

DOCTORAL THESIS



UCAM

UNIVERSIDAD CATÓLICA
DE MURCIA

INTERNATIONAL DOCTORAL SCHOOL

Doctoral Programme in Doctorado en Ciencias Sociales

The Impact of using Digital Technologies at the POS on
Customer Satisfaction in Do-It-Yourself Stores

Author:

Dominik Rode, MBA

Supervisors:

Prof. Dr. Nicolás González-Gallego

Prof. Dr. Cathrin Stammen-Hegener

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THESIS SUPERVISORS' AUTHORISATION FOR THESIS SUBMISSION

Prof. Dr. Nicolás González-Gallego and Prof. Dr. Cathrin Stammen-Hegener, as Supervisors⁽¹⁾ of the Doctoral Thesis "The Impact of using Digital Technologies at the POS on Customer Satisfaction in Do-It-Yourself Stores" by Mr Dominik Rode in the Doctorate Programme Doctorado en Ciencias Sociales, **authorise its submission**, given that it meets the required conditions for its defence.

Which I hereby sign in compliance with Spanish Royal Decree 99/2011, of 28 January, in Murcia, on 20/12/2023.



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ABSTRACT

Digitalization is having an enormous impact on society, the economy, and the state. The resulting digital transformations affect companies in all sectors. For this reason, it is essential that companies scrutinize previously established business models and thoroughly examine digitalization and the associated digital technologies. Even in retail, the accelerating pace of digitalization has led to major changes in recent years: On the one hand, this has led to the closure of supermarkets, department stores and specialist stores, but on the other hand, digital technologies are also enabling retailers to successfully differentiate themselves from pure online players. The use of digital technologies at the point of sale (POS) in retail stores can make a significant contribution in this regard, as they can lead up to extraordinary customer satisfaction, resulting in sales and profit maximization.

The purpose of this study is to provide insights about digital technologies used at the point of sale in Do-It-Yourself (DIY) stores and their impact on customer satisfaction. In this context, the study presents a structured overview of the do-it-yourself sector, analyzes the current situation of the POS in DIY stores, and examines which digital technologies are suitable explicitly for DIY brick-and-mortar stores to achieve customer satisfaction. The aim is to provide concrete recommendations for action that will provide companies with competitive advantages and thus strengthen their business success by leading to increased profitability.

Initially, the current state of literature on the theoretical concepts is provided, followed by presenting the results of a systematic literature review carried out in advance, which brings these concepts into relation. The following qualitative, empirical investigation is conducted based on semi-structured, guideline-based expert interviews with highly experienced DIY retailers and suppliers. The evaluation was carried out using qualitative content analysis.

The results of this study provide specific factors that result in a satisfying DIY store visit, indicate digital technologies that can be used at the POS in the DIY sector by contributing to an increase in customer satisfaction and specifically address the particularities of the DIY store and its product range. The results of this study

indicate that the DIY sector - which has received little attention in the academic literature, as demonstrated by the systematic literature review - should be given significantly greater attention.

RESUMEN

La digitalización está teniendo un gran impacto en la sociedad, la economía y la Administración. Las transformaciones digitales resultantes afectan a las empresas de todos los sectores. Por ello, es esencial que las compañías realicen un escrutinio de los modelos de negocio establecidos y de las tecnologías digitales asociadas. A nivel del sector minorista, la acelerada senda de la digitalización está trayendo consigo grandes cambios en los últimos años: por un lado, ha generado el cierre de supermercados, grandes almacenes y tiendas especializadas; pero por otro lado, las tecnologías digitales han permitido a los minoristas diferenciarse con éxito de los puros distribuidores online. El uso de tecnología digital en el punto de venta (POS por su siglas en inglés) en establecimientos de venta al público puede contribuir significativamente a este respecto, dado que puede incrementar de forma extraordinaria la satisfacción del cliente.

El propósito de este estudio es aproximarse al empleo de tecnologías digitales en el punto de venta en tiendas *Do-It-Yourself* (DIY) y a su impacto en la satisfacción del consumidor. En este contexto, este estudio presenta una revisión estructurada del sector DIY, analiza la situación actual del punto de venta en las tiendas DIY y examina qué tecnologías digitales son adecuadas para tiendas DIY físicas para lograr la satisfacción del cliente. El objetivo es ofrecer recomendaciones concretas de actuación que proporcionen a las empresas ventajas competitivas y refuercen así su éxito empresarial, conduciendo a una mayor rentabilidad.

Inicialmente, se realiza una revisión de la literatura actual sobre los conceptos teóricos, seguida de la presentación de resultados de la revisión de literatura llevada a cabo previamente, lo que permite relacionar los diferentes conceptos. A continuación, se realiza una investigación empírica cualitativa fundamentada en entrevistas estructuradas con expertos minoristas y proveedores del sector DIY. La evaluación se realiza mediante análisis cualitativo de contenido.

Los resultados de este estudio ofrecen factores específicos que resultan en una visita satisfactoria a una tienda DIY, señalan las tecnologías digitales que pueden usarse en el punto de venta en el sector DIY que contribuyen a incrementar la satisfacción del cliente y que atienden, de manera específica, a las particularidades de una tienda DIY y su gama de productos. Los resultados de este estudio muestran que el sector DIY – que ha recibido escasa atención en la literatura académica, como evidencia la revisión sistemática realizada – debería tener un mayor protagonismo.

KEY WORDS

digital marketing; digital technologies; customer satisfaction; do-it-yourself sector; point of sale

PALABRAS CLAVE

marketing digital; tecnologías digitales; satisfacción del consumidor; sector do-it-yourself; punto de venta

ACKNOWLEDGEMENTS

To my wife...

“Until now, there have been relatively few academic studies of the DIY retail sector and DIY consumers.”

Colin C. Williams, Professor of Public Policy

(Williams, 2008)

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ACRONYMS AND ABBREVIATIONS

3D	three-dimensional
AG	Aktiengesellschaft (Public limited company)
AI	Artificial Intelligence
App	application
AQUAD	Analysis of Qualitative Data
AR	Augmented Reality
ATLAS	Computer-aided qualitative data analysis software
B	Billion
B1	Discount DIY store
BAHAG AG	Central purchasing organization
BHB	BHB - Handelsverband Heimwerken, Bauen und Garten e.V.
BMWK	Bundesministeriums für Wirtschaft & Klimaschutz
C&C	ectect
C/D paradigm	Confirmation/Disconfirmation paradigm
CAQDA	Computer-Assisted Qualitative Data Analysis Software
CE	Conformité Européenne (European conformity)
CEO	Chief Executive Officer
cf.	confer (compare)
COPs	Communities of Practice
CoV-2	Corona Virus 2
COVID-19	Corona Virus Disease 2019 caused by SARS-CoV-2
CSAT	Customer Satisfaction Score
DevOps	Development and Operations
DIY	Do-It-Yourself
DT	Digital Technologies
DVPW	Deutsche Vereinigung für Politikwissenschaft
EAN	European Article Number

EDS	EBSCO Discovery Service
esp	especially
E-commerce	Electronic commerce
ESL	Electronic Shelf Label
Et al.	et alii or et aliae oder et alia (and others)
etc.	et cetera (and so on)
GM	General Manager
GmbH	Gesellschaft mit beschränkter Haftung (Ltd.)
GPT	Generative Pre-Trained Transformer
GTM	Grounded Theory Methodology
ICT	Information and Communication Technologies
Inc.	Incorporated
IoT	Internet of Things
IP	Internet Protocol
K-Group	Kesko, Finnish listed trading sector company
KG	Kommanditgesellschaft (limited partnership)
KPI	Key Performance Indicators
Ltd.	Limited
M	million
MAXQDA	Software for qualitative content analysis
MBA	Master of Business Administration
MR	Mixed Reality
NFC	Near Field Communication
No.	number
NPS	Net Promoter Score
OBI	German DIY store chain operating throughout Europe
POP	Point Of Purchase
POS	Point Of Sale
QDA	Qualitative Data Analysis

QR	Quick Response
resp.	respectively
RFID	Radio-Frequency Identification
ROW	Rest Of the World
RQ	Research Question
RWA	Raiffeisen Ware Austria AG
SARS	Severe Acute Respiratory Syndrome
SLR	Systematic Literature Review
SRQ	Sub Research Question
SSC	Self-Service Checkout
SSTs	Self-Service Technologies
T	Trillion
TR	Technology Readiness
TV	Television
UX	User Experience
VR	Virtual Reality
XR	Extended Reality

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I – INTRODUCTION

I - INTRODUCTION

As an introduction to this thesis, the significance of the study is presented in concise form in the first subchapter 1.1 and the problem definition is outlined, before describing the objectives of the thesis and the research questions in Chapter 1.2. This is followed by the presentation of the study- and the methodological design in section 1.3. Finally, section 1.4 deals with the chosen structure of the study.

1.1 SIGNIFICANCE AND PROBLEM DEFINITION

The advancing **digitalization** and the associated opportunities and risks are having a tremendous impact on the state, society, and the economy (Lindemann, 2019, p. 87). Increasingly fast-paced changes, not least due to **digital technologies** such as artificial intelligence, the metaverse, robots and big data, are also having an immense impact on commercial enterprises (Schmalzried, Hurst, Wentzien, & Gräser, 2023; Zander, 2022). Regardless of the industry or the size of a company, it is essential that these address these challenges and critically scrutinize their own business models to remain successful in the future; not least, to ensure their own survival (Gröschel & Leuchter, 2020). Companies have to meet these challenges and develop innovative business models in order to discover and exploit new opportunities for value creation (Oswald & Krcmar, 2018).

These opportunities and risks also apply to **retailers** and their **suppliers**: The increasing progress of digitalization also confronts them, alongside the challenges of constantly changing customer behavior, rising energy prices and problems in supply chains (Kolf & Scheppe, 2023). Recent years have seen the closure of numerous department stores, supermarkets, and specialty shops (Jahn, 2017). However, digital transformation also present opportunities: companies from

outside the industry have succeeded in entering markets and taking market share from established companies (Oswald & Krcmar, 2018). For brick-and-mortar retailers, digitalization offers a chance to not only compete with online-only players but also gain a competitive advantage over them. This is not least due to the opportunities that **digital technologies** bring - also for the **point of sale** in retail (Pursch, 2021). However, to successfully organize the point of sale with the help of digital technologies, it is important that existing digital technologies are used in a targeted manner to satisfy customers and thus achieve sustainable added value. So, it is the quality of digital technologies that determines success, not the quantity. The challenge in these fast-moving times, however, is to find precisely which suitable digital technologies result in **customer satisfaction** (Knoppe, 2018).

The **Do-It-Yourself sector** is a large and growing area worldwide. In 2022, worldwide DIY & Hardware Store revenue amounted to €2.449 trillion (DIY & Hardware Store – Worldwide, 2023, p. 7). At the same time, the sector occupies a special position among retail companies due to various special features, for example, the product range can be characterized by the fact that many articles require explanation, as they are predominantly technical or construction- related (Gelbrich, Wünschmann, & Müller, 2018; BaumarktManager, 2015; Meyer & Reher, 2016; Kempkens & Kopatzki, 2021). These special features result in a particular need for a targeted design of the point of sale in the Do-It-Yourself, so that this ultimately results in a satisfied customer.

There are numerous publications on the topics of digitalization, digital technologies and the resulting digital transformation. In addition, customer satisfaction research has already been researched for years and is covered in numerous studies. There are also many publications on the point of sale in retail. For example, there is a large number of studies that deal with food retailing, the CE / electricals retail trade or the fashion & accessories sector. But for the Do-It-Yourself retail sector, there are only a few studies available. Nevertheless, the DIY sector stands out due to distinct characteristics. Its product range often requires detailed explanations, involves technical configurations, and is frequently associated with project-driven purchases (see Chapter 2.2.3.1 - 2.2.3.4).

Consequently, applying findings from research in other retail sectors to the DIY sector can be challenging.

In summary, it can be said that **the investigation into the impact of digital technologies used at the POS in DIY stores on customer satisfaction is of particular importance** for the following reasons: Findings on improving customer satisfaction - explicitly within the Do-It-Yourself sector - would help Do-It-Yourself retailers and suppliers to benefit from this, as an increase in customer satisfaction verifiably leads to sales and profit maximization (Weitzel, Wendt, & Zimmermann, 2017; Dallwitz-Wegner, 2016.). Moreover, small companies and shareholders within the retail and supplier landscape often lack the technical resources necessary to access important external sources for possible investigations. Additionally, research attempts are hindered by constraints related to time and finances (Rauter, 2013).

However, there is also a **research-driven interest** in such an investigation, which is evident from Williams' formulation: "Until now, there have been relatively few academic studies of the DIY retail sector and DIY consumers" (Williams, 2008, p. 312). Wolf and McQuitty also back up this opinion by stating, "Despite the size and growth of the industry, DIY behaviors have prompted few academic studies." (Wolf & McQuitty, 2011, p. 155). Röderstein concurs, and also points out in his publication right at the beginning that the DIY sector and its special features are rarely considered in scientific publications (Röderstein, 2009). BWI-Bau Düsseldorf confirms this, stating: "Although there are a large number of scientific papers and studies on specialized topics in the construction industry, there is still no fundamental, introductory publication that describes the specific functioning of the market mechanisms of the Do-It-Yourself sector." (BWI-Bau, 2013, p. V).

This **lack of scientific engagement with the DIY sector has direct implications for the practical and at the academic level**. In practice, this leads to **insufficient decision-making**, since scientific findings simply cannot be considered. It can also be assumed that the lack of reflection **limits the sector's ability to achieve innovations**, since potential development opportunities may not be recognized. Consequently, there is a risk that **companies in this sector will not**

be able to react adequately to changes because there is no scientific basis. **Problems also arise for academic levels** as well: Because the DIY store sector represents a significant share of the retail industry, this neglect leads to an **incomplete overall understanding of the entire retail industry** because, among other things, theoretical models that take into account the special features of the DIY store sector are not available (Timm & Kortum, 2023; BWI-Bau, 2013, p. V; Fischer et al., 2015; IFH Köln, 2024; Hehle, 2011; Reith, 2007). This justifies the significance and importance of increased research for the construction market, which in Germany alone generated a turnover of 25.51 billion euros in 2023 (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2024).

1.2 RESEARCH OBJECTIVES AND RESEARCH QUESTIONS

This study examines the impact of digital technologies used at the point of sale in the Do-It-Yourself store on customer satisfaction within the German DIY-market. Therefore, the thesis first examines the current situation by investigating which factors of a DIY store visit lead to customer satisfaction and to what extent the DIY store already fulfills these factors today. A further research focus of the thesis is on the digital technologies used today at the POS in DIY and their impact on customer satisfaction. Furthermore, the suitability of product ranges for use at the POS will be analyzed and scientifically evaluated. This is followed by exploring how the success of the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction can be measured. Finally, an analysis of which digital technologies will have become established in the DIY sector in the future and what impact will this have on customer satisfaction compared to today is provided.

Based on the problem definition and the lack of sufficient empirical literature on this topic, the following **objectives** can be deduced for this study:

- Providing a **structured overview** of the **DIY sector** in terms of product ranges, market data and the drivers and trends of the sector.
- Providing a **systematic literature review** on the **relationships between digital technologies**, the **POS in DIY stores** and **customer satisfaction**.
- **Analysis** of the **current situation** at the POS in DIY stores regarding the use of digital technologies.
- Identification of **customer needs contributing** to a successful visit to a DIY store regarding **customer satisfaction** by **applying digital technologies** at the DIY store's POS.
- Identification of the **digital technologies** that will be **most important** in the **future** for **increasing customer satisfaction** at the POS in DIY stores.
- Providing specific **metrics** and **indicators** to **measure** the impact of the use of digital technologies at the DIY store's POS on customer satisfaction.
- Providing concrete **action recommendations** for **retail** and **industry** for achieving **competitive advantages** in the use of digital technologies at the POS in DIY stores.

In pursuing these objectives, the study provides a **valuable contribution** to the **understanding of digital technologies at the point of sale in the DIY store** and their **effect on customer satisfaction**, which leads to **competitive advantage** and ultimately to **maximizing sales and profits**.

In accordance with the research needs and the objectives of the study, specific research questions can be derived for this dissertation, which are intended to answer the principal question: **What insights can be gained into digital technologies that can be used at the point of sale in Do-It-Yourself stores, and how do they impact customer satisfaction?**

Based on this problem the following **research questions** and the associated sub research questions are defined for the thesis:

RQ 1: Which factors of a DIY store visit lead to customer satisfaction and to what extent are they fulfilled?

- *Which factors of a DIY store visit lead to a (extraordinary) satisfied customer?*
- *To what extent do DIY stores fulfill these factors today?*

RQ 2: Which factors of digital technologies used today at the POS in DIY stores influence customer satisfaction?

- *Which digital technologies are used in DIY stores today?*
- *Which factors of digital technologies used at the POS in DIY stores influence customer satisfaction and in what way?*

RQ 3: For which product ranges are digital technologies suitable in the DIY sector and for what reasons?

- *Which product ranges are suitable for the use of digital technologies at the POS in DIY stores?*
- *What characterizes the articles that are suitable for the use of digital technologies at the POS in DIY stores?*

RQ 4: How can the impact of the use of digital technologies at the POS in DIY stores be measured in terms of customer satisfaction?¹

- *What objective measurement methods can be used to determine the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction?*
- *What subjective measurement methods can be used to determine the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction?*

RQ 5: Which digital technologies used at the POS in DIY stores will have become established in the future and what impact will this have on customer satisfaction compared to today?

- *Which digital technologies will be used at the POS in DIY stores in the future?*
- *Which impact will these digital technologies have on customer satisfaction and how does this differ from today?*

Addressing this research gap would make a significant contribution to both science and practical applications, particularly in retail and industry, by providing new insights for scientific and economic success. Furthermore, the clear focus on the Do-It-Yourself sector means that new ground is investigated and unexplored territory is being examined.

¹ In the course of the research for this thesis, this question was considered to be of considerable importance and thus RQ 4 was added during the course of the study, in accordance with the existing flexibility of this interview form, to the interview-guideline for the conducted semi-structured interview from interview no. eleven onwards (Döring & Bortz, 2016; Gläser & Laudel, 2010).

1.3 STUDY AND METHOD DESIGN

The underlying research methodology of this dissertation is based on the approach for empirical studies according to Döring and Bortz (Döring & Bortz, 2016). Initially, a secondary analysis in the form of an extensive literature search was carried out to create the **theoretical principles**. Sources of information included publications, scientific literature, newspaper articles on scientific events, conference reports and presentations, studies by market research institutes, company annual reports and manufacturers' websites. The following **systematic literature review** followed a structured search approach in ten databases. A qualitative study with semi-structured, guideline-based expert interviews was conducted to collect data. For the evaluation, the qualitative content analysis according to Mayring was chosen.

1.4 ORGANIZATION OF THE DISSERTATION

The structure of the dissertation follows a decision-logical approach (Krüger, 2011, p. 180) and is divided into five main Chapters: introduction, theoretical principles, literature review, research approach and the future relevance: Following the outline of the study's significance and the problem statement, as well as the description of the objectives and research questions in Chapters 1.1 and 1.2, the study design and methodological approach will be presented in Chapter 1.3.

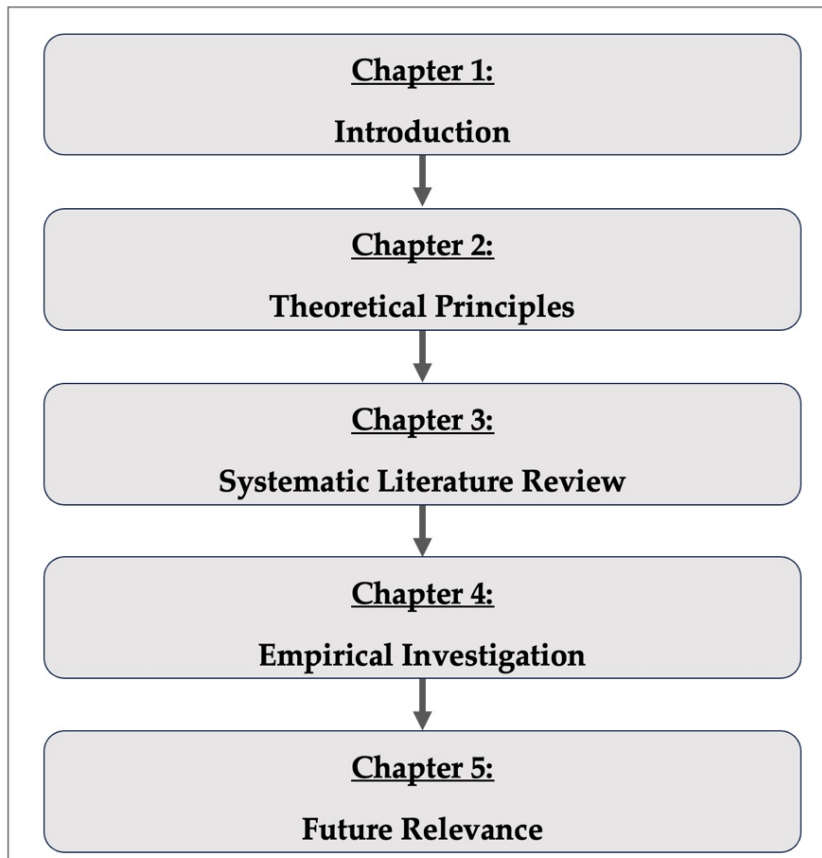
Chapter 2, the content-related theoretical part of this dissertation, first explains the general meaning of the term Do-It-Yourself in Chapter 2.1. The terms Do-It-Yourself, digitalization and digital technologies, the point of sale, digital technologies at the point of sale, and customer satisfaction are then defined in Chapters 2.2 - 2.6. The following chapter 2.7 then provides practical examples of the use of digital technologies at the point of sale in brick-and-mortar stores and their impact on customer satisfaction.

Following this, Chapter 3 presents the current state of research on the relationship between digital technologies, the DIY market, and customer satisfaction. This is accomplished through a systematic literature review, starting with the formulation of empirical findings in Chapter 3.1 and then identifying the research needs in Chapter 3.2.

