I did four weeks ago. That task is done. We are at the beginning of both sides.

Hopefully, marketing and sales will become a lot more tailored. Furthermore, gaining GPA (global privacy assembly) is a very important topic on how we treat our data, but marketing can better tailor content once the consumer accepts cookies. Rather than accepting cookies, I, as a consumer, would be happy if a website would ask me whether I could specify in what product I am interested in so the company can apply a tailored approach.

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**RP\_08****1 Research Participant 8**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 I think the vast majority is still strongly human labor when we talk about marketing, and Digital platforms play rather a smaller and more analytical role. The vast majority is still on creative content, discussions purely on the human side. That is how I see it in terms of marketing since I am in the marketing department.

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**4 Is there anything you could add for sales, or would you like to focus on marketing due to your specialization in marketing?**

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5 No, we can also elaborate a bit. I would say that I am not a specialist and have never really worked 100 % in sales yet for sure. Since I am in a commercial function, I notice it a bit in terms of the work, how much they are working, and how they are working. When I compare marketing to sales, I would say sales can leverage more on digital footprints and enablers than marketing.

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**6 When focusing on marketing, I would like to dig deeper into human labor's tasks if you could take an employee of your team as an example. What is his or her daily business, and what is this employee performing every day concerning tasks?**

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7 So, I am approaching it in a two-folded way. On one side, I would always call it business as usual, meaning there are repetitive tasks to be done, and the content can be different, but the processes are similar. On that side, it is normally the case that, for example, in my department, we are getting a so-called toolbox since we are an affiliate and are not creating everything from scratch for all dimensions. We are taking this toolbox, if there is a theme, a toolbox release, review what is relevant for the German market, match it, and then see what is in the toolbox to be deployed, what makes sense concerning

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consumer insights, and also what of the imagined footprints setting from the German organization can be realized. I would say this is classically and constantly popping up. On the sales side, my department is thinking a bit more strategically and always analyzing the current status quo of what is currently running the business, where our consumers are to finally identify so-called business problems we want to solve, slash jobs to be done, to derive a long term perspective, to enable other teams to proceed on that path which will be defined in my strategy department.

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**8 Which tasks do digital technologies in marketing and sales perform nowadays?**

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9 I mentioned in the beginning that we have reports, especially for those aspects. To give you a more concrete example. One of the steams in my department takes care of so-called digital ads. Since it is digital, we can analyze ourselves to death, meaning we know exactly where the consumer is, how long he is on which site, what he clicks on, and where he looks at. Of these things, I strongly see getting better and better to get transparency of our consumer insights. If I compare it to other steams I lead, it is much more difficult, for example, "out of home." In the end, I can decide which billboard is on air and where to put it on air. However, I am heavily relying on market research data which is labor-intensive work, to get insights based on what resonates with consumers and is not. On digital fronts, I see that behavior immediately rather than getting consumer feedback.

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**10 Would you agree if I summarize that digital technologies enable and complement the human labor in your marketing department?**

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11 We can see it as a complementary element and tool kit to ease our process. Nevertheless, I would say it goes beyond. If I can compare my example, I prefer digital insights more because this is actual behavior versus what the consumers tell me. I always see, especially from the marketing perspective, that a consumer wants to get something or likes something, which is my stated consumer hypothesis. However, do they really invest 100 EUR in

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buying a product? Do they really do it? That I can see from the digital side. Because I see true behavior and can bring it back to where the consumer is. Moreover, this is data-wise fully automatic. It would take ages for a person to get all the numbers, and what I get from the agencies right now is super quick and real life.

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12 **How do you, if at all, quantify the tasks performed?**

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13 So I think I am still on duty, and I am now talking old school, but there are such big topics on my plate that there are rather strategically important goals that I need to achieve. I have two layers below me. I know my sub-team is taking care of the tools "confluence" and all supporting elements to maintain the correct prioritization, understand which tasks need to be done, and more. So from day-to-day work, I am not fully involved. Hence I have the luxury that I do not need such a high prioritization like where we stand and what is important. Since I have two clear goals for my team to achieve, I constantly work against them. I do not need high prioritization because everything I do in my department is either working on goals one or two.

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14 **You have, as a specific department head, two big KPIs. Would it help you to quantify your team's tasks even more, probably counting tasks, for example, employing fewer people since automatization is driving efficiency or anything similar? Would it help you, or are your department and KPIs and tasks far away from anything applicable compared to that?**

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15 No, I think you touched upon a very good point. I fully agree on a theoretical level. I would love to have something more automated, like a tool somebody uses or uses. We lack it right now because we are not using it; it is only partly used. I can give you a good example of Microsoft Teams. We are strongly working together with the market research department, and it intensively evolves that market research uses the Microsoft Teams channels to distribute their reports and analyses. Nevertheless, the reports have become so many that it is actually now a second inbox. I do not know what to prioritize. I elaborated with our market research department head that we will need a

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system of right prioritization. If his team publishes twenty reports, I do not have the time to go through twenty reports. He just cannot leave it alone by saying that it is posted. What has been created through Covid-19 is a second inbox. Moreover, it is not only a second inbox as Microsoft Teams has so many inboxes within itself that it gets very difficult to look through it and understand what is important and what is not. I am a big fan of what you have expressed and what you would profit from. Yes, I would profit, but the problem is that it needs to be applied with the full consequences. If Microsoft Teams, in my example, is fully applied, get rid of Microsoft Outlook. Fully apply Microsoft Teams. Here, you can prioritize and assign tasks, which is great. What we are doing right now is, especially for our company, that we always have multiple tools, not fully directly interlinked, while also having an unbalanced user level, meaning some are so-called power users who know every detail of every tool. However, for example, my line manager barely knows how to open a PowerPoint. There you have a big gap in between. You can try to live it, but I beg your pardon. When the organization's people cannot fully use it, you end up in workarounds and come back to the original processes. This hinders us from genuinely applying all the support we could potentially have.

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16 **Let me rephrase the question once again. How do you assess if your team is working with full efficiency and effectiveness?**

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17 Traditionally old school. I have my weekly call with my team and see the process behind what they have achieved so far, what projects come to life, and what takes longer.

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18 **A qualitative assessment?**

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19 Yes.

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20 **Would a quantitative assessment be something of interest to you? Maybe not to derive full consequences but to identify potential fields where no full efficiency potentials are probably exploited?**

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- 21 It is a bit of a chicken and egg question because, once again, in theory, yes, but in practice, no, because I know how long it takes to feed the system. In the end, it only lives by feeding. My team needs time which, in some cases, is quite a lot, to put all the status quo in and to achieve the tickmark to set up the whole project in a system like "confluence" or whatever. This takes quite some time. Since it is constantly changing, I would love to have it, honestly, but as I said, the consequence needs to be that everybody applies it, which is not currently the case.
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- 22 **How do you, if at all, determine tasks as high-value versus low-value tasks?**
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- 23 Business impact is very simple. What is your task? What do you think? What do you bring to the table?
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- 24 **Could you specify the business impact?**
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- 25 Business impact, market share, users or sales, and devices.
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- 26 **How do you identify it in the explicit comparison to low-value tasks? I understand that you try to quantify with clear business results, which are business impact. How do you identify something as a low-value task? How do you know if that is not leading to business impact?**
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- 27 For example, it would be an internal process we think we need to do, which has no added value. Because we think we need to please somebody, and that is, for me, a low-hanging fruit. Alternatively, if we think we already have a solution serving ninety percent, we want to optimize it by another two percent. The incremental add-on is, for me, not significant. So, if I have a thing that runs not on a hundred percent but 90 percent and my team starts to talk about optimizing it by another two percent, I would ask for the effort to be put behind it versus a new project which would potentially achieve 10 or 20 percent of progress with the same effort.
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28 **To what extent do you eliminate low-value tasks and foster high-value tasks?**

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29 At least, and I hope my team can support that, if I spot something with a low value, I stop it immediately. I would ask you not to put any more effort into it. I see the point, and if you want to proceed, but potentially later, when we are in the luxury position, everything works very smoothly. We can optimize the last two, three, or four percent. We can pick that up and bring it out of the drawer, but for the time being in the organization, in the lifetime of our product, and in how we are performing in the market, it is a different beast. We need to focus on the big-ticket items.

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30 **You also presented the possibility of a qualitative assessment in your team's daily or weekly meetings. Is there another way or process for identifying tasks and labeling them as low- or high-value tasks?**

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31 In the end, it starts with how I brief my team on new projects and daily business. Defining the final KPIs is key. If I define my KPIs right, arguing that these are your KPIs supposed to be achieved, I need to create the respective projects. Afterward, we can talk about the numbers and contributions. Nevertheless, saying I want you to improve is not concrete enough for me. There would be discussions. Try to quantify it. If you cannot quantify it, it brings me an argument beyond simply saying it feels good and is great. Especially in marketing, not everything can be quantified. For example, concerning out-of-home media, it is sometimes difficult. Convince me that it adds value.

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32 **What is the general impact of digital technologies on tasks and human labor?**

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33 I at least observe that technology has become easier to replace consumer interaction. If I am thinking of renting a car, you are taking off the facade that you need a person talking to users, a very complicated system. Nowadays, booking flights and getting a cap without paying is easy, as everything is

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already saved. It is the equation, at least how I see it: you give away a bit of freedom of your data, and, in return, you get a nice experience. You do not need to take care of anything. Everything is done with a click, more or less. So, I see that coming more and more, especially the face-to-face engagement role of human labor, will play a less and less important role over the years.

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34 **Your main aspect of argumentation is that the general impact of digital technologies on task and human labor is transferring the initial responsibilities of an employee towards the consumer to free up resources internally to be more efficient and hopefully more effective in terms of quality and business impact. Is that summarized correctly?**

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35 Adding to the element of the user experience from the consumer's side. Just the example of Uber. It is a pain point derived from the consumer journey. You need to hire a taxi, the taxi arrives, you need to tell where to go, and you need to pay. Now you can type everything very quickly into your mobile phone. Where do you want to go, you immediately see how long it would take, and you do not need to pay since the transaction happened via phone and was done. There is no interaction needed anymore. It is easy because I do not need to pay attention to the route. It says left or right if the cab driver does not know where to go. It is also for cab drivers very easy. Now, they know where to go. They can plan the route accordingly. I know when I will arrive because I can enter the data accordingly. It comes with much ease for the consumer. Because you were now just focusing on the business, it is also for the consumer. There is beauty in it.

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36 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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37 I think the most obvious one is actually when physical labor is involved. There is technology that can contribute by easing the processes, which also becomes dangerous, and a machine can be in place to create an easier and smoother process. Within the last five years, there was a big step in artificial intelligence because computer power got massively better. Now, performing

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tasks that are not just physically driven are outperformed by computers, but you need smart people to program them. You need to feed it with data to make a prediction. There is more room for replacing, but complementing is especially for labor, where more brainpower is required.

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**38 How far do you assess human labor skills to perform certain tasks, especially digital ones?**

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39 I think data can kill you. Your last question is whether anybody can use data or artificial intelligence to enhance their work style. Especially with the brainpower I mentioned earlier if you use tools as complementary to get more insights, a better prediction, and more. That is good, and that is just getting you closer to something. However, at the same time, if you give that support to somebody who is not an expert and he cannot read it correctly, I think that is killing by data. It is a system overload; you get too many data points and interpretations, even with artificial intelligence or digitalization. Let us look back to my topic, you need intelligent people to feed it, but you not only need to feed it, but you also need to understand it truly. What is your technology, what can it do, and what not? You need to understand it to also fully trust it fully.

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**40 Once defined and once you understood what you just elaborated. Again, how do you assess the skills? What is the category, and what is the requirement of the people you would probably need? What is an expert? What is the best possible way to identify this person as an expert?**

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41 I think this is a very broad question. It depends on what level of digitalization we are talking about. When we are talking broadly about digital technology, it depends on maturity. For example, if I already take a pretty advanced technology, such as computer techniques and simple laptop maintenance. I need a specialist. I need to educate him that he can truly work it, explain when it is broken, tell him how to fix it, and all the stuff. Nevertheless, the same guy will be lost if I take something else, for example, autonomous driving. In the end, different skills are needed because the technology has

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not yet matured. So, I need somebody who is visionary and starts to educate the technology. That is what I meant with input like intelligence people that we need in this topic to test, learn, and see if generated insights can eventually end in automatizations. Moreover, I can bring it to stock market apps or whatsoever. It is always the same logic. There are easy functions that are running already now. They are super easy to do. I can give that to a less skilled person because it has already proven to work. I know there are certain hick-ups that he or she can counteract. If I take technology that is not fully embarked and crafted, I need somebody scouting that technology.

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**42 What knowledge and skills do marketing and sales professionals need about digital technologies?**

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43 Honestly and I must say our company is not very advanced yet. For me, the aspect of high-skilled professionals concerning digital technologies is not as strong as I could see in other companies. Nevertheless, what we are looking for when we have a job opening and a certain set of knowledge about digital technologies is needed, I would first define whether it is a business-as-usual aspect or not, meaning project management skills, highly complex, multiple facets, multiple departments involved. If that is so complicated nowadays that I need somebody who is truly trained in digital technologies, using Jira, for example, and using all the different tools, technologies, data, and more, I will look for a person who has worked with these tools in the past. Certifications would be great. However, if I want to go beyond that, somebody is applying new ways of working. I must say that these are currently not the skills at least I am looking for because, as said in one of the earlier questions, it needs to be lived throughout the organization. Hiring one person who approaches things differently will not be successful.

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**44 Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**

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45 Let me take my digital media department as an example. Here, everything is happening digitally. We have many trackings to analyze how the consumer

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behaves, what he is clicking on, how long he is on websites, and more. This is our backbone in optimizing what to do next with our campaigns or something else. We do not compare different technologies to each other, e.g., going with the technology in one direction and comparing it to the next. However, we are focusing on content as such. Once we have a technology and a baseline for infrastructure, we change contents and apply A/B testing to see what is more efficient. Since we now have such forms, especially in digital media, my team's benefit is the market speed. I put something on air and will have the first results by the night's end. To see and react very quickly and potentially even react the next day by further using the better content and neglecting the worse.

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46 **I would categorize that as the consumer perspective. Also, ask for the internal perspective of whether your team is working efficiently. Is there any calculation that you apply?**

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47 I must say no. There is nothing in place. We are an organization focusing on creating and deploying products until the launch in the field without looking back afterward on the daily business because we keep on running and developing something new. We are pretty weak, and I think there are many potentials to optimize and get higher efficiencies.

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48 **If you could ask for a model, what would be the best possible model for your company to apply such measurements if there is such a high potential?**

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49 If I look into the internal processes and what role technology has, it is the efficiency of time spent. I want to end up with a team that does not work 40 hours per week, and I would love to work only 30 hours per week but with the same output. They should work much more efficiently and only on high-value tasks, as you defined, while cutting all the unnecessary initiatives that cost high energy without output.

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50 **Focusing only on high-value tasks. Could you think about any holistic model for the whole company to identify low-value tasks?**

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51 I think any department head must identify a low-value task that does not add any value, such as the visualization of what your team is doing, where the focus is, and what energy is spent. Nevertheless, I must say that my supervisor does not care. He gets the direction, and it is my duty to deliver against that. I would not see it as a higher management decision to go through excel or, in general, of the workload and the project distribution throughout the organization.

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52 **How far, do you think, would it help you to not only focus on your two main KPIs but also know that your team could be one-third more efficient if you would reach out for digital technology while probably also cutting high-value tasks because they are overtaken by digital technology? How far do you think that would help you drive your business if you had these quantities of internal team performance?**

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53 It is a certain transformation, and I think the commitment would be pretty low. It is a process that eventually takes over, but right now, we are not there yet that high-value aspects will be taken over by digitalization, as otherwise, there would be many companies already there. Our company is not known for the most innovative working methods, and I think it still takes some time to take over high-value aspects. We need to define what is needed from humans and what from technologies. We all try to drive for more efficiencies in terms of how we work. So I could imagine that eventually, we are not there, but any technology needs to be fed data so the technology can read data, interpret it, and ultimately provide predictions. That is what the human brain and the humans are trying to do, trying to predict, what is striking, what is working, what is working internally, and if the technology can complement that and eventually take over, it would be great.

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54 **How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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55 Yes, I touched it earlier. Technology can be applied and work great, but if it is not lived, it will fail. The full performance potential can be achieved if there is a commitment throughout the organization. If everybody sighs when there is a new direction and as of tomorrow, we forget the old system, which we currently have with a new system, it will not work. Is it better? We do not know yet. Most likely, it is worse in the first weeks and months because there will be bugs. However, eventually, it is becoming better. It is fully internal until everything is unified under one technology aspect and how we internally work. That is the good part. If everybody commits throughout the organization, you give it a chance, and you can work with it. However, they will always be workarounds if you do not have the commitment from the senior management and the organization. Eventually, you are creating workarounds that are not exploiting the full performance potential, and it sometimes creates even more work.

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56 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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57 I think it is once again a two-folded aspect. First, I see technology as the focus. Over the last few years, digital technologies are developing immensely, and there have been many enhancements. You can see that something which took ten years, in the beginning takes now only half a year or even less. I think this is one aspect. Technology, the capability of our computers, and more are immensely increasing and developing. The second part is human nature; you will have the next generation in ten years. A generation that fully grew up in the digital surrounding. Moreover, those who have been in the company for a longer time and those who have been longer in the working set will be dinosaurs, and nobody will be left who did not grow up without digitalization. I now see that my previous supervisors have been at school and university without a computer. They learned it in the course of their working environments, and if I look at you and myself, we grew up with this. So the infinity of technology is a vastly different one. If something is new, we jump on it and understand it quicker, and the end-user needs to be

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capable of using it. This is the biggest step that will happen over the next seven to ten years. It is a quicker step because the end-user is more capable of using it.

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58 **Are you saying that the performance of a marketing and sales team is significantly increasing over the next ten years because the employment of many people that did not grow up with digital technologies is probably not given anymore? The consumer is experiencing the same, and the people who did not grow up with technology are not, at least not to the same extent, left in the economic environment. Do you agree?**

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59 Yes. I can also summarize it differently. Technology is actually faster than we are. The problem is the end-user. It is us. We need time to adapt. We need time to understand it fully. In the example of Tesla and any other example of technologies, it is how we are programming and developing the technology. Nevertheless, the technology as such can perform it. We cannot just simply crack it. So we are lacking behind. It is not technology.

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**RP\_09****1 Research Participant 9**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 I think there are plenty of things still managed by human labor and will always be from my perspective. I will guide you a little bit through a process of how we live at our company in which you can simply see where human labor is needed. It all starts with our brands, our biggest assets, next to our employees. People in marketing need to understand what the strategy and the situation of the brand are. They need to understand the consumer and the shopper so they really understand who is out there and the targets. The beginning of the process is understanding our brands' situation, which is all guided by people. Digitalization supports us a lot because, in the situational assessment which we always do at the beginning of the process, digitalization helps us a lot, may it be in market research, may it be in shopper understanding, may it be in really understanding the brand assets of how they will perform or would perform. This is always guided by human beings supported by digital tools and digitalization. When you now move along the purchase chain after we understand the situation of the brand and the situation of the consumers and the shoppers, understanding which products we need to launch, which price points we need to do, which promotion activities we do, all of this is done by human beings by our colleagues mainly in marketing supported by sales but also finance. Come to conclusions with our brands, deciding which brand we want to support and which investments, again here digitalization supports us, such as investing in media, how to invest, where to invest, and also going further, which products need to be launched. At some point in the whole journey, it is handed over to sales. The sales team, my team, understand that we have this package for the brand, we take it, we think through how we can sell it to our customers like Rewe, for example, can sell it to the end consumer ideally, while my team is doing the planning, getting the assets, getting the tools, getting the media to invest and finally planning it in our systems, also

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supported by digitalization. However, the whole planning process needs to be done by the key account managers. It is taken to the customers where we sell it in further conversation with our buyers. Here, human beings are very important, and again, digitalization is supported across the whole purchase chain, but, in the end, it is the human being selling the product to the buyer.