In line with the research design, Chapter 4 then deals with the implementation and evaluation of the semi-structured, guideline-based expert interviews. To this end, the qualitative and quantitative research approaches are first described in subchapters 4.1 - 4.2 and the selection underlying this study is justified. Chapters 4.3 - 4.5 focus on the research process of qualitative research, basic principles of the qualitative paradigm of scientific theory and the quality criteria in empirical social research. This is followed by the presentation of the research design in Chapter 4.6, the operationalization in 4.7 and chapter 4.8 explains the sampling of the empirical study. Chapter 4.9 deals with the data collection in the form of expert interviews and Chapter 4.10 describes the data preparation. This is followed by Chapter 4.11, which presents the data analysis, 4.12 presents the findings and Chapter 4.13 concludes this main Chapter with the implications for research and practice.

In the final Chapter 5, future relevance, Chapter 5.1 presents the reflection of the research process, 5.2 the limitation before the dissertation ends with Chapter 5.3 future directions. The following figure provides an overview (Figure 1):

Figure 1: Organization of the Dissertation.



[source: own elaboration]

II – THEORETICAL PRINCIPLES

II - THEORETICAL PRINCIPLES

“Although there are a large number of scientific papers and studies on specialized topics in the construction industry, there is still no fundamental, introductory publication that describes the specific functioning of the market mechanisms of the Do-It-Yourself sector.”

BWI-Bau - Institute of Construction Economics

(BWI-Bau, 2013, p. V).

The initial chapter offers a concise introduction to the research topic. It presents the central research question and discusses the scientific relevance as well as the specific objectives of the study. In addition, the intellectual challenge that this study represents is explained.

Chapter two provides the theoretical foundations of the dissertation. It includes an exhaustive literature analysis to present the conceptual framework and to precisely define the key terms. Initially, an etymological and semantic exploration of the term “Do-It-Yourself” is carried out, followed by its contextualization in the context of the corresponding market segment and economic sector. Subsequently, the concept of the point of sale is discussed in detail. Based on this, a dedicated definition of digital technologies at the POS of DIY stores is undertaken, including a distinction that is crucial for this study. Subchapter 2.6 focuses on the theoretical foundation of the construct of customer satisfaction and presents relevant models for its conceptualization. The chapter concludes with a presentation of empirical evidence on the use of digital technologies at the POS in brick-and-mortar stores and their implications for customer satisfaction, followed by a synoptic summary of the theoretical foundations. This structured approach ensures a solid theoretical basis for the subsequent empirical investigation and contributes to the coherence of the entire dissertation.

2.1 GENERAL MEANING OF THE TERM DO-IT-YOURSELF

Do-It-Yourself describes a method of repairing, remodeling, building or modifying things yourself without requiring the help of professionals (Goldstein, 1998; Hurst & Tobias, 2011; Atkinson, 2006). In 2011, Wolf and McQuitty defined the abbreviation DIY as “activities in which individuals engage raw and semi-raw materials and component parts to produce, transform, or reconstruct material possessions, including those drawn from the natural environment” (Wolf & McQuitty, 2011, p. 154).

There are several motivations on which DIY behaviors are based: In 2008, Williams created a typology of consumer motives for DIY projects that recognizes their heterogeneity and distinguishes between willing and reluctant Do-It-Yourselfers: Willing DIYers therefore choose to practice DIY activities to add value to their home, to find their own identity with the end-product, or for enjoyment. Reluctant DIYers engage in DIY activities because of difficulties in finding a craftsman or due to economic limitations (Williams, 2008, p. 311). Wolf and King elaborated on this further and stated in 2011: DIY behaviors are based on both marketplace evaluation motivations (need for customization, economic benefits, lack of product quality and lack of product availability) and identity enhancement motivations (need for uniqueness, community seeking, empowerment and fulfillment of craftsmanship) (Wolf & McQuitty, 2011, p. 155).

Probably the first article that deliberately used the term Do-It-Yourself appeared in an American magazine in 1912, which urged homeowners to do the renovation of the interior themselves and not leave it to professional painters (Gelber, 1997, p. 79). In the course of a DIY movement, which took place in the 1950s, the term Do-It-Yourself or Doing-It-Yourself gained general usage. The term was used in the context of people being able to carry out creative and financially viable activities such as construction projects or modernizations on their properties (McKellar & Sparke, 2004, p. 179). The term do it yourself also found its way into the German language in the 1950s. It formed a collective term for fields of activity that had previously been divided into repairs, handicrafts, building or maintenance, and at the same time offered a reinterpretation of such activities (Logemann & Kreis, 2022; Ulaywi, 2022, pp. 16-17).

As a result of the DIY movement, the term Do-It-Yourself has gained in importance and spread all over the world. The term was extended to a variety of skills, which is also referred to as self-made- culture (Ulaywi, 2022, p. 17; Tachmatzidou, 2019, p. 30). It is about people in a field adapting, repairing, or designing things without expertise or special training with that work (Knobel & Lankshear, 2010, p. 5). This area now ranges from classic Do-It-Yourself to software development and music. DIY has thus developed into a widespread culture in all areas today (Tachmatzidou, 2019, p. 30).

The market for DIY (in relation to all of the different areas mentioned above) is growing all over the world and media presence plays a key role in this. Television or online platforms such as Pinterest, TikTok, Instagram or YouTube serve as sources for DIY ideas, tutorials, projects, or instruction videos. Each individual can use these opportunities to share completed projects or to exchange designs, techniques, processes, or ideas (Tachmatzidou, 2019, p. 30).

Within the underlying dissertation, the term Do-It-Yourself and its abbreviation DIY will from here onwards be used exclusively in relation to home improvement and maintenance work and in the context of the DIY market and the DIY sector (or also called hardware store sector) (the terms DIY sector and hardware store sector are used as synonyms in this work) as defined in the following Chapter 2.2.

2.2 THE DO-IT-YOURSELF MARKET

2.2.1 Definition of the Do-It-Yourself Market

According to the industry definition of the BHB – Handelsverband Heimwerken, Bauen und Garten eV. (BHB), a trade association for the DIY industry in Germany, Austria and Switzerland, there are two ways to define the DIY market: This can be based on two ways, on the basis of the sales lines or on the level of the assortment (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2016). In the following, the definitions of the sales lines will be stated first, whereas Chapter 2.2.3 then presents the definitions of the product ranges of the DIY:

- 1) **DIY stores & hardware stores:** The DIY stores and hardware stores (also called home improvement centers in American English) including affiliated garden centers. The terms DIY store and hardware store are typically used if the product range consists predominantly of the product areas of Do-It-Yourself assortment, building materials assortment including living assortments, and garden assortment. This definition is independent of the size of the location's sales area (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2016).
- 2) **DIY-core-market:** This market includes all:
 - a) DIY stores and hardware stores, including the affiliated garden centers,
 - b) large retail trade stores (garden supplies, interior design, lights, tiles, sanitary requirements, building materials, components, and wood) and
 - c) small retail trade stores (ironware, interior design, garden supplies and flowers) (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2016).
- 3) **Extended-DIY-market:** This market includes all of the above-mentioned stores of the DIY-core-market (mentioned under point two) and is expanded to include the remaining specialist stores and other forms of distribution; except for crafts, these are not assigned to the extended DIY market (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2016).
- 4) **Overall-DIY-market:** All market participants mentioned up to this point are included in the overall DIY market and supplemented by the craft sector, as DIY-relevant ranges are also sold here (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2016).

Since the above definitions are widespread in the specialist literature, these distinctions are used as a basis in this dissertation (Schmidt, 2017, p. 156; Verdict Research, 2004, p. 18; Dähne Verlag, 2023; DIY & Hardware Store – Worldwide, 2023; Branchendienst der Sparkassen-Finanzgruppe, 2021, p. 10).

2.2.2 History of the Do-It-Yourself Market

2.2.2.1 *History of the Do-It-Yourself market - Worldwide and within Europe*

In the 19th century, a strong moral incentive developed in society to help oneself. The book “Self Help; With illustrations of character and conduct” (Smiles, 1859), from 1859 has become a bestseller. This book emphasized that learning is one of the greatest joys and highlighted the duty of individuals to educate themselves. A boom in productive leisure followed. However, the motivation to engage in DIY work arose primarily for economic reasons: the wars of the 20th century and the economic catastrophes of the 1920s and 1930s encouraged many people to do DIY. As an economic upswing initially failed to materialize and only took place after the 1950s, home improvement became established. In the 1950s, people's everyday lives changed: Short working weeks and more vacation days led to more free time, home ownership increased, and wages were also higher. In addition, everyday items were rationed during and after World War II and there were few skilled specialist-workers available to carry out home projects. In addition, the media on TV and magazines also promoted the topic of DIY (Science Museum Group, 2020). This led to the first DIY stores opening from the 1950s on (LOWE'S, 2023; BAUHAUS, 2023; BaumarktManager, 2017).

2.2.2.2 *History of the Do-It-Yourself market - Germany*

Until the first DIY stores opened in Germany, tools and nails could only be bought from hardware specialist stores, paints and wallpapers from paint shops and wood from wood merchants (Göldner, 2023; BaumarktManager, 2017). From the mid-1950s onwards, a dramatic change took place in retail, which led to a switch to self-service markets. At the same time, the areas of self-service markets developed in such a way that they became larger and larger, and the stores changed their name to supermarkets (BaumarktManager, 2017). At the same time, discounters such as Aldi and, later on, Lidl were formed (ALDI Nord, 2023; Lidl, 2023; BaumarktManager, 2017). This change also had an impact on, and subsequent upheaval in the hardware trade and the hardware specialist industry (BaumarktManager, 2017).

In 1960, the first real hardware store opened in Germany; BAUHAUS opened its first branch in Mannheim with a sales area of 600 square meters. The next branch followed five years later, which already had a sales area of 2,500 square meters. This development meant that hardware store customers were now able to pack their own screws and nails in small quantities in plastic bags and thus buy them as required. This new type of selling was controversially discussed in the hardware specialist industry and met with strong resistance, as the so-called revolutionary type of free choice for small fittings and fittings did not exist until then. However, this trend continued, including with the decision of the Zahn-Nopper company from Stuttgart, which decided in 1963 to convert its entire small hardware department to the self-service system. From this point onwards, it is appropriate to consider the breakthrough in the hardware specialist stores, as self-service continued to spread from then on. The trend of selling electrical goods, tools, paint and chemical building material in transparent packaging has from then on grown beyond the hardware range. From this point onwards, more and more DIY stores relied on this type of sales, offering a wider range than traditional hardware specialist stores.

This development has led to a structure that is crucial for today's DIY market. Moreover, it laid the foundations for several companies that are currently among the top ten in the German DIY market. In 1963, Max Bahr turned a wood shop into a hardware store business. The first Hornbach combined hardware and garden store followed in 1968 in Bornheim with a logo that displayed Bau-Supermarkt. Knauber stores followed, and, under the umbrella of Distributa and Globus, the first self-service department stores with integrated DIY departments. In 1970, OBI opened its inaugural store, which had a sales area of 875 square meters, in Hamburg. About five years later, OBI established ten more new stores, albeit in a franchise format. Other companies that had previously operated in the food sector followed and opened the first hardware stores, such as Wickes and Spar. This was followed by the first Mobau hardware stores, Hela hardware stores, EM hardware stores and the opening of the first Götzen hardware store in Moers. In 1978, the Rewe Group presented the first toom hardware store in Frankfurt am Main, Praktiker its first store in Luxembourg and Süba its first store in Hockenheim (BaumarktManager, 2017). On February 16, 1979, the first Hagebau market opened its doors in Kelheim near Regensburg (BaumarktManager, 2019).

2.2.3 Product Range of the Do-It-Yourself Market

At the level of the product assortment, a distinction is made between the core range and the extended range. The core range is further divided into the areas of DIY, building materials and garden. This leads to the definitions of the following four product range categories - which, like the definitions of the DIY market, come from the BHB - which are standard and accepted in the market. These range definitions are therefore used as the basis for this dissertation (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2016):

Do-It-Yourself assortment: The Do-It-Yourself assortment consists, among other things, of hardware, locks, fittings, security technology, tools, machines, construction and cleaning equipment, wallpaper, paint, painter's supplies, decoration, home textiles, electrical, sanitary and installation supplies, bathroom equipment, heating, air conditioning, floor coverings, wood and plastic cladding, lights, lamps and accessories.

Building materials assortment: The building materials assortment consists of irrigation and drainage ranges, as well as products from the interior design, drywall, building elements, construction chemicals, and tiles ranges.

Garden assortment: The garden assortment consists, among other things, of products from the areas of green-indoor, green-outdoor, fertilizers, soils, plant protection, garden tools, garden machines and accessories, garden furniture, and barbecues.

Extended Assortment: The extended assortment includes, among other things, products from the leisure assortment level, toys, crafts, small kitchens, household goods, small electrical appliances, bicycles and accessories, pet supplies, car accessories and seasonal items.

In addition to this product definition, the following Chapter describes some of the **special features of the DIY product range**, which demonstrates how the product range and therefore even the purchasing process in DIY stores differ significantly from purchases in other sectors, such as the CE / electricals retail trade or the fashion & accessories sector.

2.2.3.1 *Scope of the Product Range and Size of the Do-It-Yourself Store Sales Area*

In general, the **DIY store assortment is very extensive and is sold on relatively large sales areas**, compared to other sectors such as fashion & accessories, leisure & hobbies, or CE / electricals. In terms of retail space, it can be stated that approximately every third DIY- and hardware store in Germany was larger than 7,500 square meters in 2022 (DIY & Hardware Store – Worldwide, 2023, p. 29; diy online, 2022a). In comparison, the average sales areas of the consumer electronics retailers Media Markt and Saturn operated by the Ceconomy Group, for example, are significantly smaller at 2,600 square meters in 2019/2020 in Germany (EHI Retail Institute, 2023).

The product range is also extremely extensive and varied: Especially the large DIY stores in particular, often have around 70,000 articles in their assortment, resulting in an enormous depth and breadth of product range (Lebensmittel Zeitung, 2023; Müller & Werner, 2014, p. 407 ff.). The hardware assortment alone often consists of about 2,000 different articles (BaumarktManager, 2015).

2.2.3.2 *Need for Explanation of the Do-It-Yourself Product Range*

A further special feature of the DIY-market is that **many articles require explanation** (Gelbrich, Wünschmann, & Müller, 2018, p. 244). This results in a situation where the potential applications of products, especially those that require explanation, are not immediately obvious to the average customer. Detailed explanations at the point of sale are essential to prevent the customer being overwhelmed. For this reason, the DIY product range requires a great amount of explanation for the available articles (BaumarktManager, 2015).

2.2.3.3 *Project-driven Purchases Require Products from several Departments*

Another significant feature of the DIY store is that purchases are often **project-driven**.² This **project-focused** approach implies that **products from several departments of the DIY store are typically required** (Meyer & Reher, 2016; HORNBAACH Baumarkt AG, 2023c; Kempkens & Kopatzki, 2021).³

2.2.3.4 *Price guarantees for the Do-It-Yourself store product range*

Another special feature is that some DIY stores offer price guarantees for their product ranges. These allow customers to get at least the same price if they find an item cheaper at a competitor's store, as many DIY stores then offer to lower their price to the same level in such cases (HELLWEG Die Profi-Bau- & Gartenmärkte GmbH & Co. KG, 2023a; HELLWEG Die Profi-Bau- & Gartenmärkte GmbH & Co. KG, 2023; Globus Fachmärkte GmbH & Co. KG, 2023). In some cases, DIY stores go a step further and will not only match the competitor's price (depending on the terms and conditions of the DIY company), but also offer the customer an additional discount of 10% or 12% (HORNBAACH Baumarkt AG, 2023d; BAUHAUS, 2023c).

These special features underline the special circumstances that distinguish DIY stores from stores in other sectors. The sales area of DIY stores and the variety of product ranges are enormous compared to other sectors. Furthermore, the products' need for explanation and the frequent presence of a project concept during the purchasing process are distinguishing characteristics of DIY stores.

² A project in this context relates to a job that usually consists not just of one single purchase from a DIY store department, but a project that requires products from several DIY store departments (for example, for renovating the bathroom, refurbishing the home-office, or landscaping the garden).

³ When installing an interior door for example, various products such as the door itself, handle, construction foam, wall paint, acrylic, drill, screws, and lock are typically needed. These items, usually located in different departments, require the customer to navigate multiple product categories for their project.

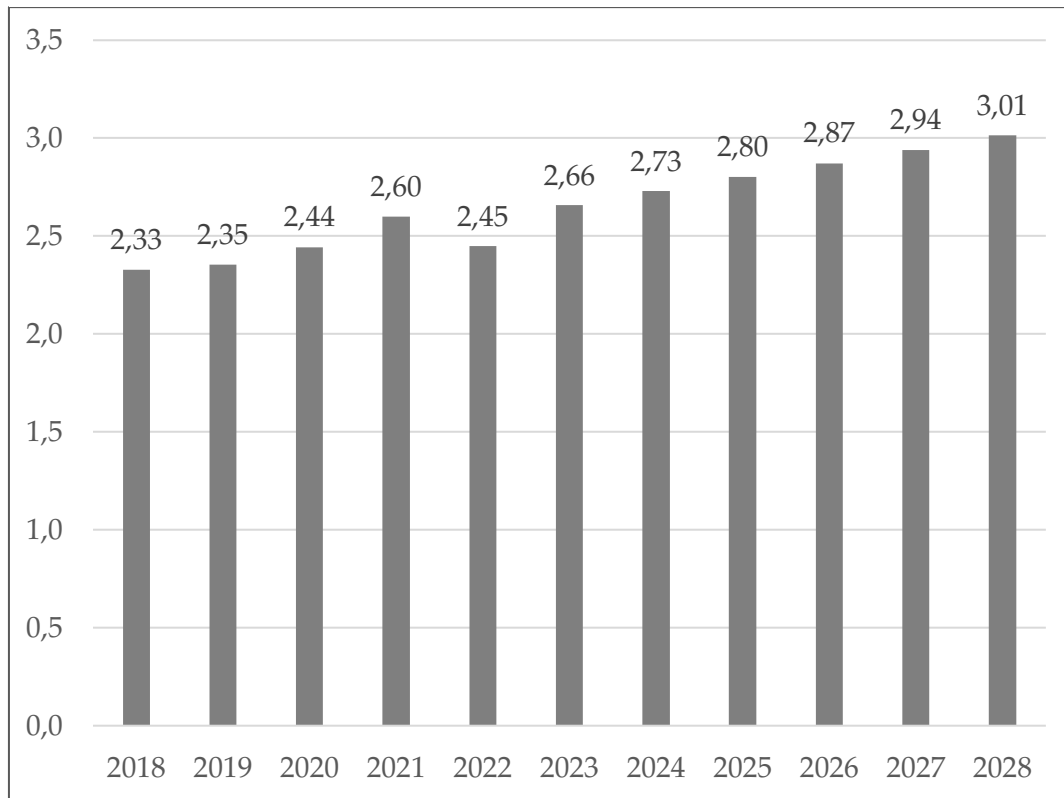
2.2.4 Do-It-Yourself Market Data

2.2.4.1 *The Do-It-Yourself Market - Worldwide and within Europe*

The DIY sector is a large and growing area **worldwide**. In 2022, worldwide DIY & Hardware Store revenue amounted to €2,449 billion (B) (DIY & Hardware Store – Worldwide, 2023, p. 7). Of this, most of the revenue is generated in Asia at €1,237 B. This is followed by Americas (North America with Central America and South America) with a turnover of €711 billion and Europe with €301 B. In the ROW (rest of the world) €199 B in sales were achieved (DIY & Hardware Store – Worldwide, 2023, p. 13). Online sales account for 16.4% (+0.3% compared to the previous year) of this total turnover (DIY & Hardware Store – Worldwide, 2023, p. 9).

The whole DIY market has been growing continuously in recent years - with the exception of 2022 (-5.8% compared to the previous year) (DIY & Hardware Store – Worldwide, 2023, p. 4-7). The decline in 2022 was due, among other things, to the war in Ukraine, as this contributed to high inflation, which, in turn, led to consumer reticence (Dähne Verlag, 2023, p. 61). Forecasts predict a steady increase in global DIY and hardware store sales, amounting to an additional €360.2 B (a 13.42% increase) from 2023 to 2028 (cf. Figure 2). It is therefore assumed that sales in 2028 will be approximately €3 trillion (T) (DIY & Hardware Store – Worldwide, 2023, p. 4-7)

Figure 2: DIY & Hardware Store revenue in billion euros worldwide including forecast from the year 2023.