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4 **Which tasks do digital technologies in marketing and sales perform nowadays?**

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5 Across the journey, we have plenty of support from digital tools. As said, a key piece is market research, really understanding the market. We get much data that we get by asking the consumer or the support of our partners, such as Google. We have a so-called "pack stack," a database where much data is stored, and this data is from all activities we have done in the past. Every single brand initiative, whether a TV campaign, digital activation, or search activation, is stored in a "pack stack," the digital core piece of our work. We get the insights out of this data to understand which campaign performed well, what the consumers are looking for, and what are trends in the market where we need to focus more. How can we be more efficient in terms of media buying or of activities we perform in the marketplace, and also, in the end, which products do we launch next? All this data is collected in this "pack stack," which is the key piece of our analysis which is just one example. Across the journey, when we go to the end and sell it to the customers, we also have tools from providers like Nielsen or GfK, which data we also put in our tools to understand how much value potential a certain customer has in certain categories. One example is that most customers still have potential in a couple of toothpaste areas. We sell, for example, toothpaste and see, based on the data, that there is value potential in terms of up-trading consumers to higher price points, and therefore we need to understand how high the value is with which the customer could live. We finally see whether the product is perfectly set up to live this value if the product is listed. Also, much data is used, and artificial intelligence is used to understand how this story can work from end to end.

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**6 How do you, if at all, quantify the tasks performed?**

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- 7 That is a very good question. In terms of human labor, I think it is spread very widely. On the one hand side, we are in sales. We can be measured pretty easily. The more you get to the selling perspective, you can measure the tasks of an employee. For example, in the field force, we measure everything done and what is legally allowed to measure. How many visits does a sales representative perform per day? We have a target of 5.8 visits per day, and we can understand how many customers are physically visited. That is measurable. We can also measure, for example, the share of the shelf. Our products should have a particular share on the shelf in terms of product facings which we can also evaluate within the system. The sales representative takes a picture, and the system automatically counts the work. We take a picture before and afterward to understand the impact of being in the store. There are a few examples in which we are good at tracking how efficient people are and can set targets and set data, but also agencies that provide us a couple of data points to understand whether we are already set up for success or have to increase to get better. Coming to the internal sales force, for example, my key account managers are not measured about their work efficiency. They are limited to a certain number of hours they are allowed to work; in this time frame, we measure them on their targets. I am mainly measured on sales targets and customer feedback targets, but the key is whether we achieve our sales targets, and this is also how I measure my employees in the sales team. I do not want to know what my people do the whole day. Whatever they do, they must deliver against the target mainly driven by sales. Therefore, it is not about whether an employee is efficient along the journey but whether he delivers against the targets. If a target is not achieved, my team and I go to the next layer to see what they do all day, and if we need to train them to become more efficient and show them how it works better, the sales department is measured on targets. In other departments, it is pretty similar. If we go, for example, into marketing, we have a couple of areas like a brand team which is mainly measured by market share performance. Do they gain market share, or do they lose market share? Are you better than your competitors in a certain market share environment?
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This is the key criterion next to also internal sales. They also have our net sales as a target; we measure them on target achievement but are not measuring them by efficiency and by doing a test in a certain timeframe. What we then take a look at, before I come to another point, is that there are other departments, so-called support functions like supply chain, finance, and more, who are tracked based on the overall target which we all need to achieve and how is my feedback from sales if I get the support that I need. It gets more tricky the fewer people are connected to sales to track the performance. We also take a lot of overarchingly, which I mentioned earlier. We clearly track how much net sales each employee impacts if you ask for efficiency. My team consists of around 90 people. I deliver a certain number of net sales. In my instance, it is about 200 billion, and it is easily measurable how much net sales every single employee delivers on average. I am compared with other teams in Germany, Switzerland, and globally. We are measuring the teams; one single employee is, for example, delivering two million net sales, and in Italy, one employee is delivering 1.5 million net sales. Therefore it seems like Germany is more efficient. We need to understand where it came from and do we need to adjust. This is how it works from the overarching perspective.

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8 **How do you, if at all, determine tasks as high-value versus low-value tasks?**

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9 This is very tricky and very tough. I think we go away from human labor. We are very good at understanding efficiencies. Maybe the best company in the world is Google, and whenever we have a process with Google, we understand how efficient certain web banners and search criteria are. Therefore, we have click-through rates and several more criteria to measure whether we are efficient or not. This is an example of an area where you can easily judge whether you are efficient. You invest certain monetary value and get a certain outcome that KPIs can track. For human labor, it is very tricky. You can not understand to the last euro how efficient people are and if you are really on the right track, but I think it is always a matter of comparison. Ultimately, it will always come back in marketing and sales

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from my perspective to overarching targets and if you can achieve those. If yes, fine. If not, we need to understand how to become more efficient to achieve the target, or was the target too high? Nevertheless, if we achieve it with more efficient input, it would be a reduction in employees. We are not set up for measuring each individual's efficiencies. In the end, we are talking a lot about sales and numbers. However, my key question is if a company lives many people's values and if we should judge every employee on KPIs and efficiencies. Is there maybe something more valuable? There is a human being and a value, no matter if KPIs are fully achieved or not.

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**10 To what extent do you eliminate low-value tasks and foster high-value tasks?**

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11 We try to do as much as possible, which is a very good point. In the ideal world, human labor focuses on quality, like talking to customers, understanding situations, being creative, and thinking about new ideas. Looking at sales, lock yourself away, go outside to the stores, understand the trends and drive qualitative conversations to create new ideas in sales. Machines and systems do the quantitative piece. I think today. Unfortunately, there are still a lot of manual data pieces that could be automated but are not. We have many systems in place in our company, like SAP and Workday. There are plenty of things you could work with, but much human interaction is still needed. One example is our planning process. My team is currently doing in-depth analysis plans for every single customer, every SKU (stock-keeping units), and every single volume per month, and a system could easily do this task because they understand the orders per month or from the last years. They could also understand the trend in the following years and outline the value or sell-in in the following months, but unfortunately, in our company, the systems are not that advanced yet, and we do not trust them to the last extent. Therefore, still, much human interaction is needed. In the end, I would say that even 70-80% of my team's time is used for these interactions where systems could be more efficient, but I think the reality is still that we are not there yet.

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12 **What is the general impact of digital technologies on tasks and human labor?**

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13 I think the general impact is already big but by far not there where it will be in the following years. Suppose I thought from a broader perspective when I started my life, like how people traveled five or ten years ago versus how we are traveling today with every mobility impact, whether car sharing or electric scooters. In the past, there was either a bicycle or a taxi, and we are now in a state where everything has fully changed. Also, food delivery is an example of where technology made a difference. We are still at the beginning, and my true belief is that people who are good at only one thing will not be successful. Very smart people should not focus on doing only one thing they are very good at, but people who will be very successful in the future are the ones who can think broadly and can easily adapt to new situations. My answer on how technology will change or impact the world is that it is very big already, but there is more to come.

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14 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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15 As always, the best answer is that it depends. It varies a lot. Suppose I look at our production sides. We have very automated production sides in Germany. For example, our toothbrushes are produced in Cologne, which is fully automated. One or two people take care of the machinery, but everything else, like the millions of toothbrushes, is just running through. On the other hand, we also have toothbrushes that are more tricky like battery-driven, where you have to plug in the batteries manufactured in China because more human labor is needed. I think this is a good example of how it can vary. It is the same product, but in terms of the specifics, it is sometimes better and cheaper to do it in Germany, and sometimes it is better and cheaper to do it in China, neglecting sustainability for the moment. This is an example that we will see across the board. I genuinely believe there will always be a bigger action by human beings in marketing and sales because there are a lot of specifics and experiences which we need, and there is also

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much interaction with customers. This will always be there. The ideal scenario is that the work is made much easier with tools, databases, and digital resources to support human labor.

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16 **How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**

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17 This changed a lot during the last few years. A skill set that was in the past needed is connected with customers, such as selling and negotiating, but now it is more data-driven. We base every single decision on data. Having a good skill set, being smart, connecting the dots, and using data to make decisions is becoming much more important. Simple answer: in the past, it was more people-driven such as connecting with people, and today it is more data-driven such as understanding and analyzing data and finally making decisions. That will increase in importance in the future.

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**RP\_10****1 Research Participant 10**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 I want to separate the topic of marketing and sales because these are two areas for me. For me, marketing is mainly directed inwards or preparatory. I prepare content, while sales tend to use this prepared content and thus also make sales. So I would like to have that split into two. Sales has various tasks, which are all based on the customer. In our company, promotion is about bringing the technical topic we have to the customer and generating leads in the process. These leads are converted into opportunities and the best way to persuade the customer to purchase. In comparison to traditional sales and the sales representative, who looks after the customer as a whole, we look in promotion after the customer for a certain topic and accompany the sales process. A classic sales role to also sort the two tasks. If I now think of the sales tasks, holistically speaking, the topic is customer care, contact search and lead generation, trade fair visits, and thus product presentations, evaluations of the current unit numbers, and using the marketing documents to evaluate the current market situation.

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**4 You brought up the topic of lead processing. What tasks do I perform when I process a lead?**

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5 The typical process for us at the moment is that a lead is sent to us via the CRM system, e.g., from the trade fair. That means the first task, for example, is to analyze which leads are relevant in my region. Then the lead is analyzed to see what kind of customer it is, what was asked for, and which topic is the right assignment for the analysis, a kind of control of the already assigned leads. And then, topics already have to be prepared, e.g., prepare content in the lead query and get in touch with the customer. Getting in touch with the customer means first calling or writing a mail, depending on what is necessary to get in touch. Then, once the customer contact has been created, the products are introduced, and the lead's questions are answered. This is

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the first part. If it is said to be a qualified lead, e.g., the customer is interested in one of the products, this generated lead is converted into an opportunity, e.g., from a technical point of view in the CRM system. Subsequently, information such as the number of products purchased, when the products were purchased, what activities took place, and more, are stored.

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6 **Which tasks do digital technologies in marketing and sales perform nowadays?**

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7 Certain information is stored in the CRM system regarding data, sorting, data search, and more, so that is stored in the data record, which is only a little automatic and data-based in the lead generation. For example, a lead is generated directly if the customer has looked at two or three things at an event. That would be, for example, a task in the context of lead generation, which works partially automatically, but not yet consistently.

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8 **Are other digital technologies already taking over tasks in the day-to-day marketing and sales business, perhaps also in your specific area of expertise?**

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9 Are there any examples of this?

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10 **For example, the automated sorting of data.**

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11 Yes, but only if humans already feed everything. The preparation and also qualification of the data happen in advance, of course. An example of this was the preparation of data from participants at events. With online events, tracking customer contacts through participation is much easier, and this preparation for this is done centrally, for example. However, this preparation is not generally automated but must be reinterpreted for each event using Excel extracts to manually qualify and systematize this data and also enrich it with additional information, such as at which other events the customer attended. This qualified data is saved specifically via the system as a lead.

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- 12 **Are there any related examples of digital technologies that you or your department still work with?**
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- 13 We have very good transparency when it comes to sales figures. Which customer buys which products in which region, and what quantities of products are sold? In this period, the preparation and evaluation of the data are done by machines without further human action. When this data gets back to Marketing Intelligence, everything is automated.
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- 14 **How do you, if at all, quantify the tasks performed?**
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- 15 No, not at all.
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- 16 **Could you imagine in any way counting the tasks in marketing and sales? So, what tasks does an employee perform? What are the employees doing? How can I count those tasks? Would that make sense in some way?**
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- 17 It would certainly make sense to get certain transparency and understand what effort must be made until a customer is convinced. Also, to put this in relation and to check which tasks are relevant or have the greatest impact, not so much in terms of efficiency, but in terms of impact. Does it make more sense for the sales department to visit the customer and have an on-site appointment? Am I more likely to have a sale than to have an automated email generated or a call to the customer? These would be the individual tasks I have to look at, what time, work, and effort are behind them, and what comes in return. If you had a corresponding database, it would, of course, be interesting to find out where the greatest potential lies.
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- 18 **How do you, if at all, determine tasks as high-value versus low-value tasks?**
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- 19 All tasks that are directed outward toward the customer are highly value-adding. Everywhere where there is direct and personal customer contact.
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Everything directed inwards, such as evaluations, analyses, and follow-ups, are low value-added tasks for me.

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20 **To what extent do you determine these tasks? Is that collected also to see what the ratio is? Am I particularly value-adding now, or am I less value-adding?**

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21 There is no analysis of factual numbers, so there is no quantitative survey. As a manager, it is, of course, my task to enable my employees to carry out the tasks that I consider to be more qualified and to do the other tasks as little as possible. I can control this, for example, through topics such as automated systems or a PowerPoint slide that is not created each time but is executed by the system in a predefined manner. These are measures that I can implement, but no analysis confirms this.

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22 **In summary, is it a subjective determination and control rather than a quantitative or objective measurement?**

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23 Yes.

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24 **To what extent do you eliminate low-value tasks and foster high-value tasks?**

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25 This takes place on an ongoing basis. This is an incremental process with feedback loops in which we check whether these topics are still useful, whether they are still needed, or whether the whole thing can be optimized. That takes place at non-regular intervals to check information based on subjective premises.

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26 **Could you imagine applying a model that evaluates exactly these two blocks of questions? High-value versus low-value and human labor versus digital tasks and quantifying the tasks. To what extent could that increase the fundamental performance in your department?**

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- 27 That is certainly bureaucracy. I want to split my answer in two. First, there are background reasons because I see breaking these tasks down so far and analyzing them as problematic. The task is never the same, and the customer is always different. A presentation for a customer can take half an hour for one customer and three hours for another because it is a complex topic. There can be other dimensions to it. Not every task always has the same length. The other problem I see is from a personal or data protection point of view. It is probably not allowed on the part of works councils to quantify and measure the work of employees to that extent, if it can be measured at all.
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- 28 **I want to go back to the point of the customer presentation. A presentation can take 30 minutes, and a presentation with the same or slightly modified content can also take 3 hours with another customer. If I would weight this task with the factor of time, this aspect would be reflected in the daily workload of an employee. Would there be better measurability under this aspect?**
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- 29 By weighting, you would only get the average in the end. Or do I not quite understand the background of the weighting?
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- 30 **If the same tasks are weighted with the factor of time, I generate, on the one hand, the average, and with some customers for the next year already guess that the conversation will take longer. However, maybe it is not the individual customer, but maybe this customer has a certain characteristic, such as being a large corporation. Thus, maybe you could have company or customer characteristics, which give a pattern in quantification because of this weighting.**
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- 31 I think many factors would have to be considered here, but they depend less on the company and more on the counterpart. Sales is still a people business at the moment, and the person facing you either lets himself be sprinkled and is satisfied after half an hour, goes into the discussion with you for three hours, or because he is interested and asks questions for three hours. I think
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that depends less on the organization than on the personal sensitivities of the customers.

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32 **Would you say personal sensitivities can be measured or quantified in any way? Or are we moving into a far too vague field to measure?**

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33 Because of each person's uniqueness and the situation in each sales conversation, staying with the example is too vague. I think it only makes sense to work with average values. On average, across all laws of large numbers, it fits again. You can assume that we have a short appointment of half an hour up to a full-day workshop, and on average, it fits again. Maybe there are also ways to do a rough quantification or classification. An initial visit involves a technical explanation and a clear workshop. I could imagine this outline.

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34 **You divided the tasks into sub-tasks and main tasks, such as doing a preliminary interview. Prefeeling before the actual task is performed. Do you have any examples where the actual marketing and/or sales task is accompanied or prepared with other tasks?**

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35 We accompany the entire preparation of a customer visit, of course, the search for the appropriate content, the appropriate content from the existing marketing material, or, based on this, we adapt the marketing materials to be suitable for the specific customer. Further accompanying is the trip to the customer, which is partly completely substituted if I say, for example, I make an online appointment. These would be accompanying internal topics, or if an appointment takes place on our premises, we book rooms, write invitations to the customers, prepare follow-ups, reports, report formulations, supplement the data, data preparation in the CMS system, and more.

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36 **What is the general impact of digital technologies on tasks and human labor?**

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37 That is a very general question. Holistically, it gives us a massive boost in efficiency. Both, in efficiency and effectiveness of how we do our job in sales. If you leap and think back maybe thirty years. Sales employees would drive into the office in the morning, look at what was in their mailbox, plan the route for the week, drive it off, visit only the customers they had planned and not be able to do anything else during that time, and drive back to the office without being available during that time. Compared to how it is today, we are available everywhere, we can access the information we need everywhere, and we can also make spontaneous customer appointments. That is a massive increase that we are seeing, and it will continue. I think the pandemic has now shown a little about what possibilities there are, what issues arise from this, or what potentials can be exploited, such as time. Just the topic of reducing travel times was also from the long history of an attempt to get more digital customer appointments before Covid-19 and was extremely accelerated by this. This is related to the fact that there is now customer acceptance. Now the digital possibilities have still to be accepted on the customer side. That is one of the big hurdles. Moreover, extreme events like last year naturally offer the opportunity to gain greater acceptance for such topics for digital technologies.

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38 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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39 Replacing people with digital technologies in sales is not an option in my department because it conflicts with the growth goals we have in sales. That is, anything I can bring in efficiency-wise will allow me to have increased potential and allow me also to have greater growth in sales. I would not say that I am trying to mechanically replace the labor of my employees and thereby be able to deliver the same performance, but rather to create free space such as the topic of higher priority or higher value tasks.

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40 **This sounds very much like the push environment you are describing, meaning your workforce is working physically. There are growth targets for which you need human workers. I now take this push environment**

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**and transform it into a pull environment. I create an incentive and effect with customers to pull. In other words, we put an area that is time-consuming and does not necessarily lead to a sale. From push to pull. Would that be conceivable?**

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41 This transformation from push to pull is already taking place in general. On the one hand, it is a generational issue. How do people work in their private lives in a private environment? In the same way that many things are procured via digital marketplaces in private life, whereas in the past, you might have had to go to the mall and get advice. Now that happens more with the pull effect I described. I inform myself about test reports available online and then purchase products myself. As a digital marketplace, I save labor, and that push into the market. That is also generally the case for us. We are also working on making as much information as possible online from the headquarters' point of view. The focus here at the moment is on mapping the customer journey completely digitally. The biggest task is to use the pull effect that has already been created to generate the highest possible conversion rate for the customer. In terms of the question, yes, it is planned and desired and also fits a certain area of the customer clientele. Especially either new customers or small customers who may not have personal contact. To a certain extent, also existing customers who only inform themselves in advance. This takes place with certain customers in our business, not only in pure product sales but in the solution sales we are in. I cannot get around to this final recording of the customer requirements, what is to know about the product features, and how to handle this humanely, certain specialist know-how, which is what you have to bring with you here.

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42 **How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**

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43 Basically, and also in the future, the ability to analyze complex data structures and information even more than before, driven by the interconnectedness of the various topics. The interconnectedness of the various information and topics that I collect about a customer and integrate

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this basic information about the customer into the CRM system, including my own experiences and information that I can collect about the customer via other social media channels. Analyzing and structuring the data and information has to be a strength, which will be or needs to be further developed. Understanding the workings of the digital tools that are available. The willingness to use and drive these as well. Also, the willingness to perhaps go beyond personal reactive behavior and into virtual pro-active behavior.

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#### 44 **What tools do you use?**

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45 We are implementing several tools right now for sales, which allow us to provide, in the true sense of a "High-Spot," online accounts and send them to existing or known customers. As opposed to just putting stuff in an email. Nevertheless, that gives me the ability to draw conclusions. When did the customer open which files? For example, on the one side, I have the information about slides shown, and on the other, more in-depth information, such as application proposals up to the offer. Then it goes into the analysis to say when is the right time to call the customer to ask about the offer and the possible order. These are the possibilities that "High-Spot" offers. With transparency for marketing, it is also analyzed which of the provided marketing content is used frequently and less frequently to optimize the content in the files. That is one thing. The other thing we are currently introducing for this digital push-pull effect is the pair factory, used in the so-called marketing enablement to address previously unknown customers. It allows getting to a micro-site, using these micro-sites, and depositing content that always offers more information on the topic to the person who has searched for a certain term. A content, which I deposit in advance, and over which the customer also comes up to a certain point, at which this still unknown customer must deposit his data, e.g., to receive further information, e.g., for a white paper. The task at the moment is to use these new tools and systems to integrate them into our sales journey. So what does the sales journey look like for this? Starting from building a track, using it within my social media account, and tracking the customers who clicked

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on it. Using it for lead generation and customizing the customer profiles at the same time. That is the whole process from front to back all the way to sales.