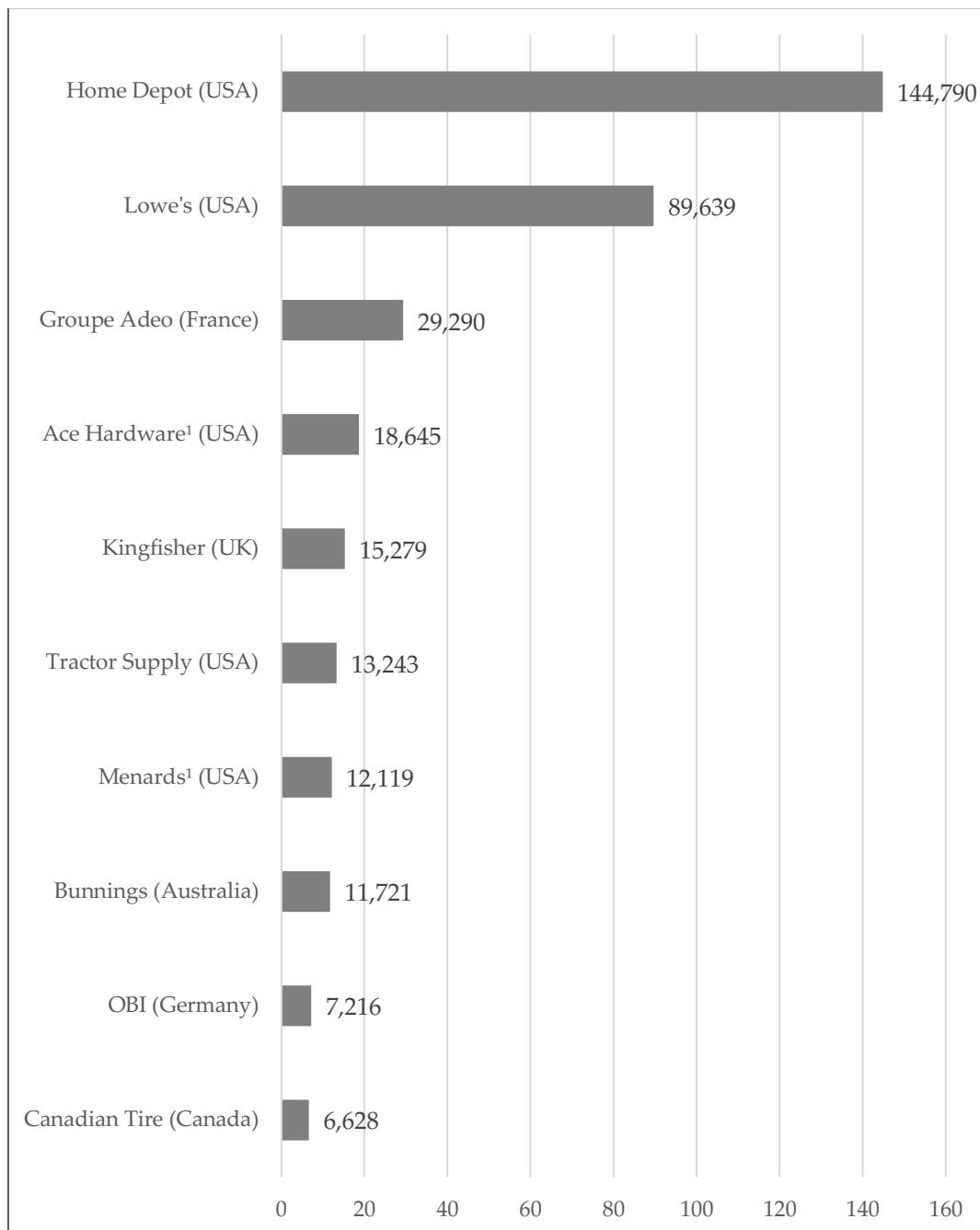
[source: own elaboration based on (DIY & Hardware Store – Worldwide, 2023, p. 7)]

This means that - based on the total population of the entire world - per capita sales of approximately €321.6 were generated in 2022. Measured in terms of revenue per capita, the highest turnover was achieved in Americas (€708), followed by Europe (€355), Asia (€275) and the ROW (€154) (DIY & Hardware Store – Worldwide, 2023, p. 14).

In terms of net sales in 2022, the largest DIY store companies in the world are Home Depot (USA) with net sales of €144.7 billion, Lowe's from the USA (€89.6 billion) and Groupe Adeo from France with net sales of €29.2 billion. This is followed by Ace Hardware (USA) with €18.6 billion, Kingfisher (UK) with €15.3 billion, Tractor Supply (USA) with €13.2 billion, Menards (USA) with €12.1 billion, Bunnings (Australia) with €11.7 billion, OBI (Germany) with €7.2 billion and Canadian Tire (Canada) with €6.6 billion as the top ten players in terms of net sales in 2022 in the world. The three largest DIY store companies globally account for

76% of the total net sales of the world's top ten DIY store companies (cf. Figure 3) (Dähne Verlag, 2023, p. 80). This shows the oligopolistic structure of DIY retail, which can also be seen in a similar way in Europe and Germany (Williams, 2008).

Figure 3: Largest DIY store companies worldwide by net sales in million euros in 2022.

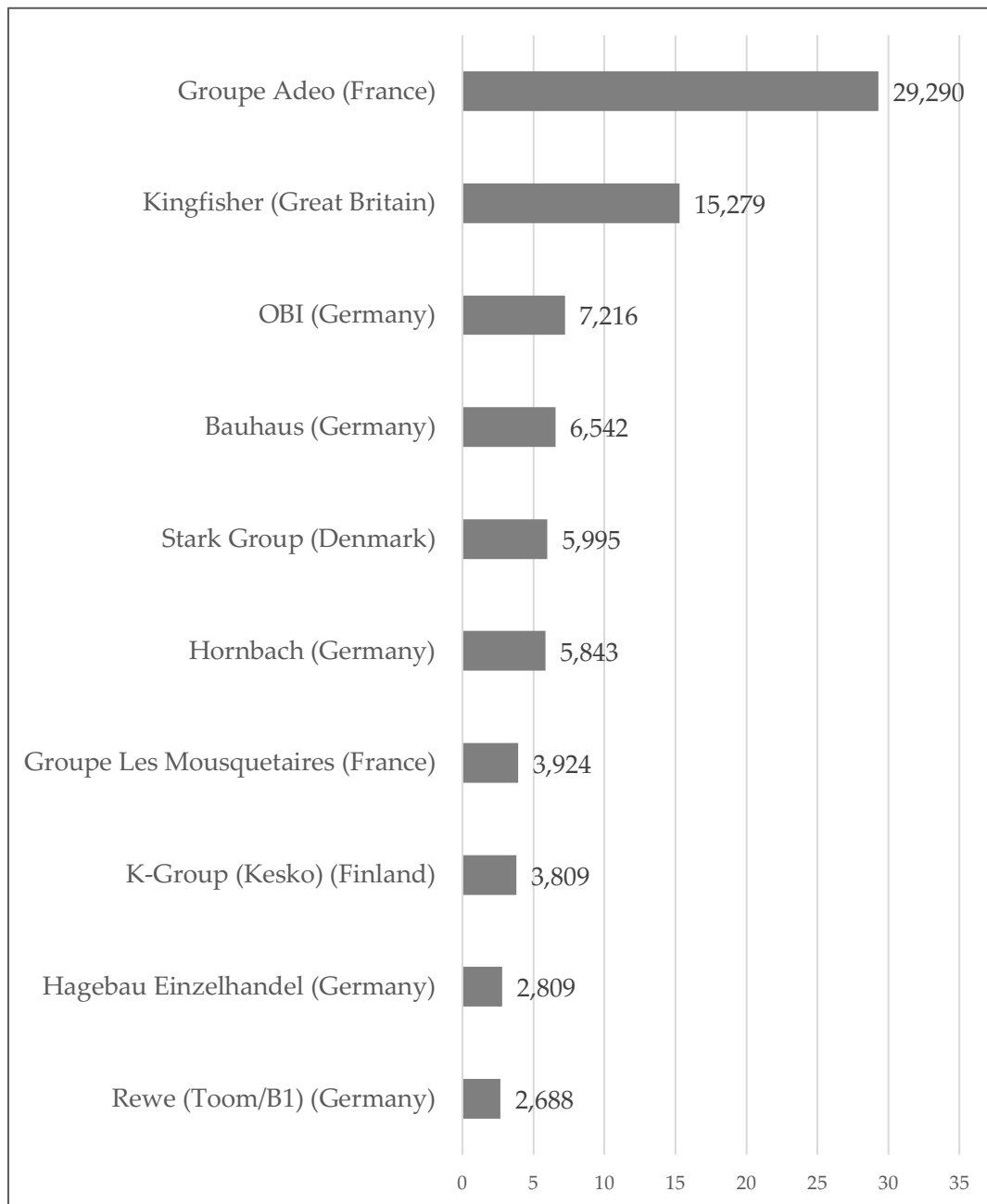


[source: own elaboration based on (Dähne Verlag, 2023, p. 80)]

Analyzing the distribution of sales between brick-and-mortar retail (also known as offline) and online retail, shows that 83.6% of sales were generated offline and 16.4% online in 2022. In 2018, the proportion of sales generated offline was still 86.8%. This means that bricks-and-mortar retail recorded a decline of -3.2% in favor of online retail in the period from 2018 to 2022. This also shows however, that offline sales still dominate the global DIY market. Forecasts do not predict an extreme decline in offline sales in the future either. According to expert forecasts, the share of sales generated online will only increase by + 1.4% between 2022 and 2025 (DIY & Hardware Store – Worldwide, 2023).

Within **Europe**, the following five DIY store companies are the five largest in terms of net sales in 2022: Groupe Adeo (France) with 29.3 billion euros, Kingfisher (UK) with 15.3 billion euros, OBI (Germany) with 7.2 billion euros and Bauhaus (Germany) with 6.5 billion euros and the Stark Group (Denmark) with 6 billion euros. The five companies, following them can also be seen in the following Figure (cf. Figure 4) (Dähne Verlag, 2023, p. 76) The data underlines that the DIY market in Europe is also oligopolistic, as the two largest companies generate a sales share of 53% of the top ten DIY store companies.

Figure 4: Largest DIY store companies within Europe by net sales in million euros in 2022.

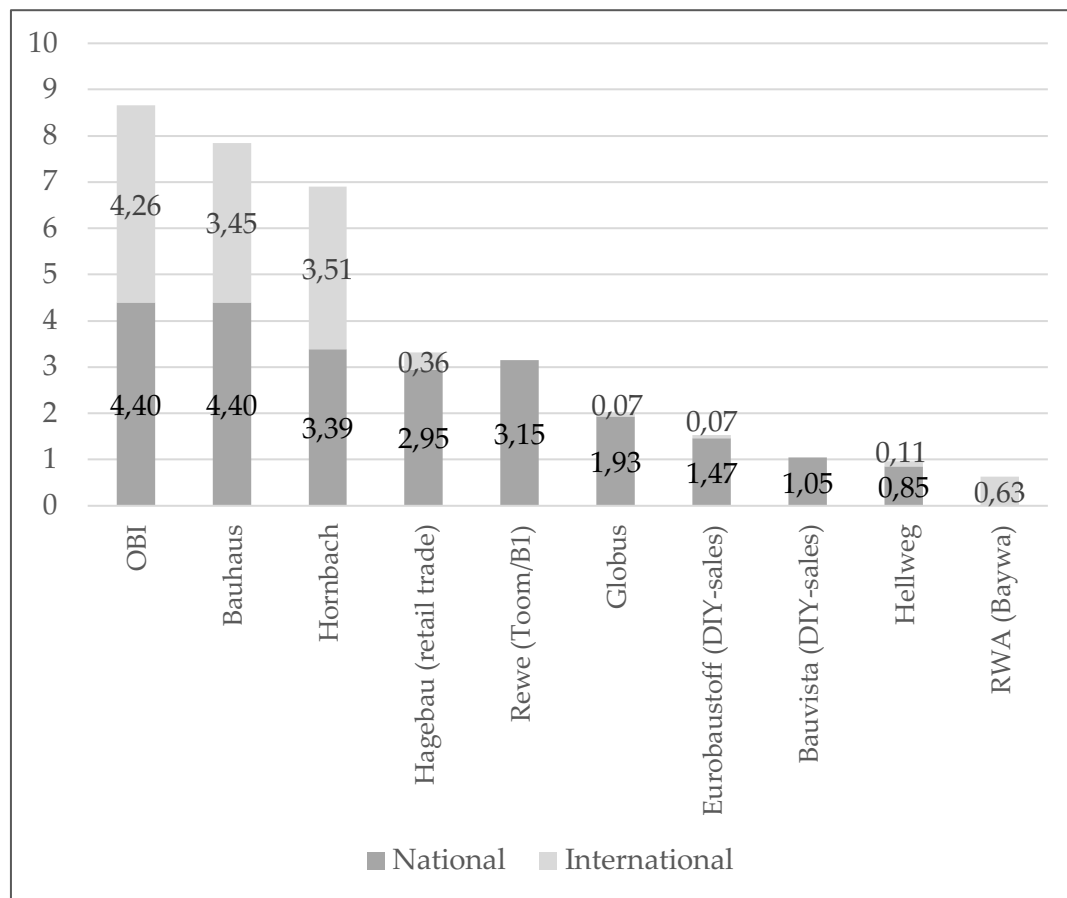


[source: own elaboration based on (Dähne Verlag, 2023, p. 76)]

2.2.4.2 *The Do-It-Yourself Market in Germany*

In **Germany**, 2,067 DIY- and hardware stores were recorded as of January 1, 2023. The total sales area amounted to more than 11.9 million square meters. This equates to an area of around 5,770 square meters per store (gemaba - Gesellschaft für Markt- und Betriebsanalyse mbH, 2023). Sales at DIY- and hardware stores in Germany amounted to 21.92 billion euros in 2022 (BHB - Handelsverband Heimwerken, Bauen und Garten e.V., 2023). The DIY-core-market generated 52.73 billion euros, resulting in per capita sales of 634 euros. The largest German DIY store companies in terms of gross sales in the domestic and international markets can be represented as follows (cf. Figure 5):

Figure 5: Largest German DIY store companies by gross sales in million euros in the domestic and international markets for 2022.



[source: own elaboration based on (Dähne Verlag, 2023, p. 28 & 62)]

Figure 5 shows that OBI and BAUHAUS are the largest companies overall in terms of gross sales both in the domestic and international markets in 2022. OBI reached combined gross sales of €8.7 billion in the domestic and international markets; Bauhaus €7.9 billion. Hornbach is the only German DIY store company that reached a higher gross sales value on the international as opposed to the domestic market; with a total of €6.9 billion, the company is in third place (Dähne Verlag, 2023, p. 62).

The top 10 DIY store companies in Germany generated gross sales of €25.9 billion in 2022. In percentage terms, an increase of 31.5% was achieved in the comparable period 2008 - 2022. The following table provides an overview of the number of locations of these companies (this includes hardware stores or hardware store departments with a sales area of 400 square meters or more). The overview shows that the companies Hagebau (retail trade), Eurobaustoff, Bauvista, Fishbull (Sonderpreis Baumarkt) and Rewe with their toom and B1 stores, each with over 300 locations, have the most stores.

Table 1: Number of DIY stores and DIY store departments with sales space of 400 square meters or more of DIY store companies in Germany.

DIY store company	Number of locations	National Gross Sales (in billion euros)
Hagebau (retail trade)	471	2.948
Eurobaustoff	416	1.467
Bauvista	375	1.050
OBI	348	4.400
Fishbull	325	0.420
Rewe /toom / B1)	311	3.145
Krämer	258	0.380
Euro-DIY	166	0.550
Bauhaus	159	4.400
Hornbach	98	3.390
Hellweg	88	0.850
Globus	88	1.934
	3,103	24.934

[source: own elaboration based on (Dähne Verlag, 2023, p. 30)]

2.2.5 Drivers of the Do-It-Yourself Market

With its product ranges described in Chapter 2.2.3, the DIY market is dependent on various factors in the economic environment. As these environmental factors are decisive for the development of the DIY sector, the most important drivers of the market are described below. This is not least because digital technologies can be a vehicle for responding to these drivers. The key market drivers are presented in this sub-chapter, as they can be considered the most important for the sector (DIY & Hardware Store – Worldwide, 2023):

The **housing market** has a strong influence on the sales generated in the DIY market, as the prevailing situation there determines the behavior of property owners. If the housing market performs strongly, property prices rise at the same

time, and the property owner is more likely to invest in DIY projects to achieve an increase in property value. This may imply higher sales of assortments, such as, paint, flooring, and landscaping supplies, or lead to an increase in larger projects, such as bathroom or kitchen remodels. If the opposite is occurring and the housing market is performing rather weakly, this can lead to homeowners investing less often in renovation work, which results in a decrease in sales in the DIY market (DIY & Hardware Store – Worldwide, 2023; Deutsche Presse-Agentur, 2023; BaumarktManager, 2023).

The **housing market also has a further influence on the respective DIY product range**: if the housing market performs strongly, many owners are willing to sell their property. This then results in staging investments, which should lead to a possible increase in the sale price of the property. This then leads to staging projects, such as painting the exterior or making minor repairs. If the opposite is true and the housing market is performing rather weakly, this can lead to property owners being less willing to sell their own properties and then focus more on projects such as larger renovation projects such as major remodeling. Depending on the situation, a different range is needed and purchased for each of these works (DIY & Hardware Store – Worldwide, 2023).

Another major influence on the Do-It-Yourself market and the economy in general is **consumer spending**. These are influenced by income, household debt and consumer expectations, among other factors. All these aspects have an impact on the economic situation of the DIY market: The **increase in consumer disposable income** is accompanied by a higher demand for goods, which leads to an economic upswing. **Household debt** has an impact on the market in that it determines how much money consumers are able to spend (DIY & Hardware Store – Worldwide, 2023). In Germany, the level of debt rose almost continuously from 2012 to 2020 and around 10% were thus considered to be over-indebted in 2020. In 2021, the level of debt has fallen slightly to 8.9%, but experts did not expect the situation to ease due to the COVID-19 pandemic (Peters, 2022).

Consumer expectations resp. consumer confidence also plays a significant role in the economic situation of the DIY sector. Consumer spending figures increases when the country's economic situation is stable. Causes that can contribute to a decline in consumer spending include inflation (DIY & Hardware

Store – Worldwide, 2023). The development of consumer spending in general appears as follows: Since 2010, this has risen steadily in Germany until 2020. In 2020 it fell falling from €1.752 trillion to €1.654 trillion. In 2021, it then rose again, reaching a new high of €1.921 trillion in 2022 (Statistisches Bundesamt, 2023).

Another driver of the Do-It-Yourself Market is demographics and related **demographic trends**. Germany is already experiencing significant demographic changes (DIY & Hardware Store – Worldwide, 2023). The number of younger people has been declining noticeably since 1990, while the number of older people has been increasing. Every second person in Germany is now over 45 years old and every fifth person is 67 years or older (Statistisches Bundesamt (Destatis), 2023; Statistisches Bundesamt (Destatis), 2023a). This demographic change is accompanied by certain needs that are relevant to DIY. Due to this aging population, there is an increasing demand for products as well as services that are aimed precisely at this aging population (DIY & Hardware Store – Worldwide, 2023). These include any items that promote barrier-free living (Wonneberger, 2018; Immobilienmanager, 2023), such as grab bars, stair lifts, wheelchair ramps or level access showers (DIY & Hardware Store – Worldwide, 2023; Blasig, 2021).

Another trend is based on the increasing number of **Millenials** entering the housing market. This results in a stronger demand from this generation for products and services that meet the interests of this group (DIY & Hardware Store – Worldwide, 2023): smart home innovations (GfK SE, 2017), energy-efficient appliances, intelligent home technology along with furnishing features that reflect the style of millennials (DIY & Hardware Store – Worldwide, 2023). Thus, the Millenial generation plays a key role for the DIY market in terms of this product segment (GfK SE, 2017).

Another trend is that more and more people are moving into **smaller living spaces in urban areas**. This in turn leads to the need to create new products and solutions, such as compact tools, storage solutions (DIY & Hardware Store – Worldwide, 2023) or combination solutions, such as stacking beds, cabinet beds or shelves and cabinets that can be used as a table at the same time (Lambernd, 2022).

2.2.6 Trends of the Do-It-Yourself-Market

As detailed in the previous Chapter, key drivers such as the housing market, consumer spending, and demographic trends significantly influence the DIY market. This subchapter highlights crucial trends that present both opportunities and challenges in the sector.

Sustainability and **eco-friendliness** have become significant trends in the DIY sector. Growing environmental concerns and the consumer desire to minimize environmental impact have increased the demand for sustainable products. As a result, retailers are adapting their assortment to offer sustainable and eco-friendly products: For example, **products** and **product packaging** are made from recycled materials, such as decking made from recycled plastic or insulation made from recycled glass (toom Baumarkt GmbH, 2022; DIY & Hardware Store – Worldwide, 2023; BaumarktManager, 2021) .

Beyond this, various retailers have also adopted **sustainability programs** or measures to address the issue of sustainability and contribute to a reduction of the environmental footprint (DIY & Hardware Store – Worldwide, 2023). BAUHAUS, for example, has declared that sustainable action is one of the company's most important tasks: among other things, the company pays attention to waste reduction. BAUHAUS reports a significant environmental achievement, having reduced plastic waste by 45,000 kilograms per year in their tools and hardware section. This reduction was made possible by replacing plastic bags with glassine bags⁴ for loose items. Additionally, BAUHAUS places a strong emphasis on offering healthy living products. In collaboration with the Sentinel Haus Institut, they ensure these products meet strict safety standards for harmful substances and emissions. Products that meet these transparent quality criteria are included in BAUHAUS's healthy living range, distinguished by a signet from the Sentinel Haus Institut (BAUHAUS E-Business Gesellschaft für Bau- und Hausbedarf mbH & Co.

⁴ Glassine bags are a special form of packaging material made from glassine paper, which is a smooth, glossy paper that is resistant to air, water and grease. They are manufactured using a supercalendering process. The supercalender consists of several elastic rollers arranged one above the other, through which the paper web is passed. Heat, pressure and friction in the nip make the paper surface smooth and glossy (UPM, 2023).

KG, 2023; Sentinel Haus Institut GmbH, 2023). In addition to BAUHAUS, other DIY retailers also have similar programs or pursue corporate activities with regard to sustainability, such as toom, which has built a corresponding program on four pillars: green products, social commitment, employees and energy, climate and environment (toom Baumarkt GmbH, 2023; toom Baumarkt GmbH, 2023a). Hellweg emphasizes on its website, for example, that no products containing glyphosate have been sold since 2018, or refers to Plantiflor, a brand under which only tested quality is sold (HELLWEG Die Profi-Bau- & Gartenmärkte GmbH & Co. KG, 2023). Hornbach also pays considerable attention to the issue of sustainability, subdividing this topic into several subcategories on the website: attitude, people, assortment, background, sustainable products. Under all these categories, they focus intensively on these various sub-items under the aspect of sustainability (HORNACH Baumarkt AG, 2023). OBI, which received the German Sustainability Award in 2023, states that it has made it its mission to become more sustainable, to use resources more sparingly, and to support its customers in implementing their projects in an ecological and sustainable manner (OBI GmbH & Co. Deutschland KG, 2023). Many other companies could be cited below as examples, as the top players in the DIY sector are all addressing the issue of sustainability to a certain extent. Sustainability efforts among DIY retailers frequently encompass recycling programs, like those introduced at Globus, and enhancements in store energy efficiency (DIY & Hardware Store – Worldwide, 2023; Böhl, 2021). Additionally, many retailers collaborate with their suppliers to ensure adherence to sustainability standards. Since the issue of sustainability is thus becoming a focus for both customers and companies, consumers are becoming increasingly aware of their impact on the environment, it can be assumed that in the future, products that align with these customers values will continue to be sought and purchased (DIY & Hardware Store – Worldwide, 2023). The fact that this topic is a trend, especially in Germany, is evident in a survey: most respondents (22%) in Germany, in direct comparison with the USA and the UK, answered that sustainability is an important topic for them in the DIY market (one per cent more than in the USA (21%) and four per cent more than in the UK (18%)) (DIY & Hardware Store – Worldwide, 2023, p. 22).