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**46 Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**

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47 Occasionally, but not generally. In some cases, it is possible to conduct certain surveys for specific projects through interviews or work observations, but these must be coordinated with the works council. That is the topic I touched on earlier. From that point of view, there is nothing general. One example of this was the introduction of tablets in sales and their use, what efficiency surveys there are. For this, there were interviews before and after the use with a certain clientele of users, but also just to carry out the effect of before and after. The same applies to the topic of online visits to the customer. Customer on-site visits were a high-value task before the introduction of digital communication tools, such as MS teams or the like. That was also done sporadically in samples. However, there is no general measure for that because it is not permitted by the works council either. Nevertheless, when you talk to people about whether customer visits are possible, they also confirm that they used only to manage three customer appointments a week. Today, they can sometimes manage three customer appointments a day because these can take place differently. The travel time is eliminated. In the past, it took two hours to get to a customer appointment, three hours to meet the customer, and two hours to drive back, and the working day was over. Here, the form of the appointments is changing in some cases. Now the appointments are one and a half to two hours long. If there is no more travel time, I can, of course, make three appointments a day in principle if you only consider the task of the appointment. Of course, there is also the preparatory work and the follow-up work. The travel time alone cannot replace everything, of course, since the preparatory and follow-up tasks must also be included in the calculation.

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48 **How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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49 As far as possible and sensible, existing processes are digitized. This always makes sense when personal contact is unnecessary and does not yield the desired results. Moreover, it can also be easily transferred without increasing administrative effort. In the direct sense, it is individual tasks that I can, of course, perform through certain administrative systems, such as a unit count analysis, ramp-up analysis, or market figure analysis, which previously still had to be picked up manually in some cases, was manually cast in foil and is now used via ready-made tableaus, for example.

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50 **Does this speed up the creation of the evaluation or increase the quality? What is the driving effect?**

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51 Higher quality.

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52 **Why is speed not the driving factor? I am referring to non-value-added activities because, according to you, they are inward-looking. Is that the right train of thought?**

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53 Yes, in principle, it is because the increased speed means I do not have to do anything more. That is one thing. The quality, on the other hand, creates a standardized procedure, and I do not have to do things myself. They are already prefabricated, and I have significantly higher transparency, which is not made up. It is purely the bare numbers.

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54 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**

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55 Yes, I think so. I believe that it will increase dramatically. On the one hand, due to the pull effect and the fact that in ten years, we will already be much further ahead with the possibilities of information processing that we can

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make available to pull customers. In other words, we will have technologies at our disposal that will enable us to provide customers with much more information in advance before any personal contact is necessary. Furthermore, it does not even have to be a protected system, which would certainly also be a driver, but where is it not currently? Therefore, I think that the systems themselves will be optimized to a great extent, that the data basis in all companies will become much better, and that decisions can be made much faster, which will make it possible to become much more performant. To be able to use workflows more sensibly because, as we already see today, I no longer look personally at each customer but do the whole thing virtually. So the whole thing will take place even more via digital or virtual contacts because customers will accept it more. Furthermore, we can inform the customers even better in advance. For example, I can use chatbots to analyze or pre-filter and qualify many things until I get to the actual conversation. In the best case, I can already guide the customer in the right direction through targeted questions or question sequences so that I can lead them directly to the right products without any contact having to take place at all.

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56 **The preparation of information is getting better, and the data is getting better. Everything is strongly quality-oriented. To what extent can an increase in efficiency drive this increase in performance because digital technologies are faster than humans?**

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57 It is mutually dependent. Quality cannot be considered independently of quantity in terms of the time factor. What is eliminated are certain tasks that I have to do manually today. Due to the increasing quality, this data is more transparent, and I can concentrate on the essentials, which must ultimately be necessary to close the sale. The tasks are changing because I can scan and evaluate a qualified list of leads with 100 leads faster than with 100 people individually and physically qualify these leads train by train. That is why the quality of the systems virtually conditions the performance in time or the performance increase.

**RP\_11****1 Research Participant 11**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 It depends. Looking in the field of software and cloud service sales, which I am working in, a major part of marketing and sales, especially in terms of marketing, is to go outside, create brand awareness, make webinars, fill in LinkedIn, basically all social content. From a sales perspective, it is typical key account management. Looking at our branch, we mainly deal with companies with a revenue of over two billion dollars per year, which means that we have a named account set where a salesperson provides a service of about ten to fifteen pounds. The main tasks provided by human labor are interaction, building pipelines, building opportunities, bringing a solution into the company, negotiating deals, growing the business, and creating a partnership relation.

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**4 Let us focus on sales since you are occupying a sales director position. What does your team's daily business look like, and what tasks are performed?**

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5 From an overall perspective, the task level is up to 60 to 70 percent of pipeline activities, as we call it. This can be tasks like calling the customers, sending out "vetos," which are emails to arrange meetings, preparing meetings, doing research, preparing for customer interaction, making account plans, and making so-called pipeline plans on how to attack or target a customer individually on a specific basis and the major part is then on the execution. Looking at the tasks, it is from a 100 percent workload, 60 to 70 percent pipelining. Thereof fifteen to twenty percent are only the interaction with the customer, and the rest is research and preparation to get in contact with the customer. The other 30 to 40 percent are administration work, deal negotiating, pushing deals, interaction with the legal department, procurement department, and finally also with C-levels to get things done. In the end, I would rather guess they spend ten to fifteen percent of all time.

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6 **Which tasks do digital technologies in marketing and sales perform nowadays?**

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7 It is less than performed by human labor. We are performing more and more tasks with digital technologies. We use the software as a service to make the salesperson more efficient. An example is reaching out to customers with mailings. We use tools called "Outreach." You can use templates built on your self-defined preferences from a time perspective and reach and push emails automatically sent without any human interaction. You can herewith reduce the workload to reach out to customers via email. The other big part is research, where we mainly use digital technologies first to bring the salespersons up to speed as efficiently as possible without them doing all the research or using other departments. Here we are using data providers, like data FOBs and others, to gather as much information as possible from our targeted customers, such as spent budgets, revenues, employment, number of information technology employees, organizational charts, and generally getting all information available for initiatives, and more from digital technology.

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8 **How do you, if at all, quantify the tasks performed?**

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9 No. We are counting only the interaction with the customer, and we are counting what kind of meetings are performed and time spent on a task like research or planning a meeting, but we are not counting the tasks themselves, whether digital or done by human labor.

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10 **How do you, if at all, determine tasks as high-value versus low-value tasks?**

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11 A low-value task is everything, such as spending time on research, where you do not need a skilled person. You need time to spend on Google and research or also working on documents and presentations where it is not that much about the content itself rather than putting things together or searching for content that might fit. On the other hand, it also performs administrative

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tasks like preparing organizational charts, getting things together, and finding numbers or email addresses. All these are low-value tasks because having a high set of skills is not needed. It is just time-consuming. The high-value tasks are making an account plan, a targeted plan for a customer, thinking through how we can reach the customer, where the customer is in this journey so far, where are the customer's challenges, how we can map our solutions to the customer needs, the corporate plans. And definitely also the interaction with the customer itself. It is by far the most complex task. Bring the company forward, do pitches, get meetings done, and achieve progress.

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12 **Is it correct when I summarize your determination of a low and high-value task as the skillset of your employees as the main parameter?**

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13 Yes.

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14 **To what extent do you eliminate low-value tasks and foster high-value tasks?**

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15 As mentioned before, in some parts, we try, but there is room for improvement. We try wherever it is possible to use digital technologies like service solutions of the cloud to gain information to make research more efficient so that human labor does not need to spend time on research. We also use it to get numbers, context, and everything we can receive from tools. Also, not for spending time in copy and pasting and email send-outs for which we have templates or asking for a meeting. Therefore, we also use digital technologies to do that for us.

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16 **Could you name examples for which tasks these digital technologies are currently used?**

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17 Digital technologies themselves are more data-driven for customer research. The full picture and profile of a customer in a software as a service, which is also capable of mapping a certain intelligence for public, and corporate

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initiatives, is provided by our solution. A salesperson does not need to think that through and already gets a hint from digital technology.

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**18 What is the general impact of digital technologies on tasks and human labor?**

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19 The general impact is growing so far when I compare it in that branch within sixteen years of experience and a special focus on the last six to seven years. There is an improvement in efficiency. It is becoming more and more popular and important to use every digital help you can get to outsource those low-level tasks, which in the end will end up in the fact that there is not that much labor needed. The resources you have to spend on activities are getting lower if you try to do it with several departments. On the other side, when you try to perform tasks with your high-value employees, you can also save time for them and spend time performing more valuable tasks.

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**20 How far are digital technologies substituting or complementing human labor in performing tasks?**

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21 "It is already a kind of substitution. It is an effect to substitute labor in the case of low-level tasks because it is difficult to hire that many persons at all. In that case, it is not to get rid of people, and the substitution is more in case of growing easier without hiring on the same level. The substitution is definitely given in the area of research where it is already a complete substitution from a digital technology point of view. However, also, on the other hand, it complements the sales itself because the high-value tasks have to be performed by well-skilled persons. I could never substitute this with technology at the moment in our field of serving enterprise customers. There it is more complementing, giving them more efficiency, making them more productive, and focusing more on the high-value core business.

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**22 You cannot replace high-skilled persons or their tasks with technology. Why exactly? What is not replaceable, and what is so important that they must do?**

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23 What you will never replace, definitely also not in the future, is human interaction. That means we call it champion building and gaining trust. You need to build your network. They need to trust you. They need to see you as a trusted advisor because, in the end, you can put as many processes as possible and tenders in place. People are buying from people. It is really important that a salesperson, who will be the face of a company in front of a customer, interacts at a level that gains trust. This cannot be complemented or substituted by technologies. The technology may be complementary in the way that they are better prepared to gain that trust, but the human interaction itself will never be replaced.

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24 **How far do you assess human labor skills to perform certain tasks, especially digital ones?**

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25 It is mainly the fact that everything goes into direct interaction with the customer. We can call it a high-value level task because here, these people must progress the business, build the business, and are well-skilled based on knowledge of interaction and empathy. We can only divide those into presales activities and aftersales activities. An aftersales activity is an incident or support service for which digital technology can perform better in the future, like chatbots, and more for standard questions in the beginning. In the way of trying to create the business, we are always talking about high-level skills and tasks.