Therefore, it can be assumed that DIY retailers who meet this demand will generate stronger customer loyalty and thus also higher sales (DIY & Hardware Store – Worldwide, 2023).

Another trend is the need for **personalization** and **individualization** (diy online, 2018). Consumers are increasingly seeking unique and personalized products tailored to their needs. This trend has developed even further, especially during the COVID-19 pandemic, as access to individualized products in online stores is much higher than in brick-and-mortar stores. DIY stores are already responding to these trends with a number of measures (DIY & Hardware Store – Worldwide, 2023; OBI GmbH & Co. Deutschland KG, 2023a), for example by providing paint mixing systems where customers can choose their individual color shade (DIY & Hardware Store – Worldwide, 2023; BayWa Bau- & Gartenmärkte GmbH & Co. KG, 2023). The expansion of the product ranges particularly in the hardware sector, has led to a broader selection of color and material combinations. This enhancement includes various metals such as aluminum, stainless steel, zinc, brass, and nickel, as well as options for fixtures in different colors like black, providing customers with more personalized choices beyond the standard steel offerings (DIY & Hardware Store – Worldwide, 2023; BAUHAUS, 2023a). Other options, such as customizing a breakfast tray by printing a personal picture or configuring a toilet seat, are also offered by some retailers (Rehme, 2022).

DIY stores also make use of collected **personalized data**, which they collect so that they can respond to individual search queries or customer preferences and act in a more needs-based manner (DIY & Hardware Store – Worldwide, 2023; Strüker, 2013).

Surveys also indicate that customers are becoming increasingly savvy and demanding, with 54% of Germans stating that they are more interested in products that can be customized according to their wishes than equivalent products that cannot be changed (Lebensmittel Zeitung, 2018). This means that DIY stores must meet this demand and offer **customizable products and services** in order to retain their customer base or attract new customers (DIY & Hardware Store – Worldwide, 2023).

Another key trend in the DIY market is the growing interest in knowledge and guidance on how to carry out DIY projects, which is leading to **DIY education**.

Consumers' need for knowledge to complete projects has increased, regardless of whether they are simple repairs or extensive projects. This trend has increased through social media such as Pinterest or YouTube and through communities, as also mentioned in Chapter 2.1, where customers and DIYers exchange ideas (DIY & Hardware Store – Worldwide, 2023; Tachmatzidou, 2019, p. 30).

DIY stores are already responding more and more intensively to these customer requests. For example, several DIY companies offer **workshops** and courses for customers, in which they are instructed on minor repairs or even larger projects and taught specialist knowledge on specific topics (DIY & Hardware Store – Worldwide, 2023). BAUHAUS and Hornbach, for example, among other companies, also offer a so-called “Women's Night” (BAUHAUS, 2023b) or “Women@Work” (HORNBAACH Baumarkt AG, 2023a) event, which are special DIY courses for women. In addition, DIY retailers have expanded the resources they make available for customers in this context, so that **tutorials**, videos or step-by-step instructions can now be found on the websites of various companies (DIY & Hardware Store – Worldwide, 2023; diy online, 2022; HORNBAACH Baumarkt AG, 2023b). Offers such as virtual advice, which connect customers with experts who can provide specialist advice, are also on the rise (DIY & Hardware Store – Worldwide, 2023; toom Baumarkt GmbH, 2023a). It can therefore be assumed that DIY retailers must also embrace this trend in order to be competitive and support their customers so that they can successfully complete their DIY projects (DIY & Hardware Store – Worldwide, 2023).

2.3 DIGITALIZATION AND DIGITAL TECHNOLOGIES

2.3.1 Digitalization

Having defined Do-It-Yourself and POS for this dissertation, this Chapter will now focus on delineating and classifying the concepts of digitalization and digital technologies within this context. Since the scientific literature does not provide a uniform definition of the term digitalization, as it is often used differently in different contexts, the following overview is intended to first provide a few definitions of digitalization:

Table 2: Selected definitions of digitalization.

No.	Authors and year of publication	Definition
1	Parviainen et al., 2017	“The action or process of digitizing; the conversion of analogue data (esp. in later use images, video, and text) into digital form.” (Parviainen, Kääriäinen, Tihinen, & Teppola, 2017, p. 64)
2	Hagberg et al., 2016	“Digitalization is one of the most significant on-going transformations of contemporary society and encompasses many elements of business and everyday life.” (Hagberg, Sundström, & Egels-Zandén, 2016, p. 694)
3	Amit & Zott, 2001	“Thus, digitalization refers both to a transformation from ‘analogue’ to ‘digital’ (e.g., a shift from cash to electronic payments) and to the facilitation of new forms of value creation (e.g., accessibility, availability, and transparency)” (Amit & Zott, 2001, as cited in Hagberg et al., 2016)
4	Reis et al., 2020	“digitalization is the phenomenon of transforming analogue data into digital language (i.e. digitization), which, in turn, can improve business relationships between customer and companies, bringing added value to the whole economy and society.” (Reis, Amorim, Melao, & Cohen, 2020, p. 448)
5	Hakim et al., 2023	“Digitization describes the process of converting analog information ... into digital data. Digitization (the process of converting analog data into digital data sets) is a framework for digitization defined as the exploitation of digital opportunities.” (Hakim, Laelawati, & Mardiana, 2023, p. 79)

6	Gartner, 2023	“Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business.” (Gartner, 2023)
7	Kerzner et al., 2022	“digitization concerns transforming information from any format to another easily readable and understandable by computers to allow machines to deal with the data management, process, and analysis: On the other hand, Digitalization uses digital technologies to improve the delivery and change the business model while adding new values and opportunities to the process and operations through analogy to a digital system that implements digitization through automation to increase transparency and accuracy.” (Kerzner, Zeitoun, & Vargas , 2022, p. 175)

[source: own elaboration]

The given definitions of digitalization refer to several elements:

In the technical context, the focus is on the process of transformation, which describes the conversion of analog content (esp. texts, images and videos) into digital formats (Parviainen, Kääriäinen, Tihinen, & Teppola, 2017, p. 64; Amit & Zott, 2001; Reis, Amorim, Melao, & Cohen, 2020, p. 448; Hakim, Laelawati, & Mardiana, 2023, p. 79; Lucks, 2020; Loebbecke, 2006, p. 360).

Some definitions of digitalization, especially in the context of value creation, include its role as an enabler for society and the economy. This includes supporting new forms of accessibility, availability, and change (Amit & Zott, 2001; Hagberg, Sundström, & Egels-Zandén, 2016, p. 694; Reis, Amorim, Melao, & Cohen, 2020, p. 448; Gartner, 2023). This is achieved through the use of digital technologies (Gartner, 2023; Kerzner, Zeitoun, & Vargas , 2022, p. 175).

In order to delimit the term digitalization in the context of dissertation, the following definition of digitalization will be applied:

*Digitalization describes the **transformation of business models** and processes **through the use of digital technologies** with the aim of **generating added value**.*

This transformation therefore also relates to the POS within the DIY store.

2.3.2 Digital Technologies

As digital technologies (DT) are a central element of this transformation, they will be defined below. The following table also provides an excerpt of some definitions from various publications:

Table 3: Selected definitions of digital technologies.

No.	Authors and year of publication	Definition
1	Ciarli et al., 2021	“Digital technologies permeate and restructure all facets of economic and social activities. In some ways that they are implemented, they disrupt existing activities, while in others they have a more incremental impact and complement existing activities. In some cases, they substitute for existing technologies and tasks, but in others they are complementary. At times, they result in the creation of new activities, services, innovation, and business opportunities.” (Ciarli, Kenney, Massini, & Piscitello, 2021)
2	Vial, 2019	“digital technologies create disruptions triggering strategic responses from organizations that seek to alter their value creation paths while managing the structural changes and organizational barriers that affect the positive and negative outcomes of this process.” (Vial, 2019)
3	Rusch et al., 2022	“Digital technologies (DTs), such as the Internet of Things, big data, artificial intelligence, or blockchain, are considered as enablers for a more sustainable and circular economy.” (Rusch, Schöggel, & Baumgartner, 2022, p. 1159)

4	Johnston et al., 2023	“We refer to digital technology as tools, systems and devices that can generate, create, store or process data. The data processing and logic capabilities of digital technologies are enabled through microprocesses that are programmed to perform various functions. Digital technologies refer to devices such as personal computers and tablets, tools such as cameras, calculators and digital toys, systems such as software and apps, augmented and virtual reality, and less tangible forms of technology such as the Internet.” (Johnston, Kervin, & Wyeth, 2022)

[source: own elaboration]

Summarizing the definitions provided, they can be summarized, as well as those of digitalization, in terms of several elements to which they refer:

In technical terms, digital technologies describe all technologies that are based on computer hardware, software (e.g. ChatGPT) and networking that generate, create, store or process digital data. Digital technologies can refer to tangible forms (tablets, cameras, calculators, etc.) but also less-tangible forms (apps, augmented reality (AR), virtual reality (VR), big data, QR codes, RFID, NFC, artificial intelligence (AI), the Internet, Internet of Things (IoT) etc.) of technologies (Loebbecke, 2006, p. 359; Bundesministerium für Wirtschaft und Klimaschutz, 2023a; Johnston, Kervin, & Wyeth, 2022; Rusch, Schöggel, & Baumgartner, 2022, p. 1159).

The definitions listed also mention the objectives of digital technologies: for example, they enable value creation by contributing to a more sustainable and circular economy. In this context, however, possible disadvantages and risks are addressed, such as disruptions to existing activities (Vial, 2019; Ciarli, Kenney, Massini, & Piscitello, 2021; Johnston, Kervin, & Wyeth, 2022; Rusch, Schöggel, & Baumgartner, 2022, p. 1159).

Finally, from an organizational perspective, reference is made to the accompanying changes brought about by digital technologies, for example through process transformation, which leads to the restructuring of economic and social facets (Ciarli, Kenney, Massini, & Piscitello, 2021; Vial, 2019).

The relationship between digital technologies and the associated transformation and the DIY market is aptly described by Hamberg et al.:

“This transformation is important for the retail sector, which both affects and is affected by this development. Retailers provide consumers with various digital products and services that are adapted to the use of digital technologies and are simultaneously affected by the new forms of consumption associated with these digital technologies.” (Hagberg, Sundström, & Egels-Zandén, 2016, p. 694)

As a synthesis of the definitions given and the statement by Hagberg et al., the following characterization of digital technologies emerges in the context of this study:

*Digital technologies describe all **tangible and less-tangible** forms of **technologies** based on hardware, software and networking that **generate, create, store or process data** with the **aim of contributing value creation**. They are **accompanied by structural and process transformations, which can be associated with risks**.*

The scope of this dissertation includes digital technologies that can be operated by both DIY store staff and DIY store customers.⁵

To elaborate on this, the following Chapter is dedicated to digital technologies at the point of sale.

⁵ In the DIY store, there are digital technologies that are intended exclusively for use by DIY store employees (for example, special configuration programs for worktops, windows, or doors) and those that are intended for both DIY store employees and DIY store customers. This study considers both cases.

2.4 POINT OF SALE

The previous Chapter has provided an introduction to the DIY market and, in addition to some market data, particularly dealt with the special features with regard to product ranges and any drivers and trends, providing a framework enabling the reader to follow concepts in this thesis. The following Chapter provides a uniform understanding of the point of sale (POS).

Since there is no uniform definition of the POS construct in scientific literature, a clear definition of the term is essential in the context of this dissertation: The first noticeable aspect when reviewing the scientific literature with regard to the term POS is that the terms point of sale and point of purchase (POP) are sometimes used as synonyms and are therefore considered to be of the same meaning (Seeborn, 1999; Büttner, 2009, p. 3 f.; Häberle, 2008, p. 995). In addition, the literature research reveals the following:

Seeborn briefly defines the term POS in his publication as the place where a product or service is offered and sold (Seeborn, 1999, p. 169). Vollberg defines the term point of sale somewhat more concretely and more broadly, as a space in which goods are offered. In addition to the point of sale, this includes the shopping location and the direct environment (interior and exterior design) of the objects, the people and the atmosphere. Vollberg also allows the term POS to be used synonymously with the terms outlet, branch, shopping facility, sales outlet, store or store. The virtual selling point (e-shop) is defined as not belonging to the POS (Vollberg, 2012). Häberle describes the POS as the location of a product on the sales floor or the place where it is offered. Furthermore, the definition elaborates that the consumer is confronted with the retail company at the POS in such a way that this contact has a significant influence on the retailer's personality and purchasing behavior. Häberle also considers the point of purchase to be synonymous with the point of sale (Häberle, 2008, p. 995). Egan adds that the point of purchase can be understood as the "place where customers are making their buying decisions" (Egan, 2020, p. 295). Finally, it is to be noted that Kreutzer's interpretation extends the POS or PoP to offers on a website where online purchases can take place (Kreutzer, 2012, p. 114). This differs, for example, from Vollberg's definition (Vollberg, 2012; Kreutzer, 2012, p. 114).

When looking at these definitions from existing literature, it is noticeable that they differ primarily in terms of the scope of the POS: Views are most likely to differ on this point, from the place where the product is sold up to online presence. As this thesis is concerned with DIY stores, the point of sale is characterized as follows in the context of this study:

*The point of sale is the **place where a product is offered and sold**. This includes the **entire shopping area (in the store)**. The point of sale is an important point of contact for customers that influences their purchase decision. **Digital technologies** that provide functions that are **explicitly designed for use at the point of sale** are also **assigned to the point of sale**.*

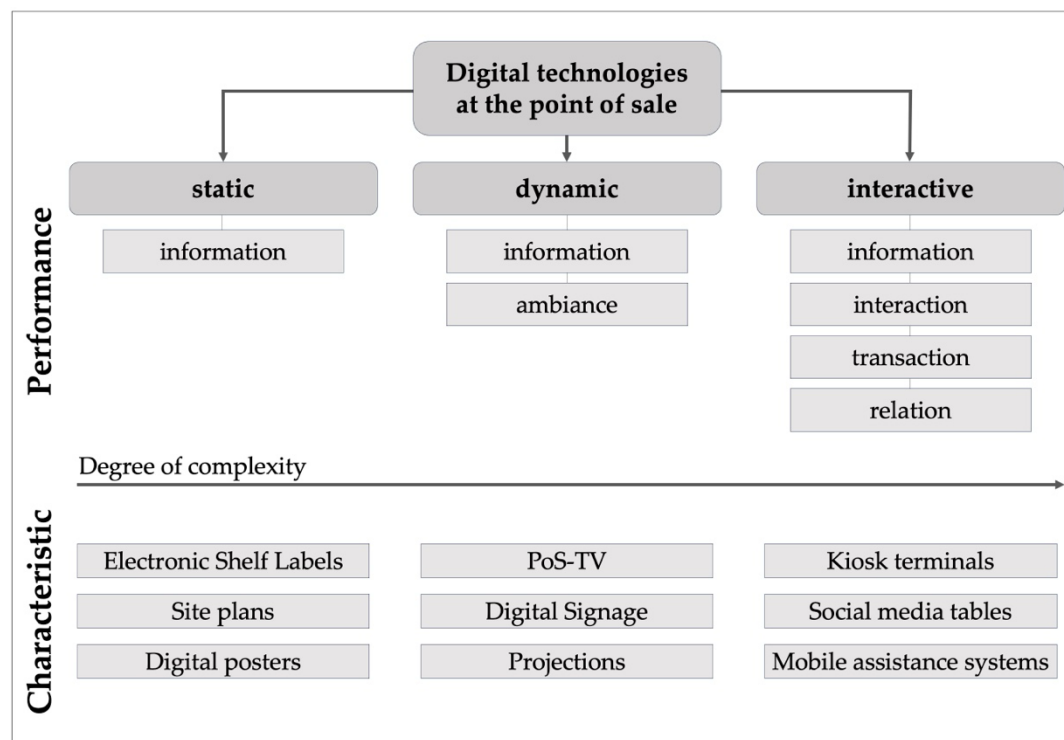
In accordance with this definition, this dissertation also considers the checkout area or an information counter to be part of the POS, as this is part of the shopping area in the store. Digital technologies that include a function that is explicitly intended for use in the shopping area (e.g. self-scanning functions or a product finder function that guides the customer to the items they are looking for in the DIY store) are also categorized as part of the POS.

However, existing virtual selling points that are not explicitly intended for use in the shopping area such as a DIY store's website or social media platforms via which a customer can buy the retailer's products at any location are not considered part of the POS.

2.5 CHARACTERIZATION OF DIGITAL TECHNOLOGIES AT THE POINT OF SALE IN BRICK-AND-MORTAR STORES

Digital technologies at the point of sale can be characterized by the use of digital information-related and communication-related technologies in brick-and-mortar stores (IFH Institut für Handelsforschung GmbH, 2016; Spreer, 2013; Gröppel-Klein, 2006, p. 645). To classify the diverse possibilities of digital technologies, the following overview presents digital technologies at the POS and characterizes them into static, dynamic and interactive point of sale technologies. This classification also includes performance dimensions and characteristics of digital POS media:

Figure 6: Performance dimensions and characteristics of digital technologies at the Point of Sale.



[source: own elaboration based on (Spreer, 2013; Rowley & Slack, 2003; Silberer, 2010; Spreer, 2013a as seen in Spreer, 2013)]

With regard to the research objective of the study, Figure 6 should be supplemented by the fact that interactive digital technologies at the point of sale can be further differentiated between technologies that may be operated by both DIY store employees and DIY store customers, and technologies that may only be operated by DIY store employees (see also the footnote from Chapter 2.3.2).

These explanations from chapter 2.5 establish the link between the point of sale (see Chapter 2.4) and digital technologies (see Chapter 2.3.2). The following Chapter then refers to the last main concept to be characterized in this dissertation that of customer satisfaction.

2.6 CUSTOMER SATISFACTION

2.6.1 Characterization of Customer Satisfaction

The construct of customer satisfaction has already been characterized in numerous scientific publications by various authors. The intention of this Chapter is to first compare previous definitions before providing a characterization that applies to this dissertation.

The concept of customer satisfaction originated in the 1970s and has been examined repeatedly since then in numerous publications (Anderson, 1973; Hempel & Rosenberg, 1976; LaTour & Peat, 1979; Churchill & Surprenant, 1982). However, as there is still no standard definition of the term customer satisfaction, the following table provides an overview of selected, frequently cited definitions:

Table 4: Selected definitions of customer satisfaction.

No.	Authors and year of publication	Definition
1	Day, 1984	"...consumer satisfaction/dissatisfaction is the consumer's response in a particular consumption experience to the evaluation of the perceived discrepancy between prior expectations (or some other norm of performance) and the actual performance of the product as perceived after its acquisition" (Day, 1984)
2	Gustaffsson et al., 2005	"Customer satisfaction is defined as a customer's overall evaluation of the performance of an offering to date" (Gustaffsson, Johnson, & Roos, 2005)
3	Oliver, 1997	"Satisfaction is the consumer's fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under- or over-fulfillment." (Oliver, 1997)
4	Tarnowska et al., 2018	"...customer's satisfaction is multidimensional and varies with different characteristics..." (Tarnowska, Ras, Daniel, & Fowler, 2018)
5	Auge-Dickhut et al., 2016	"Customer satisfaction is multidimensional. The demands placed by customers on a product, a service or a certain technology can be divided into basic, performance and enthusiasm demands. Their fulfillment has a different effect on customer satisfaction." (Auge-Dickhut, Koye, & Liebetrau, 2016)
6	Howard & Sheth, 1969	"Satisfaction is defined as the buyer's cognitive state of being adequately or inadequately rewarded for the sacrifices he has undergone" (Howard & Sheth, 1969, p. 145)

7	Locke, 1967	"...the better a person did in relation to his expectation, the more positive affect (satisfaction) experienced." (Locke, 1967)
8	Westbrook & Reilly, 1983	"Consumer satisfaction, then, is an emotional response to the experiences provided by, or associated with, particular products or services purchased, retail outlets, or even molar patterns of behavior such as shopping and buyer behavior, as well as the overall marketplace" (Westbrook & Reilly, 1983)

[source: own elaboration]

The overview of the definitions of customer satisfaction shows that the term is differentiated in academic literature with regard to customer satisfaction as the result of a target/actual comparison (definitions no. 1-3), as a multi-dimensional construct (definitions no. 4-5) and as an attitude (definitions no. 6-8) (Stock-Homburg, 2012; Fuchs, 2010, p. 49; Grund, 1998, p. 18; Bakken & Frazier, 2006, p. 289; Auge-Dickhut, Koye, & Liebetrau, 2016, p. 117; Tarnowska, Ras, Daniel, & Fowler, 2018, p. 292; Day, 1984; Gustaffsson, Johnson, & Roos, 2005; Oliver, 2015; Westbrook & Reilly, 1983; Locke, 1967; Howard & Sheth, 1969). All of these components can be found repeatedly in academic literature.

Thus, it can be stated that the construct of customer satisfaction consists of the following basic components (Winter, 2005):

- **Customer satisfaction as the result of a target/actual comparison:**
Customer satisfaction is the result of a comparison process. Before the customer buys a product or uses a service, they form certain expectations. These expectations are then compared with the perceived performance of the product or service received (target/actual comparison). If the result of this comparison process is that the performance does not meet expectations, dissatisfaction arises. If the performance meets expectations, this results in indifference, which can also be described as average satisfaction. For a customer, the company's services would be interchangeable in this

case. However, if the performance exceeds expectations, this results in enthusiasm or extraordinary satisfaction, which is also described as genuine satisfaction. It can therefore be stated that customer satisfaction is the discrepancy between the expected and the experienced performance from the customer's point of view (Hinterhuber, Handlbauer, & Matzler, 2003, p. 14 ff.; Day, 1984; Gustaffsson, Johnson, & Roos, 2005; Oliver, 1997; Stock-Homburg, 2012; Winter, 2005; Homburg, Giering, & Hentschel, 1998; Meffert, Bruhn, & Hadwich, 2015, p. 220; Nerdinger, Neumann, & Curth, 2015, p. 120 ff.; Clausius, 2015, p. 62).