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26 **Let us assume we are currently in an interview situation for hiring new employees. You have to assess somebody's skills on whether the applicant can perform high-value or low-value tasks. How do you know which category he or she will fit the most?**

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27 It is mainly about looking at the resume and the experience, about studies completed, what did they study, what experience they have in which area, and also asking different kinds of questions which will reveal whether this person is skilled in this area or not and can only be answered if someone has a minimum level of skillset.

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28 **What knowledge and skills do marketing and sales professionals need about digital technologies?**

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29 It is helping and supporting if they are familiar with several tools we are using, which complement the sales work like salesforce. With that tools, we create our offers, which we use as a customer relationship management system or even things like "Outreach" or classical tools such as Microsoft office packages and working with PowerPoint, Excel, Word, and mailings. Overall, there are some basics I would rather look at, but in general, the complementary tools they need a skillset in are not that difficult because they are designed in a way to learn it very fast.

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30 **Do you measure the digital technology impact on efficiency calculations? If not, are there different performance measurement calculations?**

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31 Not from an overall perspective. We are measuring high-value tasks like the interaction with the customer. The salespersons are flagging if they spend time researching and executing a discovery meeting, workshop meeting, or negotiation meeting. With all the data, you can see where the time is spent and how many activities are performed with the customer. When implementing new digital technology for any task, it is possible to analyze how the number of customer activities is developing in the following weeks and months. That means if we expect more efficiency in customer research, we expect that the salesperson can spend more time interacting with the customer. Therefore, the number of, e.g., discovery or negotiation meetings grows.

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32 **The criteria for calculating the digital technology impact on efficiency are flagging tasks based on the number of interactions and time spent per task?**

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33 Yes.

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34 **How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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35 Our company has a special team within the go-to-market department that analyzes how we approach the market in marketing and sales. That means, on the one hand, what is our story, where do we want to go in the market, and on the other hand side, how will we try it and also how in terms of providing tools to our salespersons. They are evaluating all the new technologies from the market. We are also performing a proof of concept or testing beta versions in place. That means we are using good and bad sellers from a numbers perspective to see whether this has a direct impact. In addition, we are evaluating on a company level how we can improve our behavior with anything possible to improve on a digital level.

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36 **You also mentioned the research activities already partially performed by digital technologies or artificial intelligence. What is the most impactful digital technology you have implemented, or which has been implemented on efficiency or sales?**

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37 There are many tools. When I changed the company, the former company was not providing a tool like "Outreach," used for sending out workstreams of emails automatically based on pre-designed templates. This increased the efficiency of the sellers in terms of time. Sending 60 emails per week done by manual interaction by always copying and pasting the email, the address header, and more takes a lot of time. Another one changed the whole industry with web meetings like Zoom or Microsoft Teams. If you do not need to spend much time traveling to customers and you can do the human interaction through a digital device or with a digital meeting, which was not common in the past since we were not allowed to meet, this has a huge implication on efficiency, because you can perform four to five customer meetings a day. Compared to the past, there was a maximum of one or two meetings possible due to travel time. It is also cost-saving.

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- 38 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**
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- 39 I would say the impact will grow more and more. On the one hand, we will get used to digital meetings with decreasing travel time which will stay in the future. I assume that the digital meetings in 2030 will be approximately 90% versus 10% in direct human interaction onsite. The other part will be artificial intelligence. I guess that will play a huge role in researching but also planning the go-to-market in terms of targeting the customer and mapping the solutions we are selling and providing to the customer. On the other hand, I also assume that even the number of salespeople might decrease because cloud solutions will become standard-driven. Therefore, the interaction will also go through a digital channel, like more webinars and more digital content, where the interaction from a marketing and sales perspective will not be that necessary due to decreasing installation complexity of products.
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- 40 **At the beginning of the interview, you split the portion of the work of the workforce into the preparation and sales phases. You named artificial intelligence with a strong focus on presales activities. Could you think of any impact of artificial intelligence or machine learning directly impacting the sales process as such? The process, the attributes that you labeled as social interaction, are irreplaceable by digital technologies.**
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- 41 I think the main effect appears not in those complex sales situations. When we distinguish between enterprise accounts, big accounts with complex environments, and mid-market and small customers with less complex IT solutions, we are using salespersons with different skill levels, for example, low-level skills. Only calling, not being onsite to reach out to such customers. Here I see artificial intelligence as an entry point with the customer in terms of communication by creating a workflow with artificial intelligence to ask questions and provide answers. I think this will increase enormously.

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**RP\_12****1 Research Participant 12**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 I will be more specific on the marketing side. Human labor still carries the majority of task density in our organization and most marketing organizations I know. The tasks are simply structured in more strategic analytical tasks versus very operational ones, which are delivering assets to the consumer and hence also the second point that I want to focus on with you. Nowadays, all these tasks in a marketing environment are centering around the consumer, the value that can be brought towards a consumer. That is the concentric model of how tasks should be organized in a marketing function, and my idea is that the human element is still quite intense in marketing.

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**4 Suppose we would need to focus on one specific average person working in your marketing department. How would you describe the individual tasks and the daily business of such an employee?**

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5 The routine day of a brand manager, an average and multiplied role in our department, will most likely start with email correspondence to follow up. That will deliver progress against certain projects that the brand manager is either leading or as part of a group that leads a project. This can vary from a launch project of a new product item in a range to a communication campaign or a selling activation through the sales force. Most of the tasks in the progress of a day will continue to be meeting-based. These meetings will evolve a wider range of different stakeholders from different departments. Marketing tasks are mostly concentric in an organization and evolve all other parts of an organization, especially from a commercial angle, but also into supporting and enabling functions like finance, regulatory, research, development, and more. A good portion of the time will be allotted to some analytical work to understand data points that are relevant for that particular business and brand to make interpretations and deductions from these data

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points to drive certain project tasks forwards, e.g., the creation of a campaign or the change to a digital asset because we have seen that the performance of an, e.g., yellow font is better than a red font. The third chapter I think that will be relevant and visible throughout every day is the checking with the line management which usually on that level occurs daily because some things need to be governed. That is the government piece that is also part of every day. So, someone either needs to bless a decision or provide input, advice, or feedback for rework.

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6 **Which tasks do digital technologies in marketing and sales perform nowadays?**

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7 Can I specify the question? Does email correspondence also qualify as digital technology?

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8 **Yes, if this is a significant digital technology applied in your business to drive efficiency.**

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9 Honestly, I would say this is already business-as-usual practice. There is no way to work in a marketing organization that is not email-based. To me, I would discard that. That is just a regular practice of nowadays business practice. Digital technologies are really important for us. Of course, everything is connected to data points that we are receiving in most phases digitally because we have dashboard solutions set up in which we understand consumer preference data, selling data, market research data points, and all these elements, which are digitally transported and communicated with us and that takes a large portion of any marketing organization because it is giving us the insights, the understanding that we need from a consumer perspective. This is the inflow of where we receive information and data points that are relevant to our work. Then there is the outflow. The outflow is, just to give you a data point, we classically in the past years as an organization, and I think that is also true for the industry, are shifting our marketing expenditures from previously in 80/20, of 80% being classic media, so TV-based print, and more to nowadays a 50/50 or

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even 60/40 towards digital activation. Digital technologies in communicating with consumers are becoming the majority of our work at this point, and that is, of course, manifold channels through social channels, through direct marketing channels such as email marketing, through online videos, as well as display and banners advertising which become a hugely important role in the life of a marketing professional.

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10 **This gives a quite good picture of how the outflow might look like. If I may re-ask the question with a strong focus on internal efficiency within a daily marketing routine of an employee. How is this employee or these employees supported or affected by digital technologies? Also, do you have a specific example of those technologies?**

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11 The past year through the pandemic has expedited everything related to the daily routine work from a digital technology perspective. File-sharing elements, and platforms for communications, such as Microsoft Teams or Google hangout, are used dominantly in a hybrid model when we are partly working from home or in the office. We would not be able to deduct any regular business activity if we could not access our digital technology platforms and the way we govern information, share information and communicate with each other. While we still have face-to-face interactions, these interactions are supported or facilitated by digital technology.

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12 **How do you, if at all, quantify the tasks performed?**

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13 Only in outflow, to be very transparent with you. In inflow, the intrinsic work processes I do not quantify, and I think we do not, as a company, quantify how it is happening via digital technology and platforms or other elements. For the reason of data privacy, we are also not looking into the Microsoft databases and who is using which technology for which portion of time. We are not tracking our employees' task delivery based on those metrics. For outflow and external, we do quantify.

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- 14 **Let us assume there are no data privacy issues and no data protection elements relevant. Do you think it would help you in terms of driving efficiency in your marketing department if you could and would quantify these tasks on task and employee levels?**
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- 15 Yes, I do think these would be valuable metrics. However, you would need to be very specific concerning the role profile. We have more specialized roles versus more generalized roles. For me, a brand manager is a generalist role, and someone who is a market research agent in our organization is more specialized. A specialized role, of course, would need to have higher efficiency in performing the same tasks over and over again, and I want to see an improvement in efficiency over some time. A brand manager, on the other side, who is more versatile and more cross-functional orientated, and the project sizes vary significantly from project A to project B, I do not expect that level of efficiency gain by being able to trace the metrics of how much time was invested or has been supported with digital technology versus how much time was spent on this or that particular part of the business.
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- 16 **How do you, if at all, determine tasks as high-value versus low-value tasks?**
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- 17 We do not have a category system that we track from a metrics perspective. What we do is separate tasks into what is administrative and organization-based versus what is delivering against the project that drives consumer value. Our end equation for the marketing department is to enhance consumer value which ultimately ends in more revenue and profit for the company. What we separate for are the tasks that are pure administration which is more or less the entry ticket to be in business, like running processes such as approval processes, purchasing order management, cost management, and more, and what an employee needs to perform as an entry ticket to even be able to create consumer value. Our division is administrative versus consumer-orientated tasks.
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18 **To what extent do you eliminate low-value tasks and foster high-value tasks?**

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19 We review the processes through a lens of "is it fit for purpose." The question that we ask is, in a specific example, to ensure that an advertising campaign is, from a regulatory and legal perspective, liable and in line with the laws and regulations that we are facing. Those processes involve a variety of stakeholders and possibilities of inefficiencies. Therefore, we are revising those processes annually through a management board to ensure that they are delivering as lean and efficient as possible against the principle of getting the job done and being fit for purpose without being a burden and holding us back. That time can be invested in value creation and consumer-orientated tasks.