- **Customer satisfaction as a multi-dimensional construct:** Customer satisfaction is also seen as a multi-attribute and multi-dimensional concept, meaning that the overall satisfaction rating can depend on a variety of assessment features. For example, the price, the product range, retail staff or even the salesroom design can represent a dimension that has an influence on customer satisfaction (Fuchs, 2010; Grund, 1998; Bakken & Frazier, 2006; Winter, 2005). In this regard, Auge-Dickhut et al. state that customer satisfaction is multidimensional, as customer requirements can be divided into basic, performance, and enthusiasm requirements. This is independent of whether it is a product or a service. This contributes to the Kano model, which is also presented and explained below (Auge-Dickhut, Koye, & Liebetrau, 2016, p. 117; Tarnowska, Ras, Daniel, & Fowler, 2018, p. 292).
- **Customer satisfaction as an attitude:** Customer satisfaction can be understood as an attitude according to the definitions outlined above (Howard & Sheth, 1969; Locke, 1967; Westbrook & Reilly, 1983; Stock-Homburg, 2012; Winter, 2005). There is debate over whether customer satisfaction should be distinguished from the concept of attitude. On one side, the prevailing view is that customer satisfaction is transaction-specific, arising from individual experiences with a

product or service. In contrast, some argue that customer satisfaction has a cumulative character, formed from multiple transaction-specific experiences. This cumulative satisfaction can contribute to a lasting attitude towards a company or brand. However, it's important to note that attitude, as a broader, more enduring sentiment, encompasses more than just accumulated satisfaction and can be influenced by factors beyond specific transactions (Fichter, 2018, p. 62; Nerdinger, Neumann, & Curth, 2015; Hill & Alexander, 1996; Winter, 2005; Borth, 2004, p. 14; Meyer, 2010; Backhaus & Bauer, 2003, p. 108; Johnson, 2001, p. 160).

In recent literature, it has also been increasingly observed that customer satisfaction is not viewed purely on a cognitive level, but that emotions and their influence on customer satisfaction are also increasingly gaining in importance (Griese, 2002, p. 217 ff.; Faullant, 2007, p. 29 ff.; Boslau, 2009, p. 25 f.; Hensen, 2019, p. 320 ff.). Therefore, the evaluation process of customer satisfaction is increasingly both cognitive and emotional, with the balance between these aspects varying dynamically (Hensen, 2019, p. 320 ff.).

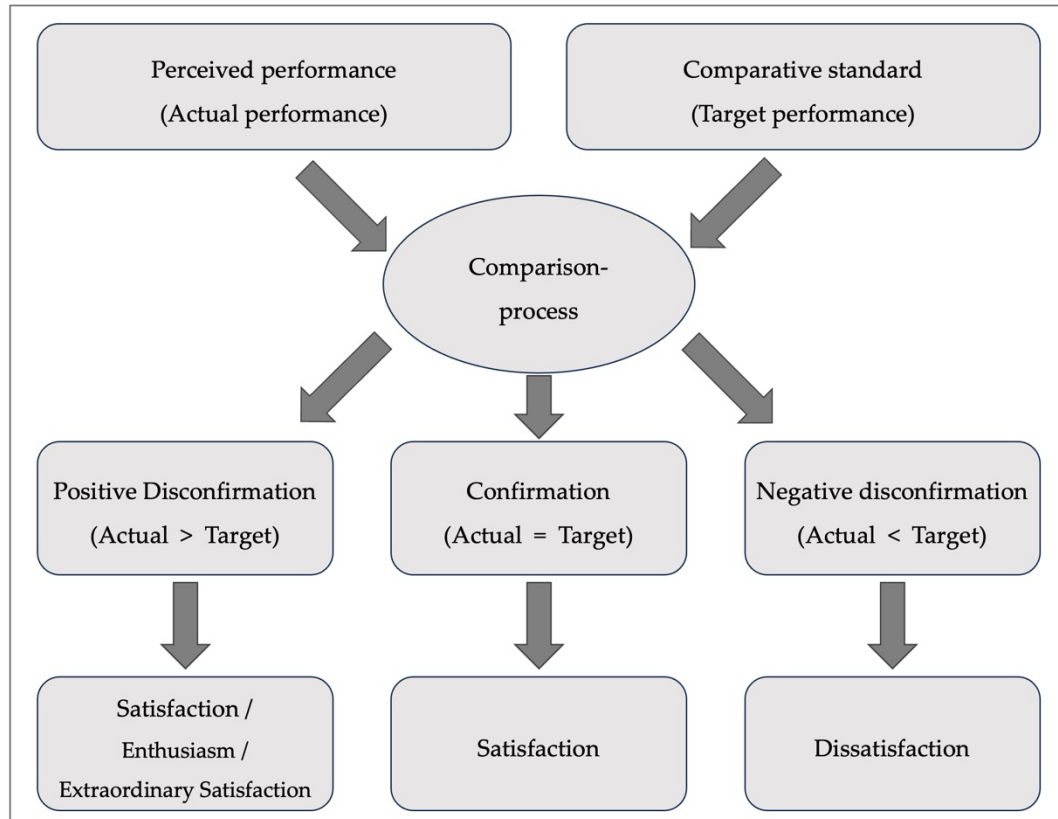
All of these characterizations make it clear that the construct of customer satisfaction describes a complex process, as it is influenced by a variety of factors. As it is a construct of social research, it is best to approach the term with the help of models. For this reason, two well-known models that serve the purpose of the dissertation well are presented below (Hensen, 2019, p. 320 ff.).

2.6.2 Customer Satisfaction Models

2.6.2.1 *Confirmation/Disconfirmation-Paradigm*

One of the most well-known and established models in satisfaction research is the confirmation/disconfirmation paradigm (C/D paradigm), which elucidates the construct as a kind of basic model (Pucko, 2010, p. 22; Hensen, 2019, p. 320 ff.). The model pursues a cognitive, technical-functional approach by considering the degree of fulfillment of requirements (Hensen, 2019, p. 320; Homburg & Koschate, 2007). The model describes customer satisfaction as the result of the cognitive comparison, which compares the perceived performance (actual performance) with the expected performance (target performance). The paradigm first shows the comparison process that takes place between the comparison standard, which describes the target performance, and the perceived performance being the actual performance. This comparison process can result in negative disconfirmation, leading to dissatisfaction, or in confirmation and positive disconfirmation, both of which lead to satisfaction (Homburg & Koschate, 2007). The following Figure illustrates this comparison process:

Figure 7: Underlying principle of the confirmation/disconfirmation paradigm.



[source: own elaboration based on (Homburg, Giering, & Hentschel, 1998, p. 3; Homburg & Koschate, 2007, p. 846 f.)]

There is disagreement in the literature about some of the terms used in the confirmation/disconfirmation paradigm. For example, Homburg et al. state that if the actual performance exceeds the target performance, this leads to satisfaction; Nerdinger does not use the term satisfaction in this case but uses the term enthusiasm for the comparison result in this case. According to Homburg et al., if the actual performance corresponds to the target performance, this leads to satisfaction; Meffert and Bruhn, however, refer to this result with the word indifference and do not use the word satisfaction. Agreement is only established if the target performance exceeds the actual performance; the authors mentioned above then refer to this uniformly as dissatisfaction that arises (Homburg, Giering, & Hentschel, 1998; Meffert, Bruhn, & Hadwich, 2015, p. 220; Nerdinger, Neumann, & Curth, 2015, p. 120 ff.).

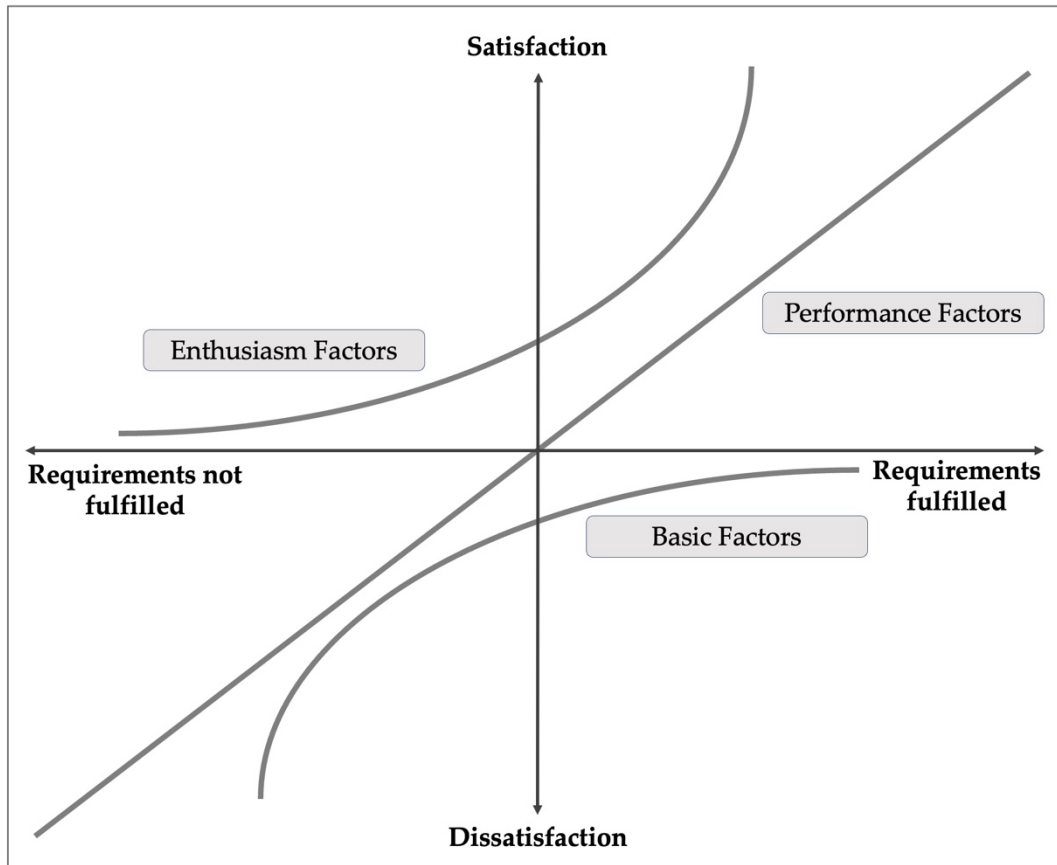
2.6.2.2 *Kano-Model*

The Kano model, developed by Noriaki Kano, follows the basic idea that satisfaction and dissatisfaction (two-factor theory) of consumption are triggered by different factors (Hensen, 2019, p. 321 ff.; Nerdinger, Neumann, & Curth, 2015, p. 126). The model distinguishes between three factors:

- **Basic factors:** The basic factors represent quality features that customers take for granted. If these are fulfilled, this does not lead to a positive evaluation; if they are missing, however, this leads to a negative evaluation (Nerdinger, Neumann, & Curth, 2015, p. 126; Meffert, Bruhn, & Hadwich, 2015, p. 321 f.).
- **Performance factors:** Performance factors are generally expected by customers. These can influence the quality assessment positively (actual performance > target performance) and negatively (actual performance < target performance). The relationship between confirmation level and satisfaction is linear (Nerdinger, Neumann, & Curth, 2015, p. 126; Meffert, Bruhn, & Hadwich, 2015, p. 321 f.).
- **Enthusiasm factors:** These factors are not expected by the customer and therefore lead to a high level of satisfaction, which is rated positively by the customer, insofar as they are perceived (Nerdinger, Neumann, & Curth, 2015, p. 126); Meffert, Bruhn, & Hadwich, 2015, p. 321 f.).

The following Figure illustrates the Kano model of customer satisfaction and shows how customer satisfaction is measured using the model:

Figure 8: Kano model of customer satisfaction.



[source: own elaboration based on (Berger, et al., 1993, p. 4; Nerdinger, Neumann, & Curth, 2015, p. 127)]

Based on the definitions provided and the two models presented, it can be stated that the following applies to customer satisfaction:

- Customer satisfaction describes a comparison process in which the customer compares his expectations (target performance) before using a service with the perceived degree of fulfillment after using the perceived service (actual performance).
- The result of this cognitive and emotional comparison process results in negative disconfirmations, indifferent confirmations, or positive disconfirmations, which result in dissatisfaction, satisfaction, or enthusiasm/ extraordinary satisfaction.

- The construct of customer satisfaction is multidimensional, as it is influenced by a variety of factors.
- Customer satisfaction is transaction-specific, as it depends on at least one experience (transaction).

Since customer satisfaction in the consumer goods sector can be conceptualized as transaction-specific (Boslau, 2009, p. 26), and the aim of this thesis is to gain insights into the impacts of digital technologies at the POS in DIY stores on customer satisfaction, we will treat each customer interaction with digital technologies as a distinct experience (transaction). Consequently, the working definition will not encompass the following broader characterization:

- Customer satisfaction can be seen as an attitude-like construct, as it is a more long-term concept based on cumulative experiences of individual customer experiences (transaction-specific).

This derivation of the findings enables the term to be defined in the context of the study, so that the following definition of customer satisfaction is valid in this study:

*Customer satisfaction describes a **multidimensional, transaction-specific comparison process** of the customer, comparing **the target performance** with the **actual performance**, resulting in the three possible outcomes of **dissatisfaction, satisfaction, or extraordinary satisfaction**.*

2.6.3 Measurement of customer satisfaction

Since the previous chapter ended with a definition for customer satisfaction, the aim of this chapter is to provide an overview of how customer satisfaction can be measured.

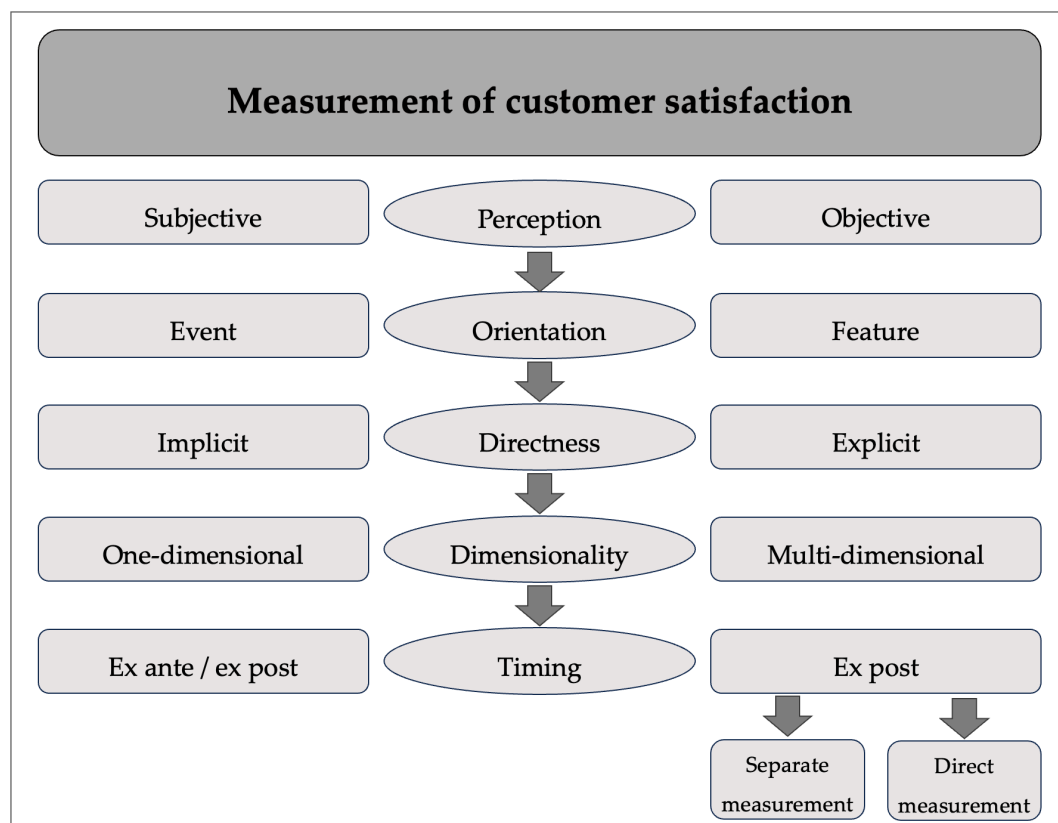
For measuring customer satisfaction, there exist numerous approaches. According to the literature, a distinction is made between subjective and objective methods. **Objective measurement methods** are based on easily measurable quantities such as profit, sales or market share. These indicators exhibit a high correlation with customer satisfaction. **Subjective measurement methods** are based on a survey of customers' subjective satisfaction (Homburg & Koschate, 2007). According to the literature, objective methods are quite often far removed from the object of measurement of customer satisfaction (for example, a decline in sales does not always mean that this is due to a decline in customer satisfaction). In contrast, subjective measurement methods are seen as being more closely related to the customer, since they determine, for example, the assessments of customers that directly indicate customer satisfaction (Bruhn, 2004; Voeth & Herbst, 2013; Homburg & Koschate, 2007).

Another distinction in the literature is made between **event-oriented** and **feature-oriented procedures**: Event-oriented procedures only consider one contact between the customer and a product or service, while feature-oriented procedures follow the approach that customer satisfaction describes a cumulative result of individual quality features and thus track this totality of events. Feature-oriented procedures can be further subdivided into **implicit** and **explicit** procedures: implicit procedures refer to perceived performance deficits, such as complaints. However, since not every customer who has a performance deficit contacts the company, the explicit procedure is preferable, whereby a direct survey of customers is carried out using suitable instruments. These procedures can be further subdivided into **one-dimensional procedures** (where a factor with an indicator is used for measurement) and **multidimensional procedures** (where a factor with an indicator is used for measurement), which consider several dimensions (Bruhn, 2004; Beutin, N. 2006; Massenbach, 2009).

Finally, a distinction can be made based on the time of measurement: In the case of **ex ante procedures**, customer satisfaction is determined by a measurement

carried out in advance, which is compared with a subsequent measurement. In the case of an **ex post procedures**, only one measurement is carried out afterwards (Bruhn, 2004; Beutin, N. 2006; Massenbach, 2009). The following Figure 9 below illustrates this in the form of a schematic illustration.

Figure 9: Measurement of customer satisfaction.



[source: own elaboration based on (Beutin, 2007, p. 124)]

2.7 PRACTICAL EXAMPLES OF USING DIGITAL TECHNOLOGIES AT THE POINT OF SALE IN BRICK-AND-MORTAR STORES AND THEIR IMPACT ON CUSTOMER SATISFACTION

After the previous chapters have now explained the most important theoretical principles of this thesis, this chapter aims to conclude by **linking the concepts of digital technologies, point of sale and customer satisfaction**. Since digital technologies are already widely used in brick-and-mortar stores at the point of sale and there exist also studies on their impact on customer satisfaction, this chapter will conclude by providing an overview of the most important studies that address this link between the topics. Thereby, **the focus will be on various retail sectors, but not on the do-it-yourself sector**. The reason for this is that the DIY sector has been poorly researched in this context, which will be presented in more detail in Chapter 3, which explicitly deals with the impact of the use of digital technologies at the POS in brick-and-mortar stores on customer satisfaction in DIY and demonstrates a lack of research covering this area. However, to permit a critical review of different perspectives, including those from other retail industries, the aim of this chapter is to identify the effectiveness and limitations of the use of digital technologies at the POS in brick-and-mortar stores across all retail sectors.⁶

2.7.1 Robots

Robots, which in brick-and-mortar retail are usually designed as humanoid robots, can be used by retail companies in the service or sales area. For example, the consumer electronics retailer MediaMarktSaturn Retail Group uses the sales robot Paul, which assists customers with finding products or providing sales advice. The advantages of robots are primarily that they relieve the burden on staff in brick-and-mortar stores while also increasing customer satisfaction by providing

⁶ The author has published a systematic overview of available digital technologies for the POS in brick-and-mortar retail in the book chapter 'Digital Touchpoints at the POS - Generating Competitive Advantages in Retail Stores' as part of the academic book 'Marketing & Innovation 2021' (Naskrent et al., 2021).

information quickly, reducing waiting times, being able to provide advice in several languages and contributing to an enjoyable shopping experience. Possible disadvantages are their limited ability to answer more complex customer queries and their deficiency in emotional intelligence (Gmelch & Hofmann, 2024, pp. 51 ff.; Leitherer, 2024; German Federal Ministry for Economic Affairs and Climate Action, 2024).

2.7.2 Checkout Systems

Checkout systems for paying goods purchased by customers in brick-and-mortar stores can be divided into three main types: cash registers with conveyor belts, payment at self-checkout terminals and cashless payment. In the following, examples of self-checkout terminals and cashless payment methods are presented (REWE Markt GmbH, 2024). In the context of the thesis dealing with digital technologies, the concept of traditional cash registers with conveyor belts is not presented:

Self-checkout terminals are one form of staffless checkout technologies. At self-scanning checkouts, customers scan and pay for their goods independently at the checkout that they operate themselves, without the need for staff. Supermarkets such as REWE, for example, use this technology. Another company that also uses self-scanning technology is Bingo-Box. Bingo-Box has been opening unmanned stores since 2017. In these 24-hour self-service stores, customers shop for products, scan their barcodes or QR codes using self-scanning technology, and then pay with WeChat Pay or Alipay (Gatti & Richter, 2019, p. 65; Nowroth, 2024; REWE Markt GmbH, 2024).

Examples for **cashless payment** methods can be found at Amazon, among other places: Amazon names a such a technology they utilize: Just walk out technology. In this case, the customer registers by scanning a QR code on their mobile phone when they enter the store and from then on can put the desired products directly into their bag. Camera and light barrier technologies, as well as infrared and volume change sensors located in the store, are used to assign the

products purchased by the customer to them, and the customer then leaves the store without going to the checkout. However, it should be mentioned that Amazon is currently scaling back these technologies since the savings resulting from fewer personnel on the sales floor are not in proportion to the costs incurred by the system, for example, the fact that camera feeds must be monitored by personnel to ensure correct processes (German Federal Ministry for Economic Affairs and Climate Action, 2024; Proschofsky, 2024; Lebensmittel Zeitung, 2024; Berg & Knights, 2022).

Amazon is currently working on a new solution that could replace just walk out technology: The smart shopping cart “Dash Cart”. Computer vision, sensors and cameras are used to recognize which products customers put in their shopping cart. This technology allows customers to keep track of how expensive their purchase is becoming. The shopping cart can also point out nearby offers. At the end of the shopping trip, the customer can leave the store without having to physically pay (Lebensmittel Zeitung, 2024).

REWE is also currently testing such technologies in its “Pick&Go” test stores. Like Amazon, the aim here is for customers to pack their goods themselves and leave the supermarket without any waiting time. This should help to make shopping a more relaxed experience, make shopping easier and at the same time reduce the time customers have to spend waiting (REWE Markt GmbH, 2024).

2.7.3 Digital Fitting Rooms

Digital fitting rooms are primarily used within the fashion retail market. In these fitting rooms, customers can be given product recommendations or a 3D background can be generated that matches the clothing items the customer is trying on. In the digital fitting room, customers can request clothing items using a touch display. It is also possible to have selected clothing items brought to the fitting room by scanning them in advance or selecting them on a smartphone. In addition, the touch display or smartphone can be used to suggest items of clothing that match well. A body scan is also possible to define the customer's clothing size. The technology is intended to turn shopping into an experience. The aim is also to fulfil customer requests more quickly and to reduce waiting times by using artificial intelligence to draw on empirical values, such as which items of clothing are often

combined, or which clothing sizes are needed. Companies using this technology assume this contributes to positive interaction and more efficient use of the time available for customers to try on garments. Zara, H&M, the fashion brand Savage x Fenty, Nike and Amazon, which has also entered the brick-and-mortar fashion business, are among the companies using these technologies (van de Sanden et al., 2020; McGovern, 2023; Schroder, 2018; German Federal Ministry for Economic Affairs and Climate Action, 2024).

2.7.4 Voice Interactive Mirror

Voice interactive mirrors are also commonly used within the fashion retail market. The mirrors are equipped with a computer and are able to communicate with the customer. Using pre-selected modes (for example, classic or extravagant), the mirrors create outfits based on the customer's personal fashion style. These mirrors are also able to create selfies, carry out newsletter subscriptions or offer product recommendations. Worn outfits can also be saved and viewed later for side-by-side comparisons. The advantages in terms of customer satisfaction are similar to those of digital fitting rooms, in that e.g. customer wishes can be fulfilled more quickly, or the shopping experience is improved. (van de Sanden et al., 2020; McGovern, 2023; Schroder, 2018; German Federal Ministry for Economic Affairs and Climate Action, 2024).

2.7.5 Instore Displays

Instore displays encompass all three possible performance dimensions, which were already outlined in Chapter 2.5: static, dynamic and interactive. **Static displays** show non-moving text, images or graphics. **Dynamic displays** can illustrate moving images or videos, playing speech, as well as reproducing sound and music. In contrast, **interactive displays** allow customers interaction. The following subchapter focuses on interactive displays. These are characterized by the fact that customers can enter an interaction with them, which is done through integrated touchscreens in the display, enabling customers to draw, write or configure products on the display instead of just viewing them. Digital touchscreens are used in retail for advice, configuration or for ordering processes. McDonalds, for example, uses touchscreens where customers can enter their

orders. This results in the following advantages for the customer: On the one hand, touchscreens offer greater intimacy, which makes the customer feel more comfortable than during an ordering process that takes place face-to-face at the checkout. On the other hand, touchscreens where customers order goods can reduce waiting times. A further advantage lies in the fact that customers do not feel as much time pressure when using touchscreens as they do when placing an order in person (Wang, 2024, p. 66; Lippold, 2024; Laylany, 2023).

2.7.6 Mobile Applications

Applications, or as they are also known, apps, are used by numerous retailers nowadays. Customers use them to compare prices, download prospectuses, place online orders, redeem coupons, set a reminder for special offers, digitally store till-receipts or obtain recipe suggestions. Apps also offer the customer the advantage of savings, for example through discount coupons or price alerts. Furthermore, Click & Collect orders can be placed via an app. In Germany, for example, this service is used by 29% of app users at drugstores. All these features lead to increased customer loyalty (Domke, 2024; Textilwirtschaft, 2024). In addition, apps serve as a basis for further technologies, such as participation in checkout systems (see Chapter 2.7.2), which often require an app from the retailer. Risks associated with the use of apps include deeper insights into the user behavior of customers, such as the evaluation of purchasing profiles, or access to the microphone of a smartphone, which can be assumed with the use of the app (Verbraucherzentrale, 2023).

2.7.7 Extended Reality

Extended Reality (XR) technologies, which include **Augmented Reality** (AR), **Mixed Reality** (MR) and **Virtual Reality** (VR) technologies, are increasingly being used in brick-and-mortar retail. Augmented Reality enables virtual objects to be displayed in the real world. Mixed Reality allows virtual objects to interact with the real environment. Virtual Reality allows the customer to immerse themselves in a virtual environment (Brysch, 2022; Vartanian, 2020; Kotler et al., 2024).

Augmented reality is used, for example, by the fashion retail company Marks & Spencer to assist customers in finding products using a smartphone. The customer films the environment with the camera and AR markings show the way to the desired product in real time (Giuri, 2021).

Mixed reality, which goes one step further than augmented reality by merging the real and virtual world, is used, for example, by the car manufacturer Porsche. The company uses MR to provide its customers a more immersive and informative experience. The customer is given the opportunity to handle virtual objects. In this way, for example, the interior or exterior of a car can be customized (Dr. Ing. h.c. F. Porsche AG, 2024).

Virtual reality, in which the customer is immersed in a completely virtual world, can be used in the furniture trade, for example. Cario AG, a company specializing in online fashion, is currently working with the Fraunhofer Institute for Integrated Circuits in Erlangen and the Friedrich Alexander University of Erlangen-Nuremberg to test the possibility of virtual advice. In this case, the customer receives advice from a salesperson who is not physically present in the store but is instead only projected into the store. This can be done using a display, smartphone or VR glasses (Engeser, 2024).

The advantages offered by the possibilities of XR technologies are, above all, a reduction in waiting times and more targeted product advice, but also the opportunity to offer customers the chance to visualize products in a better way or even to project them into the intended environment. Finally, these technologies, especially virtual reality, also contribute to a special shopping experience. (Brysch, 2022; Kotler et al., 2024; Giuri, 2021; Dr. Ing. h.c. F. Porsche AG, 2024; Engeser, 2024).

2.7.8 Blockchain

Blockchains are not yet very widespread in stationary retail. Starbucks is one of the first companies to use blockchains for its loyalty programme. This allows Starbucks Rewards members and employees to earn digital collectibles with every purchase they make in a Starbucks store. These assets then unlock new benefits and coffee options for customers (Morton, 2022).

The Breitling company has also introduced blockchains in the luxury watch retail sector. Among other things, this offers the advantages of increased protection against counterfeiting, seamless traceability of the watch's history, potential value appreciation for collectors and a simplified resale process (Krause, 2023). Disadvantages associated with blockchain technology include relatively high storage costs, since a blockchain grows with each transaction. At the same time, blockchains require a great deal of energy due to the significant amount of computing power needed to process them. Furthermore, blockchains are subject to regulatory uncertainty because framework conditions have not yet been standardized or because there is a lack of regulation (Technikum Wien GmbH, 2024).

In conclusion, the following Table 5 provides an overview of the digital technologies identified as being used at the point of sale in brick-and-mortar stores, as well as their effectiveness and limitations in terms of increasing customer satisfaction.

Table 5: Overview of the identified digital technologies used at the point of sale in brick-and-mortar stores and their effectiveness and limitations in terms of increasing customer satisfaction.

Authors and year of publication	Digital Technology	Effectiveness in terms of increasing customer satisfaction	Limitations in terms of increasing customer satisfaction
Gmelch & Hofmann (2024) Leitherer (2024) German Federal Ministry for Economic Affairs and Climate Action (2024) Richter (2023)	Robots	- Providing rapid information - Providing targeted advice - Reducing waiting times - Providing advice in several languages - Enhancing the shopping experience	- Potential technical difficulties - Limited ability to solve complex customer queries - Deficiency in emotional intelligence
Su et al. (2023) Gatti & Richter (2019) Nowroth (2024) REWE Markt GmbH (2024) Richter (2023)	Checkout System: Self-checkout terminals	- Reducing waiting times - Improving the shopping procedure - Enhancing the shopping experience	- Potential technical difficulties - Reduced human interaction

Su et al. (2023) German Federal Ministry for Economic Affairs and Climate Action (2024) Proschofsky (2024) Berg & Knights (2022) Lebensmittel Zeitung (2024) REWE Markt GmbH (2024) Richter (2023)	Checkout System: Payless checkout	- Reducing waiting times - Improving the shopping procedure - Enhancing the shopping experience	- Potential technical difficulties - Reduced human interaction - Concerns about data security
Van de Sanden et al. (2020) McGovern (2023) Schroder (2018) Richter (2023)	Digital fitting rooms	- Providing rapid information - Reducing waiting times - Enhancing the shopping experience - Reducing complaints	- Potential technical difficulties - Reduced human interaction - Concerns about data security

		- Visualization of products in environments for better imagination	
Van de Sanden et al. (2020) McGovern (2023) Schroder (2018) Richter (2023)	Voice interactive mirror	- Providing rapid information - Reducing waiting times - Enhancing the shopping experience - Visualization of products in environments for better imagination	- Potential technical difficulties - Reduced human interaction - Concerns about data security
Wang (2024) Lippold (2024) Laylany (2023) Richter (2023)	Instore displays	- Reducing waiting times - Offering more intimacy - Improving the shopping procedure	- Potential technical difficulties - Reduced human interaction

		- Enhancing the shopping experience	
Domke (2024) Textilwirtschaft (2024) Verbraucherzentrale (2023) Richter (2024)	Mobile applications	- Cost savings - Reducing waiting times - Improving the shopping procedure - Enhancing the shopping experience - Providing rapid information - Providing visual projection	- Potential technical difficulties - Concerns about data security
Brysch (2022) Kotler et al. (2024) Giuri (2021) Dr. Ing. h.c. F. Porsche AG (2024)	Extended Reality: Augmented Reality, Mixed	- Reducing waiting times - Enhancing the shopping experience - Providing targeted advice - Providing visual projection	- Potential technical difficulties - Concerns about data security

Engeser (2024) Richter (2024)	Reality and Virtual Reality		
Morton (2022) Krause (2023) Technikum Wien GmbH (2024)	Blockchain	- increased protection against counterfeiting - seamless traceability of the products' history - potential value appreciation for collectors - simplified resale process - increased security during the sale or even resale process	- relatively high storage costs - require a lot of energy - relatively high costs - regulatory uncertainties - lack of regulation

In summary, it can be stated - according to the above-mentioned authors - that the following **effects and limitations in terms of customer satisfaction regarding the use of digital technologies at the POS in stationary retail** are possible (Gmelch & Hofmann, 2024; Leitherer, 2024; German Federal Ministry for Economic Affairs and Climate Action, 2024; Richter, 2023; Su et al., 2023; Gatti & Richter, 2019; Nowroth, 2024; REWE Markt GmbH, 2024; Proschofsky, 2024; Lebensmittel Zeitung, 2024; Van de Sanden et al., 2020; McGovern, 2023; Schroder, 2018; Wang, 2024; Lippold, 2024; Laylany, 2024; Berg & Knights, 2022; Domke, 2024; Textilwirtschaft, 2024; Verbraucherzentrale, 2023; Brysch, 2022; Kotler et. al., 2024; Giuri, 2021; Dr. Ing. H.c.F. Porsche AG, 2024; Engeser, 2024):

The following advantages in terms of customer satisfaction can be generated by using digital technologies at the POS in brick-and-mortar stores:

- **Providing targeted advice:** Digital technologies enable customers to receive specific advice, as artificial intelligence is used to access an enormous amount of data.
- **Providing rapid information:** Digital technologies enable information to be provided to the customer in real time. Consequently, customer requests, among other things, can be answered much faster.
- **Reducing waiting times:** Digital technologies make it possible to reduce or even eliminate waiting times.
- **Providing advice in several languages:** Communicative digital technologies make it possible to advise customers in any language.
- **Enhancing the shopping experience:** Innovative instore technologies can improve the shopping experience and thus help brick-and-mortar retail to differentiate from online retail.

- **Offering more intimacy:** Digital technologies can offer more intimacy in the ordering process than is the case with face-to-face orders.
- **Improving the shopping procedure:** the shopping experience becomes easier and more relaxed by using digital technologies.
- **Providing visual projection:** Digital technologies enable customers to visualise products better or to project them into the intended environment, which helps to give the customer a greater feel for the product.
- **Reducing complaints:** Digital technologies can reduce complaints by providing improved product information and product advice.
- **Cost savings:** Digital technologies can offer customers discounts, loyalty points or deals that lead to cost savings for the customer.
- **Increasing protection against counterfeit products:** More transparent and secure traceability increases security.
- **Potential increase in value for collectors:** the authentication offered by digital technologies such as blockchain allows collectibles to be highly individualized.

The following disadvantages in terms of customer satisfaction can be generated by using digital technologies at the POS in brick-and-mortar stores:

- **Concerns about data security:** Customers may be uncertain about how their data is processed and stored and may worry that the data can be misused.
- **Potential technical difficulties:** Technical deficits or defective devices can contribute to dissatisfaction and cancel out advantages.
- **Reduced human interaction:** Human interaction cannot be fully replaced by digital technologies; customers may miss that, which can contribute to a negative shopping experience.
- **Deficiency in emotional intelligence:** Digital technologies are lacking in empathy, which can make the shopping experience seem impersonal.
- **Limited ability to solve complex customer queries:** Digital technologies are not yet able to solve all customer questions and requirements, so that the purchasing or advice process either can't take place or must be cancelled during the process, which contributes to a decline in customer satisfaction.
- **Reluctance to use digital technologies:** Not all customers are familiar with or have access to digital technologies.
- **Partially high costs:** technologies such as blockchain lead to high costs.
- **Shortage of specialized staff:** There is a lack of skilled workers to develop and maintain some technologies.

III – SYSTEMATIC LITERATURE REVIEW

III - SYSTEMATIC LITERATURE REVIEW

*“Despite the size and growth of the industry,
DIY behaviors have prompted few academic studies.”*

*M. Wolf, Department of Marketing, University of Southern Mississippi &
S. McQuitty, Faculty of Business, Athabasca University,
(Wolf & McQuitty, 2011)*

Building on the Chapter on Theoretical Principles, which defined the elementary terms of this dissertation and categorized them in the context of this particular research, the following Chapter will now examine their interrelationships. The purpose is to summarize the current state of empirical research with regard to digital technologies that can be used at the point of sale in the Do-It-Yourself store regarding their impact on customer satisfaction and to discuss the key findings of the studies conducted to date. The review demonstrates that despite the increasing importance of digital technologies in retail, research in the DIY store sector is significantly underrepresented. While there are numerous studies on digitalization in general retail, there are only a few that explicitly address the specifics and challenges of the DIY store industry. In conclusion, the chapter highlights the urgent need for more targeted research in the DIY store sector. This subchapter is based on the author's article "Digital Technologies Within the DIY Store: A Systematic Literature Review" that was published within the journal *Business Ethics and Leadership* in June 2022.⁷

⁷ The author has published a paper on a systematic overview of which digital technologies are being used within the brick-and-mortar stores' POS in the DIY sector as part of the journal *Business Ethics and Leadership*, Volume 6, Issue 2, 2022 (Sumy State University, 2022).

3.1 EMPIRICAL FINDINGS

Despite the importance of the DIY sector, which was outlined in the previous Chapter, an explicit link between the topics of digital technologies and customer satisfaction in connection with this sector is very rarely found in academic literature. While the topics of digital technologies (Hochmayr, 2021; Loebbecke, 2006; Gartner, 2023; Kerzner, Zeitoun, & Vargas, 2022; Amit & Zott, 2001; Hakim, Laelawati, & Mardiana, 2023; Reis, Amorim, Melao, & Cohen, 2020; Parviainen, Kääriäinen, Tihinen, & Teppola, 2017; Hagberg, Sundström, & Egels-Zandén, 2016) and customer satisfaction (Howard & Sheth, 1969; Locke, 1967; Westbrook & Reilly, 1983; Day, 1984; Gustaffsson, Johnson, & Roos, 2005; Homburg & Koschate, 2007; Homburg, Giering, & Hentschel, 1998; Oliver, 1997) are the subject of numerous scientific publications, the explicit linking of these topics with the DIY sector is very rare. Although DIY & hardware store revenues have been rising almost uninterruptedly for years (DIY & Hardware Store – Worldwide, 2023, p. 7) and in Germany far more than 60% of the population over the age of 14 are DIY and home improvement customers (VuMA, 2023; Statistisches Bundesamt (Destatis), 2023a), this sector only attracts minimal academic attention. Williams already stated in 2008 that the DIY sector is a very scarcely researched area, by pointing out that “Until now, there have been relatively few academic studies of the DIY retail sector and DIY consumers” (Williams, 2008, p. 312). In addition to Williams, Wolf and McQuitty also agree with this statement: “Despite the size and growth of the industry, DIY behaviors have prompted few academic studies.” (Wolf & McQuitty, 2011, p. 155). To this, Williams further adds that only “few retail academics or social scientists have paid attention to this important retail industry” (Williams, 2008, p. 311). Röderstein concurs and also points out in his publication right at the beginning that the DIY sector and its special features are rarely considered in scientific publications (Röderstein, 2009, p. 2).

Based on these findings, the author of this dissertation published a systematic literature review (SLR) in 2022 with the aim of determining the current state of research regarding the use of digital technologies at the point of sale in DIY stores, and whether any accompanying advantages for customers and retailers have also been researched. For this purpose, an extensive, systematic literature search was

conducted in eleven databases to examine German and English-language articles from the period 2010 to 2022. The literature review deliberately focuses on studies from 2010 onwards to highlight the significant lack of scientific research into the use of digital technologies at the POS in DIY stores and their impact on customer satisfaction over such a long period.

The database foundation of this literature review was the EBSCO Discovery Service (EDS), which includes the following databases: Business Source Premier, EconLit, APA PsycArticles, PSYINDEX, Medline, CINAHL, Engineering Source, GreenFILE, Contents of the IEEE Xplore digital Library, the ACM Digital Library and SpringerLink. The EBSCO Discovery Service provides a solid foundation for a scientific literature research, as it covers economics literature extensively. Furthermore, the EDS index contains an immense number of dependent papers, since the bibliographic data mostly comes from specialized bibliographies and journal content bibliographies. This makes it a comprehensive research portal that covers the full range of fundamental information needs (Gantert & Lauber-Reymann, 2022, 94 f.).

In addition, the search engines Google, Google Books and Google Scholar were used to supplement the EDS database search. The chosen combination of databases and search engines minimized the possible disadvantages of each system and allowed the strengths of each to be optimally utilized. Among other things, this meant that using databases ensured control over search results: automatic expansions and possible corrections of search terms are not carried out when using databases. Furthermore, the lists of results obtained can be narrowed down and a strictly defined order of relevance can be set. As a result, the findings in database systems are quality-checked and relevant journals are presented by subject area. The use of search engines such as Google, Google Books or Google Scholar offered the additional advantage of interdisciplinary access and a wide range of titles (Pianos & Krüger, 2014).

The search yielded 159 articles, for which only nine articles were ultimately identified following a thorough review based on a validated literature search protocol. The following table provides an overview and includes the articles, sorted by year of publication, with the corresponding key findings.

Table 6: Overview of identified studies on the relationship between the Do-It-Yourself sector and digital technologies.

No.	Authors and year of publication	Article	Methodology	Key findings / Conclusion
1	Holmes et al., 2014	Creating communities: the use of technology in craft and DIY communities of practice	Qualitative approach: Semi-structured interviews conducted with members of COPs for crafts and DIY to present data and analysis collected from an interpretive perspective.	The insights gained from this study reveal some of the detailed ways in which the application of technology is redefining the DIY and home improvement communities of practice (COPs). The use of information and communication technologies (ICT) in DIY and home improvement COPs is presented with the aim of enabling participants in DIY and home improvement COPs to network, exchange ideas and create (Holmes, Greenhill, & McLean, 2014).
2	Hatton-Jones & Teah, 2015	Case analysis of the do-it-yourself industry	Case study approach: Assessments and critical analyses of the DIY industry were formulated using real	IKEA and Airbnb collaborated to promote IKEA's new range of bedroom furniture and accessories through a digital platform. The campaign aimed to inform consumers about these products in an original way. Consumers could book an overnight stay in the furniture store to "experience" the furniture. This drew

			brands and examples. An analysis of various DIY retail strategies and DIY decking companies was summarized.	worldwide attention. The success was that the retailer knew how to communicate with a technology-oriented audience, attracting attention and using the appropriate medium. By enabling consumers to experience IKEA, the campaign not only increased the likelihood of turning them into brand advocates but also enhanced overall brand awareness. Additionally, it fostered purchase intent and social belonging through word-of-mouth promotion (Hatton-Jones & Teah, 2015). The article points out that technology and digital devices act as facilitators in the sales process. They enable consumers to access information about products and suppliers more easily. In addition, this article reveals that the interaction between employees and consumers in the digital space must be monitored because consumers' points of contact with technology have change (Hatton-Jones & Teah, 2015).
3	Hanson, 2019	The Next Level of Do-It-Yourself - New advances in technology	Overview article: Analysis of technological advances	The article deals with the use of technologically advanced machines, capable of customizing high quality products at high speed by using touch screen technology, while generating cost savings for companies (Hanson, 2019).

		deliver higher quality with the labor savings of self-service	in the field of self-service technologies	
4	Heinemann, 2019	Do it yourself! An analysis of the business opportunity of self-service technologies in the German retail industry	Quantitative approach: Online survey in Qualtrics with 160 valid responses.	Implementation of self-service technologies: websites, online shops, package tracking services, self-checkout stations, comparison portals, e-commerce marketplaces, support sites, automated hotlines, information kiosks, chat bots and Click & Collect stations. Consumers expect the following benefits: time saving, convenience, cheaper prices, and digital receipts. The advantages for retailers are improved service and reduced costs. The study discusses the business opportunities of self-service technologies (SSTs) in the German retail sector. The relationship between consumers' technology readiness (TR), their satisfaction with SSTs and their behavioral intentions towards retailers is analyzed. The holistic German retail sector is considered. (Heinemann, 2019).