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20 **What is the general impact of digital technologies on tasks and human labor?**

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21 More output over time. Intervals of task delivery are shortened. Digital technologies help us to get there faster in a very simple way. That starts with everything we do in an email until everything we communicate in Microsoft Teams and how we share things. Just a simple example, working on a document from five different sources across the globe is making us faster in a sense. The downside is sometimes the quality of work and the vulnerability to mistakes and errors, but the overall weight is just to get more done in a shorter period with the support of digital technologies.

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22 **How far are digital technologies substituting or complementing human labor in performing tasks?**

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23 It is a mixture of both. Clearly, the continued and accelerated use of digital technologies is, to some extent making certain labor work redundant. I will give you an example. The way we manage our expenses and costs. Nowadays, we just take our smartphones, and we scan, e.g., and photograph briefly, an expense or cost item we have, and it is automatically in the system,

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which previously needed one to two different people to do manual work to go through a process that was more manually intensive. With regards to more brand or marketing-orientated specific tasks, this mostly sits in the media environment where really substitution is happening because artificial intelligence, as well as dashboard solutions for mining larger volumes of data, previously resulted in many full-time equivalents that have been placed against this and can now be done with the help of a simple dashboard solution and a scorecard system that we employ for it. That happens for substitution. Complementing happens exactly with the tasks of a brand manager because a brand manager can deliver more output today, helped by the technologies he is employing to get the tasks done. Complementation is a value that this person can create against the currency of consumer value for us. He can run more campaigns than he could and deploy them to consumers without the support of digital technologies and the dashboard and system solutions I just mentioned.

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**24 How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**

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25 That is a good question. I like that one. We usually go through a quadrant of four dimensions of how to assess talent, and talent means human labor. The readiness to operate in the digital system and framework we are setting is one dimension. How versatile is a person in navigating processes like Microsoft systems, not to focus on that particular one only, including also more profound skills, for example, that we would need in SPSS to work with data sources and aggregate statistical analyses, specific media management skills, which is also very data-intensive, and especially in the digital media environment, and skill-levels that we are assessing. We are assessing what kind of experience and capability competencies the individual has to perform certain tasks in our organization. We also layer on top a dimension of continuous quality output that we see from an individual. Regardless of how we assess the skills from a technology perspective, how much value and success has that person driven on more of the Lag KPIs? Lag KPIs are, e.g., the market share development of a brand for that individual, and how the

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consumption with consumer sell-out has evolved. That builds a track record of success for human labor and the individuals in our workforce, which plays a higher weight than just the technical skills we deploy. There is one division I need to make. When we talk about a true digital marketing role, a role that is not a general specialist function, obviously, the way we assess the digital capability is by using the expertise that we have in-house as well as in agency networks to assess if this person is qualified for a highly specialized role in digital marketing tasks.

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26 **What knowledge and skills do marketing and sales professionals need about digital technologies?**

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27 For marketing, if you cannot understand digital content and performance marketing processes and the way that the optimization loop in digital advertising functions, you will not have a career in marketing. I think that is an entry ticket knowledge or skill set that a marketing professional needs. It is the understanding of communication with a consumer in today's society versus the classic historical way done through the broad stroke. Broad reach media elements such as TV, whereas today it is in an inverted pyramid, so to say, and we try to find signals from an individual consumer to display our messages against the signals that a consumer is sending. If you have not understood or are not versatile in understanding that digital marketing system approach or set-up, I think that is an entry element you lack.

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28 **It converts consumer signals into visible digital content using digital marketing systems. Is that correct?**

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29 A digital marketing approach is probably better than a digital marketing system in the end because the system is closed. It defines touchpoints where you can interact with the consumer based on the signal that this consumer sends. I will give you an example. Going into Google and saying I have a toothache is a signal I am sending. What do I do as an industry partner with that signal? I want to serve information to that consumer that ultimately sends them through the funnel, the classical funnel of having interest,

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finding, and considering us and resulting in a purchase. If you do not have that skillset on how this works on a digital touchpoint roadmap, what we refer to as the consumer experience journey, which is highly digitized, is the skillset you need.

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**30 How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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31 Unfortunately, we have not applied that principle. I like the thinking, and it actually makes me want to dive deeper into this and understand more about it. The way I interpret it from the question you are asking means you look at how I can optimize and maximize the efficiency and also, as we said earlier, the effectiveness because performance potential is ultimately layered in efficiency and effectiveness to me in the end and what role can digital technologies play to enhance and maximize this. We have not done this before, and I think it is a great principle I would like to dive into deeper. I think what we will need is more specification on what digital technology is in the end. I think we would need to shortlist three, four, or five elements that are at our disposal that we can use to maximize the output potential.

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**RP\_13****1 Research Participant 13**

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**2 Which tasks do human labor in marketing and sales perform nowadays?**

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3 In our marketing and sales departments today, our colleagues are very concerned with personal contact and management. Ultimately, this also means taking over customer relationship management. If a customer is interested in working with us as part of the sales process, there are tasks such as pitches, preparing offers, finding out what the customer wants and is interested in, and developing concepts. In other words, doing creative work and, in the end, representing a certain enthusiasm for the topic, project, event, and more to the customer. That is what human resources are all about today. Furthermore, in the field of marketing, also to make the brand strong, which is especially important with people and humanity, to do marketing for the company itself.

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**4 Which tasks do digital technologies in marketing and sales perform nowadays?**

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5 We are not yet as far along as we would like to be. We are trying to set up all our processes and support them digitally. Through CRM (Customer Relationship Management) systems, we can capture leads who want to work out a topic, concept, or strategy with us. This process is documented in the tool, as well as histories. This tool also has customer relationship management, including transparency about the customer base, in which area these customers are active, and which individual customer plans are available for this and next year. The rudimentary process understanding is to get transparency about the sales process. These are tools in the sales area. It is not just about supporting the process and mastering data management but also about creativity. Here, of course, we also have support from tools. For example, we have just introduced a visual collaboration tool through which the concepts in the tool can be presented to the customers. In the past, we had PowerPoint presentations that ran one after the other, and a lot has

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happened here in terms of technology. Different boards interact with each other. It is about finding tools that support the creativity of colleagues who also express their creativity to integrate it into concepts and present it to the customer. These are very digital tools. Another area is production. We are an agency, we have to produce content, video, and marketing campaigns, and we have digital tools that help us integrate this creativity into a medium. Here we are already very digitized. In marketing, we focus on making a lot out of personal contact. Nevertheless, there are many opportunities as well. We have campaign tools, and we use social media to make our company better known. What we use less is, for example, artificial intelligence. We are not there yet, but we want to get there eventually. However, you first have to create a certain basis of data and prepare it in a structured context, in a certain pool of data that fits together, and only then can you use artificial intelligence. This is a path that we have yet to embark on. We first have to create the basis for digitizing everything so that we can then apply artificial intelligence.

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6 **The data basis is too small for artificial intelligence, but you are on the way to getting there. What does the path look like? What are you doing right now? What is explicitly missing? Why don't you have this data basis yet?**

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7 That the data basis is too small is perhaps the wrong expression. The data is there, but it is so heterogeneous that it does not fit together. We are a company that has grown historically, in which many systems are in use but which do not communicate clearly with each other. We have many data and sources, some of which say the same thing but are named differently. This has to be brought together in a structured way, and a uniform database has to be created. Creating this database is exactly the way we are starting or have started. We are currently building a data warehouse, a business intelligence platform, on which we will bring all the data together to apply data analytics and learning methods. We want to check how much we can apply artificial intelligence to our existing data. We have many data, but it is so heavily siloed that it cannot yet be given to artificial intelligence because

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it would not be able to do anything with it. In other words, we are first trying to create a database on which we can unleash artificial intelligence.

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8 **You highlighted two aspects, CRM and lead generation, which are both supported by digital technologies. What are the classic physical processes that technologies have not yet influenced?**

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9 I think it gets hard with direct customer contact. That is what matters most to us. We want to create excitement and experiences, and in sales, you need a personal level with customers and a personal relationship. I believe you will never be able to digitize this aspect. Of course, we can talk to each other via digital media, but a certain personality factor is still missing. That will always exist in sales, and you need it because you have to create trust. A company has to build trust with its customers, show certain reliability, and successes also have to be celebrated together. I do not think you will ever be able to digitize experiences. We feel there will always be a certain human factor, especially in sales. I do not think we can digitize that because we do not want to move away from our DNA and what we sell, the experience, at all. With lead generation, maybe it is a little bit different because you can represent yourself to the outside world in a certain way. We have a website; basically, there are many more opportunities online, through conferences and events, for example. Of course, you can support that online, and through that, you can also attract new customers through campaigns. This process can already be digitalized. I can find customers or prospects this way, starting with a website with a form to fill out, which gives the lead directly into the CRM system, and no human labor is needed for data entry. This is also already a step towards digitalization. This goes all the way to webinars and digital conferences through which we capture data automatically. Another point is the emotional capture of people. When people are at an event, it is recorded how they react to something. Assuming that products or services are presented, and you see that people react positively to them, you could recognize an interest in a product or service and actively start the acquisition. A lot will be feasible here in the future, but it will always take

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personal contact to create trust and satisfaction between customers and the company.

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10 **You sell experience. Can you say that the degree of possible digitization depends on the product sold?**

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11 Let us preferably use the word experience. The experience is what we want to create. The experience with a brand. It is always easier with physical products because experience is a feeling. I cannot imagine, even in several decades, that you can digitize feelings. Maybe it will be possible to influence tastes or organs at some point, but can we digitize experiences, the feeling you have at a live concert, for example, or when you are in a brand store? However, of course, I am happy to be surprised about what the future will bring.

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12 **How do you, if at all, quantify the tasks performed?**

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13 We quantify how many customers and projects we have and how many opportunities and pitches we have won and lost in marketing and sales. Alternatively, how much success results from a campaign that has been run in order to be able to evaluate whether this or a comparable campaign should be run again? We quantify that but more to know how many customers we have and how many opportunities we have won.