5	Kim, 2020	Moving Forward with Digital Disruption: What Big Data, IoT, Synthetic Biology, AI, Blockchain, and Platform Businesses Mean to Libraries	Overview article: Analysis of leading technologies and their impact on our society.	The effects of the technologies of the fourth industrial revolution are explained. Above all, the Just Walk Out Technology is presented as a concrete example. Just Walk Out Technology enables consumers to simply take goods they want to buy in a brick-and-mortar store with them. When leaving the store, the goods are automatically charged to the credit card. For buyers, there are the advantages of time savings and the fact that no additional means of payment must be carried apart from the appropriate app on a smartphone. There are advantages for the retailer due to savings in personnel costs and space (Kim, 2020).
6	Chylinski et al., 2020	Augmented reality marketing: A technology-enabled approach to situated	Literature Review: Literature review and development of a theoretical framework based on definitions of augmented reality marketing (ARM) as a	ARM offers new possibilities in the design of physical spaces that add customer value in a way that differs from other marketing approaches. This is illustrated primarily by the following example: Lowe's HoloRoom allows consumers to design their bathroom or kitchen in actual size and change the shape, color, or content of their designed room in real-time (Chylinski, et al., 2020).

		consumer experience	customer-oriented interface for the application of digital marketing technologies in physical environments.	
7	Marr, 2021	Extended Reality in Practice 100+ Amazing Ways Virtual, Augmented and Mixed Reality Are Changing Business and Society	Case study approach: More than 100 case studies from various industries.	The potential of Extended Reality (XR), which is defined as the generic term for the immersive technologies of Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR), offers massive potential for digitally transforming industries. More than 100 case studies from various industries are presented in the context of XR, showing their possibilities and effects. Among others: Lowe's Envisioned app allows consumers to overlay 3D images of Lowe's products into their homes. The app scans the consumer's surroundings so that virtual objects can be inserted at real size and dragged to any position (Marr, 2021).

8	Turban et al., 2021	Information Technology for Management Driving Digital Transformation to Increase Local and Global Performance, Growth and Sustainability	Scientific literature: Containing both case studies and feedback from managers and practitioners in leading companies worldwide.	The scientific literature provides information on artificial intelligence, robots, quantum computing, blockchain technology, Internet Protocol (IP) intelligence, big data analysis, IT service management and Development and Operations (DevOps) and presents recommendations for action that relate to the transformation of companies, the engagement of customer acquisition and retention and illustrates how systems and processes can be optimized in terms of business relationships. This includes, for example, the topic of robots in the following context: Lowe's LoweBot – a 5' tall robot shopping assistant understands and speaks seven languages, detects the consumer by entering the store through a three-dimensional (3D) scanner; LoweBot asks consumers what they're looking for, leads them to the requested items, and displays smart recommendations and location-based specials offers on its rear-facing display panel. It also scans shelves and sends updated stock information back to store associates as it travels through the store (Turban, Pollard, & Wood, 2021).

9	Bercher et al., 2021	Do It Yourself, but Not Alone: Companion-Technology for Home Improvement—Bringing a Planning-Based Interactive DIY Assistant to Life	Application-oriented research approach: Technology transfer project based on a prototypical assistance system that was developed. Furthermore, the study includes the results of various empirical studies conducted at different stages of the prototype's development.	Assistance systems that support do-it-yourselfers in their projects. The system generates instructions for users to follow. The assistant offers explanation possibilities and/or proactive support, based on the communication with the user as well as with tools that might be needed (Bercher, et al., 2021).

[source: own elaboration based on (Rode, 2022, p. 122)]

Table 6 shows the nine studies ultimately identified that made a connection between digital technologies in DIY stores and, in some cases, also looked at the customer benefits that these technologies can bring. The overview includes digital technologies currently in use or suitable for use in DIY stores, as identified in these articles. Analysis of these articles also revealed the potential benefits of using digital technologies for customers. In this context, these advantages can be summarized as follows: Improving the shopping experience, increasing shopping convenience, increasing the satisfaction of the need for individualization, and saving time by an increase in the efficiency of shopping in DIY stores.

While the articles identify and list potential benefits of digital technologies, they do not explore the specific relationship between these technologies at the DIY store's point of sale (POS) and their impact on customer satisfaction. Key factors that significantly contribute to achieving customer satisfaction in DIY with these technologies remain unexamined. This becomes apparent by analyzing the respective core content of the articles: Although Holmes et al. refer to digital technologies and DIY in their article, this article examines how digital technologies can be used for communities who want to share DIY projects with each other (Holmes, Greenhill, & McLean, 2014). However, the aspect of using digital technologies at the POS in the DIY store is not considered. The article by Hatton-Jones and Teah from 2015 provides a case analysis of findings from a promotion carried out jointly by two companies (Hatton-Jones & Teah, 2015). However, it does not specifically investigate the use of digital technologies at the POS in DIY stores. Articles three to eight in Table 6 deal a range of digital technologies. These include technologically advanced machines, websites, online stores, package tracking services, self-checkout stations, comparison portals, e-commerce marketplaces, support sites, automated hotlines, information kiosks, chat bots and Click & Collect stations, just walk out technology or augmented reality) (Hanson, 2019; Heinemann, 2019; Kim, 2020; Chylinski, et al., 2020; Marr, 2021; Turban, Pollard, & Wood, 2021). These articles focus more on the advantages that digital technologies may provide but does not examine to what extent this affects customer satisfaction, or which factors of digital technologies explicitly contribute to this, which this dissertation aims to examine. The last article, number nine, deals with digital

technologies in the context of do-it-yourself, but focuses on digital technologies as an aid at home in the form of assembly instructions or tutorials that are made available (Bercher, et al., 2021). There is no reference to their application at the POS in this article.

In general, it is to be noted, as well that the systematic literature review and the resulting Table 6 initially confirm that the DIY sector has hardly been researched. This was further apparent in the course of a comparison: during literature research, substituting the term DIY with other terms, once for fashion and once for food. This swap led to an increase from 159 results to 688 using fashion and an increase to 6.347 results using food. All other terms relating to digital technologies remained unchanged.

It should also be noted that the term DIY is not always necessarily used and understood in the context of DIY as it is used in this thesis, relating to home improvement and maintenance work and in the context of the DIY market and the DIY sector (according to the delimitation provided in Chapter 2.1). Therefore, the 159 hits were not all DIY-related in the sense of the characterization underlying the thesis. This underlines once again the statements by Williams (Williams, 2008) and Wolf and McQuitty (Wolf & McQuitty, 2011) that research conducted on DIY is rare.

3.2 DERIVATION OF RESEARCH NEEDS

In order to be able to confirm the findings of the systematic literature review for this dissertation, the same literature review was carried out at the end of November 2023 shortly before the submission of this dissertation, to determine if any new articles on the relevant context had been published in recent months after submission of the journal article. However, did not provide any significant results in the form of new publications that examined the connection between digital technologies, the DIY market and customer satisfaction.

To sum up the empirical findings, it can be stated that the use of digital technologies in DIY stores can lead to competitive advantages. The current state of research also shows what these advantages might be. However, what receives very little attention in academic research is the specific relationship between digital technologies that can be used in DIY stores and the impact they potentially have on customer satisfaction. Although the articles that have been identified did show some digital technologies that are or could be suitable for DIY stores, the findings on the effects on customer satisfaction are not pursued in a targeted and sector-specific manner. No further consideration is given to the specific product range sold in DIY stores. The project idea, which is a decisive factor in DIY store purchases, is also not explicitly examined.

The consequence of this is that while some articles address or at least mention the combination of digital technologies, DIY, and customer satisfaction, there is a notable absence of comprehensive studies explicitly applying all three topics to DIY stores with their unique characteristics. For this reason, the author sees an urgent need to close this research gap by providing a contribution to the findings on the use of digital technologies at the POS in DIY stores, and their impact on customer satisfaction, with particular emphasis on the specific characteristics of the DIY store sector.

IV – EMPIRICAL INVESTIGATION

IV - EMPIRICAL INVESTIGATION

Building on the systematic literature review conducted in the previous chapter of digital technologies used at the POS in DIY stores regarding their impact on customer satisfaction, this chapter presents the research design. Therefore, the methodological framework and the empirical approach of the dissertation will be explained below, and findings will be presented and discussed.

The aim of the thesis is to **gain new insights into digital technologies that impact customer satisfaction at the point of sale in DIY stores** by conducting qualitative research using expert interviews. Conducting expert interviews is primarily justified by the fact that the aim of the thesis is to answer a research question for an area that has been **scientifically researched very rarely**, and the aim is to **generate new, profound insights into a complex issue that go beyond the current state of literature to provide an insightful contribution to research and practice**.

The **semi-structured, guideline-based expert interviews (n=19)** are transcribed, analyzed and evaluated manually using the **qualitative content analysis method according to Mayring**. This approach enables the **development of theories and hypotheses**, which is the subject of the following chapter.

A **perspective triangulation** is achieved by **interviewing experts from retail and industry**, and, in a second step, a **methodological triangulation** is achieved by **comparing the findings of the literature reviews in Chapter 2.7 and Chapter 3**. This approach enables the integration of divergent perspectives and the generation of a holistic understanding of the object of investigation and **aims to strengthen the research results and increase their robustness, as well as minimize false interpretations** (Mayring, 2022a; Mayring, 2019; Mayring, 2022; Mayring, 1985; Mayring & Fenzl, 2019; Mayring, 2001).

4.1 QUANTITATIVE AND QUALITATIVE RESEARCH

There are different research approaches within empirical social research. A distinction is made between quantitative research and qualitative research (Döring & Bortz, 2016, p. 14).

Fontaine & Blackhouse state that the quantitative research approach is historically older and remains the leading approach in many disciplines of the humanities and social science (Fontaine & Backhouse, 2010). In 1879, Wilhelm Wundt (1832-1920) set up the first psychological laboratory, Laboratory for Experimental Psychology, at the University of Leipzig, and carried out psychophysical experiments (Sharma & Sharma, 2006, p. 11 f.; Döring & Bortz, 2016, p. 14). Since then, this point in time has often been dated as being the beginning of the institutionalization of psychology as a scientific discipline. With the founding of this laboratory at the Leipzig Institute, the groundwork for further experimental psychology laboratories in Germany and abroad was laid. During this period, Wilhelm Dilthey (1833–1911) propagated a distinction based on pairs of opposites (Dilthey, 1977, p. LXXI), namely between a qualitative or descriptive and quantitative or subdividing psychology (Dilthey, 1923; Döring & Bortz, 2016, p. 14). This qualitative approach is primarily about **understanding** the subjective meaning of human actions. In contrast to the scientific approach, which **explains** facts based on cause-effect mechanisms and describing individual variables, this humanities approach focuses on the whole person (Döring & Bortz, 2016, p. 14; Raithel, 2008, p. 11).

From this point on, various disagreements and discussions about the relationship between the qualitative method and the quantitative method arose again and again, to be fought out by the various protagonists. The primary focus of these discussion phases was on specific differences of opinion and research styles, stemming from disagreements between the respective research camps on epistemological, ontological, axiological, and methodological worldviews (Kelle, 2008, p. 26; Madondo, 2021, p. 36). Therefore, since this genesis of the two understandings of science, dichotomous juxtapositions followed (Kergel, 2016, p. 203).

In the first half of the 20th century, modern survey-technology gained prominence. This happened almost simultaneously after a pioneering period of

ethnographically oriented fieldwork. As a result, all those methods that did not correspond to quantitative survey-technology and its standards lost their reputation (Kelle, 2008, p. 26). After the Second World War, qualitative methods experienced a certain skepticism and suffered a temporary displacement. It was not until the 1960s and 1970s that they achieved their renaissance which led to the emergence and establishment of a separate interpretative paradigm of qualitative research (see Chapter 4.4) (Wulff, 2008, p. 58; Kelle, 2008, p. 26). At this point, criticism arose about the inadequacy of quantitative social research (Kelle, 2008, p. 26; Döring & Bortz, 2016, p. 16). This paradigm controversy in empirical social research was so heated until the 1980s that literature even spoke of the “paradigm wars” (Gage, 1989).

Since the 1990s, qualitative methods have once again been able to establish themselves as a relevant methodological tradition alongside quantitative methods within empirical social research, and the paradigm dispute has since been considered to have been pacified in the sense that strengths and weaknesses can be assigned to both methods, contributing to a fruitful relationship (Kelle, 2008, p. 26; Wulff, 2008, p. 58; Döring & Bortz, 2016, p. 16). Furthermore, it can be observed that further developments have occurred within the two paradigms. In the quantitative paradigm, significantly more questions about values and power relations were addressed; in the qualitative paradigm, a concretization of methodological quality and quality criteria as well as a stronger canonization of the spectrum of methods were promoted (Döring & Bortz, 2016, p. 16). Jick states that, in this regard, qualitative and quantitative methods should be seen as complementary and not as rival camps (Jick, 1979, p. 602). This means that a phase of scientific coexistence of the qualitative and quantitative methodological traditions is currently underway, which is developing independently in separate scientific communities (Kelle, 2008, p. 26).

Thus, a strict separation of the two methods of social science research is no longer appropriate today (Gläser & Laudel, 2010, p. 25 ff.). This is due to the fact, that quantitative studies exist that include qualitative, interpretative approaches as do qualitative studies that include quantitative approaches such as quantity data or numbers (Maschke & Stecher, 2012, p. 393).

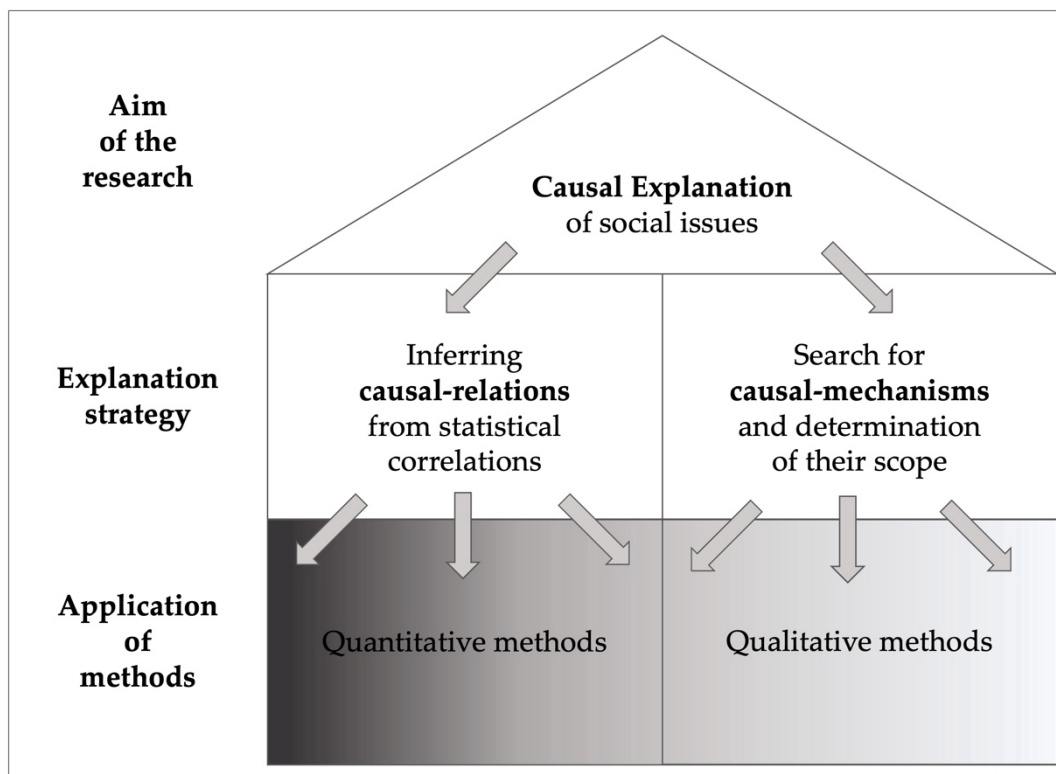
The authors Gläser und Laudel conclude that in empirical social research, a distinction is made between two research strategies: On the one hand, there are research strategies that search for **causal-relations**; this is also described with the attributes quantitative or theory-testing; Gläser and Laudel also refer to this strategy as the relations-oriented strategy. This method makes use of standardized data collection and subsequent statistical evaluation. On the other hand, there is the research strategy that searches for **causal-mechanisms**; this is also ascribed with the attributes qualitative or theory-generating; the authors also call this strategy mechanism-oriented strategy. This method makes use of the detailed analysis of only one or a few cases. This results in complementary advantages and disadvantages: **Quantitative research** that looks for **causal-relations** allows the identification of significant, non-random correlations of phenomena in a defined scope, but is relatively inconclusive in terms of elucidating causal mechanisms. **Qualitative research** offers precisely this access to **causal-mechanisms** but suffers in determining the respective boundaries of the scope (Gläser & Laudel, 2010, p. 25 ff.).

When it comes to deciding on one of the two research approaches, Gläser and Laudel believe that, despite all the existing differences, it is essential to decide how to arrive at causal explanations on the basis of the empirical investigation, that is the way in which the aim of the research is achieved: The decision in favor of one of the two approaches thus implies the choice of certain methods: If causal relationships are sought, quantitative research should be chosen; if causal mechanisms are sought, qualitative research should be chosen. However, it should be considered that this methodological decision does not exclude the possibility that both strategies can and do complement each other. Ideological disputes between the two camps, that of qualitative research and that of quantitative research, are therefore no longer tenable from today's perspective (Gläser & Laudel, 2010, p. 25 ff.). For these reasons, it can be stated, that both methods can be complemented by each other (Maschke & Stecher, 2012, p. 393).

The following Figure not only depicts the different explanatory strategies and the use of methods in empirical social research, but also addresses the blurring of

the clear boundaries between the two research methods in the course of the gradient from light to dark in the methodological approach (cf. Figure 10):

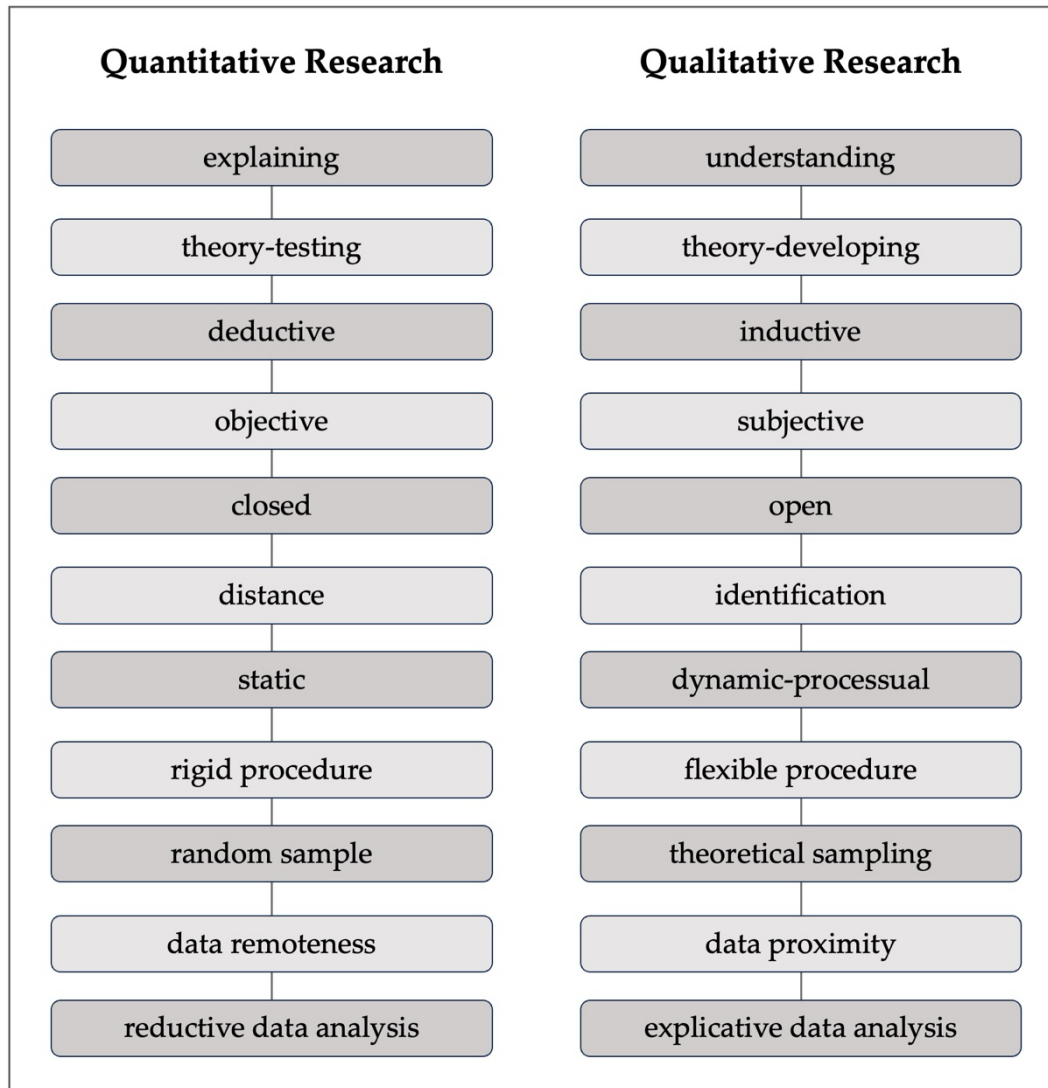
Figure 10: Schematic representation of the quantitative and qualitative research process. The highlights (in bold) mark the most intensive phases.



[source: own elaboration based on (Gläser & Laudel, 2010, p. 28)]

In order to further internalize the two strategies, the following Figure by Lamnek shows a schematic comparison of the quantitative and qualitative methodologies. The illustration addresses the partially existing interdependence of the respective dimensions, but at the same time shows any differences that lead to the respective dimensions being viewed as opposite poles of a continuum (cf. Figure 11) (Lamnek & Krell, 2016, p. 256).

Figure 11: Schematic comparison of quantitative and qualitative social research.