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14 **Would it be appropriate to argue that you are not measuring the number of tasks performed by people or technology but rather a relationship to customers and projects? Basically, a calculation concerning return on investment is leading, but not the internal number of tasks?**

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15 The question is where to start and what is counted as a task. Which task, no matter how small, is counted, e.g., when I capture a customer in the system? I think you would not be able to get out of counting because, in the end, it is the result that really counts. Of course, you have to have a certain feeling for the effort I invest and the return on investment. What brings us further? That

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is our guideline, and we invest more in certain areas than others, but we do not base that on individual tasks. We would not be able to do that because of our versatility.

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16 **You are very versatile. You have many customers and many projects. How do you know how much effort you have to put into a project if you do not quantify the tasks?**

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17 We already quantify time tracking. We write down what tasks our colleagues do all day. What project is being worked for, and what customers are being worked for? Nevertheless, that is our most granular level. We do not go deeper into the individual task level. We have to know how much effort we put in because, in the end, we have to write a number to the project concerning the costs of the project. We also have to submit an offer to the customer. However, that is more at the customer level and sub-tasks level that we need, for example, a video production here and a marketing campaign there.

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18 **How do you, if at all, determine tasks as high-value versus low-value tasks?**

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19 We do not officially apply the determination of particularly high-value and low-value-added tasks. This results from the activity. In order to get a higher-level picture, capturing a customer and his customer data, such as company affiliation and position within the company, is a rather minor value-adding task. The activity does not do us any good in the first instance. On the whole, and to understand the context, of course, it does, but it is not a particularly value-creating task for that one customer or project. Real value creation happens only through the creativity of the sales and marketing colleagues: concept development, marketing strategies, video productions, and more.

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20 **Can you summarize data collection as an administrative task? The administration is a less value-adding task, and customer acquisition and**

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**project processing directly at the customer are value-adding tasks. Could it be a promising concept to digitize the less value-adding tasks to increase efficiency?**

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21 Definitely, as part of our digital company transformation, we are trying to provide the best possible digital support for such tasks to free up space for precisely these value-adding activities. The target is not to be burdened with administrative tasks, and a large part of our time is not spent entering data in a complicated way. We want to be able to view customer data and its origins, such as websites or campaigns, relatively quickly. I can, of course, enrich this data, which is necessary. Nevertheless, I can also see at a glance that there may already have been projects on this or that there is another contact person. This means linking information I would otherwise have to compile from emails, Excel files, or manual notes. We try to digitalize these administrative tasks as much as possible. This is our goal and aspiration to create free space for our colleagues for value-adding tasks such as concept and idea development and enthusiasm.

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22 **How far along are you in your transformation process?**

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23 For example, we are currently introducing an optimized CRM system to digitize exactly these administrative tasks in the area of sales. We would have to look at marketing separately to give our colleagues a tool and, thus, a process that takes over these tasks as far as possible to simply have more time. On the one hand, this would give us much data that we need to create transparency for our management regarding the current status and which projects are currently in the pipeline. On the other hand, we also need to be able to plan resources in terms of the availability of the respective group of colleagues and their capacities and skills, which many customers request. This means that we have to create transparency here as well, which is exactly the point that we are currently facing. Introducing a new CRM system, setting up the project management cleanly, and making these administrative activities available to colleagues as simply as possible to concentrate on the concepts, ideas, architecture suggestions, and more in the end.

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**24 What is the general impact of digital technologies on tasks and human labor?**

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25 That is a good question. I, for example, grew up with this topic and already dealt with digitization during my studies. I come from a field where I try to digitize, simplify and automate processes. That is simply a matter for me. I also have no fear of contact or anything like that. However, I believe that when considering the influence of the human workforce, a distinction must be made between the fact that there are still people who are perhaps not at all familiar with digitization. We are becoming faster and faster, and we are becoming more and more digital, but we have many people who are not at all familiar with it. On the other hand, we have more and more young people who are demanding it. In my opinion, we are also in a bit of a quandary. We have to digitalize and automate more and more, but we must not forget to be human. I think that is also the challenge of digitization. Bringing everyone along makes everyone aware of the tasks a digital tool brings with it. What are the benefit and added value, and what does it bring you in the end, to create this free space and understand the advantages? According to the motto, I want to do this and not because I have to do it. Then I have the time for all the other important things.

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**26 How far are digital technologies substituting or complementing human labor in performing tasks?**

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27 There are always possibilities, especially when I think of the subject of the chatbot, and more, which can replace certain activities. I do not believe that we can completely replace humans, and we can certainly replace certain tasks, but I believe that technology should always be complementary, a linkage of both. In my opinion, technology should make humans better so that they can do their jobs better. That is what I would like to see. Yes, there will be robots in the future, but especially in sales in our industry, that will not work because experience and feel are paramount. I do not think a robot will ever pitch to a customer or anything like that. Think, for example, of retail and information portals in stores. Yes, that may certainly exist, but here

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the question is about the actual experience. When it comes to 3D or virtual reality, that might be quite different again, but I think we are not there yet. Maybe that will come in the future. That can certainly help, but I do not think it will replace humans completely.

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**28 You said that some tasks could be replaced. What kind of tasks are these? What are the characteristics of these tasks?**

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29 They are repetitive tasks, which can also be categorized, where I know that the process is always the same. At least in the form of a certain workflow, where I know what will happen and can also predict it. Of course, there is still room for development in the direction of artificial intelligence, but this must first be learned. However, here, too, I need recurring and predictable tasks, which in the end, also always deal with a similar problem. For us, for example, every project is different, and I cannot say we will do the next project the same way as the previous one. If creativity is required, then it will be exciting to see to what extent artificial intelligence can actually replace humans.

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**30 How far do you assess human labor skills in order to perform certain tasks, especially digital ones?**

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31 Of course, this is difficult to predict, but you notice it when such tools are introduced. With digital technologies, you can quickly tell whether someone has an affinity for technology or is more reserved, wait-and-see, or dismissive. Or even in the use of the tool. Our company is very young, so we do not have as many reservations about technology, but we also have older colleagues. That is not the majority, but you can see that the mental abilities that are necessary simply decrease with age. Technology is becoming faster and faster and more and more complicated, but mental abilities decrease with age. Here you already notice that you can also lose people in this process. That is then no longer a matter of course. I believe that this aspect will play a role in the future.

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32 **What knowledge and skills do marketing and sales professionals need about digital technologies?**

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33 Open-mindedness, curiosity, fun to discover new things, no fear of contact, and self-motivation to deal with new things. I notice this myself. We introduce many systems, but we cannot train every single person. We can provide training and certainly show things, but with 700 employees at our site, you cannot address every single one. That works for smaller projects and teams, but it will not be feasible for tools rolled out for an entire company. That is why self-motivation also plays an important role. In the area of marketing and sales, you also have to have the desire to find out about the market and what new technologies are available. Especially in the marketing field, a lot is going on and the world is moving incredibly fast, so you need to be able to grasp things quickly and have the desire to deal with them. You also need to develop new ideas, use technology, be highly committed and not just sit back and wait for someone to tell you what to do. These times are over. Proactivity is what is needed.

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34 **How do you use digital technologies to exploit the full performance potential in marketing and sales?**

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35 I have never thought of it that way, and I do not know if our company has ever taken that approach. Nevertheless, we are not exploiting the full potential. This is where we can get even better and do even more with it. We are on the way there because we want to. Digital technologies are one aspect of this, which is important to highlight. Since we are in this so-called experience industry, it is definitely an aspect that we will need, but it will not be fully digitalized. The experience, feeling, and humanity are in the foreground.

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36 **Assuming that you would exploit the full potential from the aspect of digitization, knowing that it is not applicable across the board. How would you proceed? What categorization would you make? What can I digitize, and what can't I digitize?**

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- 37 I would love to spend several days, or even weeks, running along with colleagues to see what we are doing in detail. To get insight into where there are opportunities and potentials for digitization. This is much more difficult in implementation than in theory because we are so diversely positioned to be able to grasp the entire potential. First, I would look for smaller aspects that can already be implemented with little effort. Just today, we had a workshop on CRM, and there I noticed a few topics related to marketing, where we could digitalize processes much more efficiently through simple changes on our website. Having more time to find such things, since we are a very large company with many business departments implementing many projects.
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- 38 **Looking back at the distinction between particularly high value-creating and less value-creating tasks, this is again about categorization. You first have to find out on a more granular level which tasks are actually performed, followed by the categorization into digitizable and non-digitizable. Is that correctly represented?**
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- 39 That is correct. In my opinion, we can digitally support these value-creating activities, but no system will remove the elaboration of a concept or a strategy. The system will support us in capturing, documenting, preparing, and presenting the result, but it will not take away the creative work that takes place in the minds of individuals. Finding out the tasks that can be digitized, e.g., which activities from everyday life are administrative tasks, would help us a lot. We have a concrete idea of supporting our colleagues and making suggestions based on experience and the environment.
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- 40 **Imagine we are in 2030: do you think the performance of marketing and sales teams significantly increased within the last decade, driven by digital technologies? If yes, why?**
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- 41 Digitization will increase. There are far too many clever minds for that, who are thinking up new and impressive things to try out. Looking back just ten years, we can already see what has happened. I believe that a lot will happen
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in the area of marketing concerning 3D or virtual and augmented reality and also in the area of sales. I am thinking of our customers in particular, but also retail, where the world is changing. The retail business itself will also change fundamentally in the future. Will there still be a store that I physically visit, or will that be transferred to an online experience? I think there is a lot more to come, simply because technology is offering more and more. We will also drive electric cars around the world. Why? Because we have not yet exhausted the potential that is possible in the area of marketing and sales. Other industries are already much further along.

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**42 Can you imagine that digitization also has a limit, especially concerning the human component in the area of marketing and sales, which, according to you, has and will continue to have a decisive share?**

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43 Honestly, I would wish for it because we simply live in a very fast-paced and fast-moving time, and we often almost just function. Based on all the discussions that have taken place, I would wish we lived a little more consciously again. That is an aspect that one notices strongly at present. Humankind is orienting itself back to more conscious and natural life, such as environmental protection. I believe there can be a limit, and the question is only when this limit is reached, which is an exciting question.