[source: own representation based on an excerpt from the figure by (Lamnek & Krell, 2016, p. 256)]

As this Chapter has explained the differences between the two research approaches, the quantitative and the qualitative, the following subchapter now justifies the choice of qualitative research within the underlying study.

4.2 JUSTIFICATION OF QUALITATIVE RESEARCH IN THE CONTEXT OF THIS STUDY

The selection of the research method depends on the availability of theoretical knowledge on the respective scientific topic (Fürst, Jecker, & Schönhagen, 2016, p. 216; Jäger & Reinecke, 2009).

As already outlined in the first Chapter, the DIY sector is facing a decisive development process, in particular due to the unstoppable, rapidly advancing digitalization. Digital technologies and their use at DIY's POS in bricks-and-mortar retail are of crucial importance for the success of the entire Do-It-Yourself sector. There is a proven correlation between the degree of digitalization and the business success of DIY companies, which substantiates the importance of the underlying topic (Rock, 2022, p. 58). Furthermore, the presented systematic literature review proved that the available information on the impact of the use of digital technologies at the POS on customer satisfaction in DIY stores is very scarce. The fact that DIY retail is in general, an area that has been explored very rarely has already been noted by Williams: "Until now, there have been relatively few academic studies of the DIY retail sector and DIY consumers" (Williams, 2008, p. 312).

Accordingly, there are very few findings on the research question formulated in this dissertation; academic articles that deal with this topic either do not address it adequately or only tangentially. For these reasons, for the underlying research question, the **qualitative research** method is suited best, as this research approach offers comprehensive opportunities to acquire knowledge on a scarcely researched subject area. The qualitative research strategy is also best situated for generating ideas, investigating detailed knowledge and for the **explorative** probing. Expert interviews are most suitable to generate this desired profound knowledge (Breitenfelder & Zeglovits, p. 1114 ff.), as only these enable a reconstruction of social issues with the necessary depth of analysis. A standardized, qualitative approach for a relationship-oriented explanation is therefore to be excluded, as this would cut off specific knowledge from experts due to standardization (Gläser & Laudel, 2010, p. 37).

In summary, this dissertation is based on the **qualitative research approach** using the method of **expert interviews** as an instrument of **explorative research**. In this context, a particular emphasis is placed on methodical structuring of the study, ensuring that, despite the typical openness and flexibility of qualitative research,

the entire research process is strictly documented to guarantee complete and comprehensive traceability (Jäger & Reinecke, 2009; Gläser-Zikuda, Stephan, & Hofmann, 2022, p. 238; Mayring, 2001).

4.3 RESEARCH PROCESS OF QUALITATIVE RESEARCH

After the previous subchapter presented the research approach of quantitative and qualitative research, focusing in particular on the differences between the two approaches, this subchapter addresses the process of the quantitative and qualitative research strategy. Finally, a detailed process description is provided exclusively for the qualitative research approach, as this forms the underlying basis of the dissertation, as justified in the previous Chapter.

Quantitative social research is assigned to the natural sciences in the tradition of scientific theory and uses quantitative methods of data collection, such as standardized questionnaire surveys or physiological measurements. The research process is structured sequentially. The structured methods provide quantitative or numerical data as a result. Finally, these are subjected to data analysis using statistical methods and statistically evaluated to test theoretically based hypotheses and operationalize theories (Döring & Bortz, 2016, p. 15; Heiser, 2018, p. 33).

Qualitative social research is assigned to the humanities in the philosophy of science tradition and uses qualitative methods of data collection, such as narrative or expert interviews. The process of qualitative social research is circular respectively iterative, as it involves analyzing a small number of cases and incorporating the insights gained from data collection, preparation, and analysis directly into subsequent data collection. Data collection takes place using unstructured methods, such as participatory field observations. These then lead to qualitative, that is non-numerical data, such as text or video material. Finally, after the interpretive data analysis, hypotheses and theories are formed (Döring & Bortz, 2016, p. 14 ff.).

At the beginning of the qualitative study, a **research topic** and the **research problem** are defined, followed by the **state of research** and the **theoretical background**. This serves to formulate a number of research questions which should not be overly constrained by theoretical assumptions in accordance with the

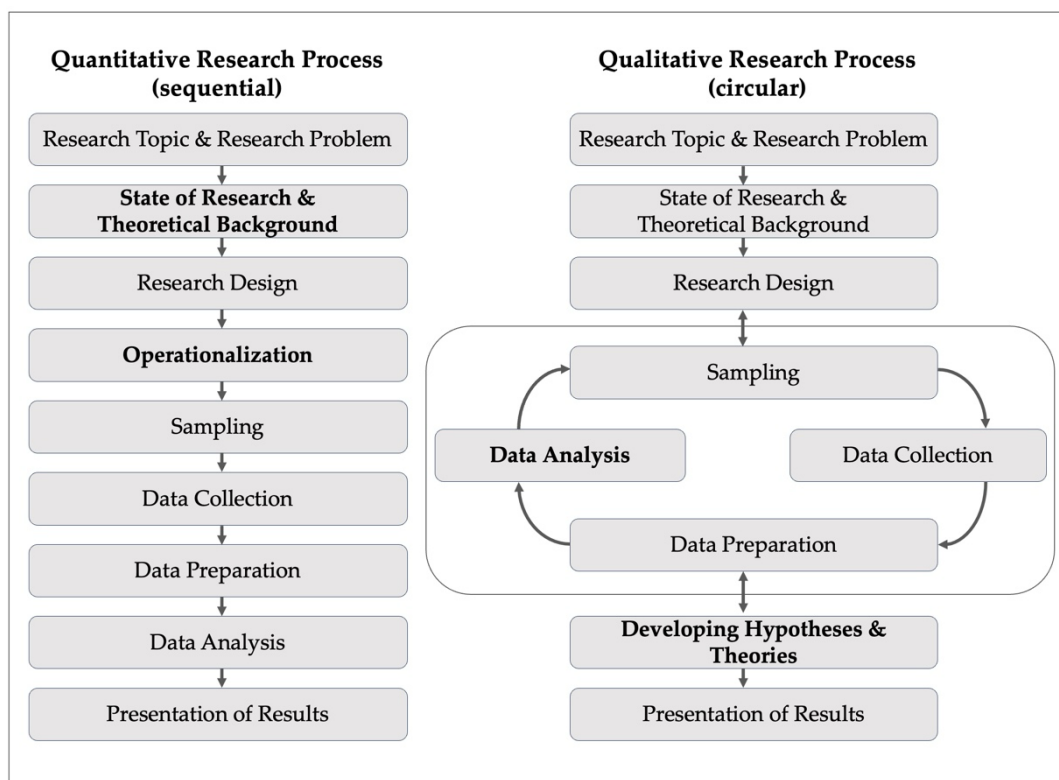
principle of openness (see Chapter 4.4) (Döring & Bortz, 2016, p. 14 ff.). The **research design** determines the qualitative methodologies on the basis of which the study is to be realized (Döring & Bortz, 2016, p. 14 ff.; Rausch, 2009, p. 105). This involves defining at which locations, how often or how long the study is to be conducted. Operationalization is omitted in comparison to quantitative research since qualitative research refrains from defining all relevant characteristics before data collection. In the next step, the composition of the **sample** is defined. This is followed by **data collection** in non- or partially-structured form and with non- or partially-standardized data collection instruments (Döring & Bortz, 2016, p. 322; Magerhans, 2015, p. 168). This leads to the generation of comprehensive raw material, which is recorded technically differently depending on the type (e.g. image or sound material) (Döring & Bortz, 2016, p. 14 ff.; Kotthaus, 2020, p. 117). This open approach is intended to enable the uncovering of aspects not previously expected. Due to the large amount of material obtained, qualitative research uses a small, deliberately selected number of cases in the sample. This part of the process is then ideally circular. Due to the large amount of material obtained, qualitative research uses a small, deliberately selected number of cases in the sample. After sampling and **data collection**, the data are immediately **prepared** and **analyzed**. The insights thus gained are then incorporated into subsequent data collection. In this way, for example, newly acquired aspects can also find their way into the sample. The aim is to achieve theoretical saturation (Döring & Bortz, 2016, p. 14 ff.). If no more theoretically relevant similarities or differences are discovered in the data, this theoretical saturation has been reached (Kelle & Kluge, 2010, p. 49). If this is the case, the circular procedure ends with data preparation and an interpretative data analysis, followed by **hypothesis** and **theory building** based on the comprehensive qualitative raw material. This is followed by the identification of study limitations and the clarification of implications for future research and practice. Finally, there is the **presentation of the results** (Döring & Bortz, 2016, p. 14 ff.).

One advantage of the qualitative research process and the circular approach used, is that it resembles a learning process for the researcher. This is achieved primarily through the non-structured and non-standardized approach, which takes place in a circular manner, meaning that the further methodical approach is based on the interim results achieved. The disadvantage of the research approach

is that it is difficult to plan precisely. Time, personnel, and costs are difficult to plan and budget (Döring & Bortz, 2016, p. 14 ff.).

The two research processes, the sequential quantitative and the circular qualitative, can be divided into the following phases (cf. Figure 12). In terms of content, this model corresponds to other representations commonly used in the literature; differences arise primarily through the labeling of the phases, as well as through delimitations and / or mergers of various phases (Döring & Bortz, 2016, p. 24).

Figure 12: Schematic representation of the quantitative and qualitative research process. The highlights (in bold) mark the most intensive phases.



[source: own representation based on (Döring & Bortz, 2016, p. 27; Witt, 2001)]

4.4 BASIC PRINCIPLES OF THE QUALITATIVE PARADIGM OF SCIENTIFIC THEORY

Scientific theory paradigms are based on presuppositions about the nature of social facts or social empirical realities (ontology), presuppositions about the recognizability of experiential reality (epistemology) and the significance of values in the research process (axiology) (Döring & Bortz, 2016, p. 9).

The quantitative paradigm requires exact definitions and measurable characteristics of social reality, with the aim of investigating their characteristics and linkages (orientation towards the natural science approach) (Döring & Bortz, 2016, p. 63). The aim of this paradigm is to **explain** the culturally/socially created reality (Raithel, 2008, p. 11).

The qualitative paradigm (based on a paradigm of the humanities) is independent (Renner, Heydasch, & Ströhle, 2012, p. 115) and aims primarily at an understanding-interpretative reconstruction of social phenomena in their respective contexts (Döring & Bortz, 2016, p. 63). The aim of this paradigm is to **understand** human behavior (Raithel, 2008, p. 11). What matters most is what is important to the participants, what life experience they bring with them, or what goals they pursue. This shows the difference between the two approaches in their understanding of social science. In their epistemological, ontological, and axiological assumptions about scientific procedure, they are thus fundamentally different. This has led not least to the “paradigm wars” (Gage, 1989) (see Chapter 4.1) already mentioned, as these differences are also reflected in the researchers' understanding of their roles (Döring & Bortz, 2016, p. 63; Gage, 1989). The different approaches to the research process have already been outlined in Chapter 4.1.

In the following, the six most essential basic principles of the qualitative paradigm, which have emerged during a critical examination of conventional methods, are presented according to Lamnek (Lamnek & Krell, 2016, p. 33 ff.):

Openness: In contrast to the quantitatively-oriented approach, which uses standardized survey instruments and in which hypothesis formation takes place at the beginning, which resulting in the fact that information is only taken from the research field and thus only this is productively processed, the principle of openness as the basic principle of the qualitative paradigm stands for the fact that the perception funnel (Lamnek, 1995) of empirical social research is kept open as

much as possible from the outset (Lamnek & Krell, 2016, p. 33 f.). For this reason, hypothesis formation at the beginning of the work is omitted, as this is seen as an inadequate perceptual funnel (Lamnek, 1995) which would not allow the receipt of unexpected and thus also instructive information (Reichertz, 2014, p. 94; Reinders, 2012, p. 33; Brüsemeister, 2008; Lamnek & Krell, 2016, p. 33 f.). Thus, qualitative social research does not see itself as a hypothesis-testing procedure, but as a hypothesis-generating procedure (Lamnek & Krell, 2016, p. 34). This hypothesis generation is also suitable for the discovery of object-related theories in sociology (Glaser & Strauss, 1979; Mayring, 2022). In this context, openness thus means remaining open to the possibly new and old (Lamnek & Krell, 2016, p. 33 f.; Reichertz & Englert, 2011). However, according to Reichertz & Englert, this does not mean that researchers are unintelligent in their approach to the subject matter, methodology and methods and do not find out in advance (Reichertz & Englert, 2011; Reichertz, 2014, p. 94). Rather, it is a matter of “artificial stupidity” (Hitzler, 1991, p. 297 f.; Hitzler, 1986), which means that the researcher has researched extensively in advance and knows what he wants to investigate (Hitzler, 1986; Hitzler, 1991; Soeffner & Hitzler, 1994). However, this validity of knowledge is excluded in order to remain open to the new and the old. Thus, the systematic enlargement, which is ensured by the artificial stupidity, helps in the later interpretation and subsequent theory building (Reichertz & Englert, 2011, p. 13 f.). In summary, it can be said that, according to this principle, empirical social research is open to the research subjects, the research situations, and the research methods (Lamnek & Krell, 2016, p. 38).

Research as communication: The qualitative research approach understands research as communication in the sense of an interaction between the researcher and the researched. In the quantitative research approach, this view is regarded as a disturbance. Thus, in the quantitative research approach, care is taken to eliminate this undesirable interaction relationship as far as possible through standardization (Lamnek & Krell, 2016). In qualitative research, however, it is precisely this interaction relationship that is considered a constitutive component of the research process and not, for example, a discursive practice or even semantics alone (Rothfuß & Dörfler, 2012, p. 25).

Thus, direct communication between the researcher and the researched is central and requires the most cooperative attitude possible on both sides. Furthermore, it is up to the researcher to become personally involved in the contact and to build up an appropriate working alliance, and up to the researched to open up in a trusting manner (Döring & Bortz, 2016, p. 68 ff.). In this context, Reinders (2012) refers to the following three core elements that must be observed during qualitative interviews: Form, rules and content. The element **form** means that the researcher deals with the researched in the form that is most familiar to him/her and thus comes close to an everyday conversation. The core element **rule** refers to the fact that during a qualitative interview, the researched, as in an everyday conversation, must be given the opportunity, depending on the degree of standardization, to initiate topics or to react to statements. This should aim at letting the researched lead the conversation. This also includes maintaining communication, which gives the researched the opportunity to ask questions if something is not understood. The core element of **content** relates strongly to the previous one: Both, researcher and researched, ensure clarity in the content of the communication and its meaning. The researcher must convey the contents clearly to the researched, and likewise the researcher must understand the conveyed contents of the researched (Reinders, 2012, p. 37 f.).

Process-character of research and object: The principle of process-character of research and object of qualitative methodology describes the research process as a communication process (Lamnek & Krell, 2016, p. 35) and thus defines empirical social research as processual and therefore changeable (Müller B. , 2009). Thus, the behavior and statements of the researched actors are understood as processual excerpts of the reproduction and construction of social reality, so that the contexts of emergence of social phenomena can be scientifically documented, analytically reconstructed, and explained through understanding. Social phenomena thereby refer to processes of reproduction, modification, and interpretation of reality-constituting patterns of action (Hopf, 1982; Lamnek & Krell, 2016, p. 35; Ferchland, 2014, p. 37). Therefore, the involvement of the researcher is on the one hand a constitutive component and on the other hand the result of this research process (Lamnek & Krell, 2016, p. 35; Ferchland, 2014, p. 37).

Reflexivity of object and analysis: Additionally, empirical social research is reflexive in the object, the analysis and in the analysis process itself (Müller B. , 2009, p. 126). This means that the researcher is self-critical in the process of interpretation by questioning and exploring his or her own prior knowledge, understanding and everyday knowledge, and is always aware of his or her own interests. These interests are consciously acknowledged (Rothfuß & Dörfler, 2012, p. 25; Müller B. , 2009, p. 126). This has the intention that the processes of interpretation and reconstruction are designed to be as transparent and objective as possible (Rothfuß & Dörfler, 2012, p. 25). Consequently, the principle of reflexivity of object and analysis in this context requires the reflectivity of the researcher, as well as a corresponding adaptability of the research instruments (Lamnek & Krell, 2016, p. 35).

Explication: The principle of explication describes not so much a procedure than a requirement. In qualitative social research, it is expected that the steps of the research process are explicated: Individual steps of the research process are therefore to be documented and disclosed in order to enable communicative comprehension. Among other things, this refers to the rules according to which data were collected or interpreted in order to ensure the intersubjectivity of the research result (Lamnek & Krell, 2016; Müller B., 2009).

Flexibility: The principle of flexibility reveals that the qualitative research process remains flexible (Müller B. , 2009). Especially due to the explorative (Lamnek & Krell, 2016, p. 37) and hypothesis-generating (Mayring, 2022) character, it is essential to be able to respond to the situation and relation between the researcher and the object of investigation during the entire research process. Through these flexible data collection procedures, empirical social research adapts to changing conditions and constellations (Müller B. , 2009). Thus, it is possible to speak of a consistently flexible research process, since the circularity of qualitative social research (Döring & Bortz, 2016, p. 14 ff.), as well as flexible survey procedures, contribute to the fact that it can be adapted to the respective object of investigation, and that progress recognized in the research process can be utilized for subsequent research steps (Lamnek & Krell, 2016).

In general, the listed principles according to Lamnek can be further supplemented depending on the methodological level of abstraction (Lamnek & Krell, 2016). However, on the whole the mentioned principles are basically consistent with the structuring of relevant literature (Kirchmair, 2022, p. 4 ff.; Reinders, 2012, p. 32 ff.; Döring & Bortz, 2016, p. 63 ff.).

4.5 QUALITY CRITERIA IN EMPIRICAL SOCIAL RESEARCH

The previous Chapter dealt with the paradigms of the theory of science, which explain the course of the research process, as well as the characteristics of the research methods and the role of the researcher in relation to the object of research. The following subchapters will now deal with the four standards of science, which serve to examine whether a study may be called scientific at all. The four criteria of scientific quality are then presented, which are more precise in that they examine whether a study is weak, average, or even excellent. Within the last subchapter, 4.5.3, the quality criteria for qualitative research get provided, which deal, for example, with the quality of text interpretations (Döring & Bortz, 2016, p. 81 ff.).

4.5.1 Four Standards of Science

There are established standards of science. These apply to all paradigms, quantitative, qualitative, and mixed methods. These four are listed and explained below:

- 1) **Formulation of a scientific research problem:** The topics selected for a study must be scientifically accepted; thus, the research problem must always fit into the existing research context (Döring & Bortz, 2016, p. 89 ff.).
- 2) **Scientific research process:** The research process must be organized in such a way that established research methods are applied, tailored to the respective research problem. A study should be divided into various phases, all of which must be grounded in established scientific paradigms and methodologies. Thus, the procedure during all phases should be oriented towards scientific methods of data collection and data analysis that

are used in comparable studies, and fit the respective research problem; the same applies to the chosen methodology (Döring & Bortz, 2016, p. 89 ff.).

- 3) **Science and research ethics:** The research process is subject to basic ethical rules. Rules of scientific ethics are disregarded if, for example, data is manipulated, or ideas are stolen. Rules of research ethics are considered to be disregarded if subjects of a study are harmed or impaired. All this would lead to denying the character of scientificity (Döring & Bortz, 2016, p. 89 ff.).
- 4) **Documentation of the entire research project:** A research project must be thoroughly documented to ensure that it is subjectively comprehensible and replicable at all stages, with data material properly archived; if this is not the case, the study cannot be assessed by outsiders and thus loses its claim to scientificity (Döring & Bortz, 2016, p. 89 ff.).

4.5.2 Four Criteria for Scientific Quality

The fulfillment of the generally valid quality characteristics meets the requirement that an article or a study can be described as scientific, however, it does not address the assessment of research paper quality. For this purpose, Döring and Bortz have defined the following four criteria of scientific quality (Döring & Bortz, 2016, p. 89 ff.; Breuer, Muckel, Allmers, & Dieris, 2017, p. 355 ff.):

- 1) **Relevance to content:** A profound study is defined by the processing of a scientifically relevant research problem. It is important to distinguish between theoretical relevance, which is essential above all in basic research, and practical relevance, which is crucial for applied research. Furthermore, the results of a study must be clearly interpretable and thus understandable for its addressees. A study that is difficult to interpret would therefore be less significant in a direct comparison (Döring & Bortz, 2016, p. 89 ff.).
- 2) **Methodological rigor:** Methodical rigor is achieved through the use of meaningful methods and methodologies, and when their aspects are implemented in a stringent, consistent and unbiased manner. Methodological rigor, a purely scientific criterion, is subdivided into many sub-criteria, which vary depending on the research approach (quantitative, qualitative, mixed methods). Errors in data collection or

data cleansing result in reduced data quality, which also contributes to the results of the subsequent data analysis being distorted or reduced in their informative value (Döring & Bortz, 2016, p. 89 ff.).

- 3) **Ethical acceptability:** According to the criteria of scientific quality, an accepted study is characterized in terms of ethical justifiability by the fact that it exhibits a high degree of ethical rigor and thus meets standards of science and research ethics in a particularly comprehensive manner. In evaluation studies, for example when existential decisions for the persons concerned depend on their results, great attention must be paid to the guidelines, in order to avoid any harm to the participants involved in the study (Döring & Bortz, 2016, p. 89 ff.).
- 4) **Presentation quality:** This criterion aims to ensure that the findings of a study are presented in such a manner as to be understood and can thus be subsequently used theoretically and practically. In terms of presentation quality, attention must be paid to the completeness, weighting and structuring of the presentation of the research project, so that, for example, readability and clarity of the texts and graphics and illustrations are guaranteed and coherent. An essential part of this is above all the research synthesis, which presents the research status of the respective research problem in a comprehensible way. This is one of the reasons why professional societies such as the American Psychological Association (APA) issue detailed guidelines on how empirical studies should be presented in scientific publications (Döring & Bortz, 2016, p. 89 ff.).

4.5.3 Quality Criteria for Qualitative Research

With regard to the concretization of methodological rigor, method-specific aspects are of particular importance. While objectivity, reliability, validity, content relevance, and ethical rigor are important in quantitative studies, the debate about appropriate quality criteria for qualitative research is more controversial (Döring & Bortz, 2016, p. 89 ff.; Breuer, Muckel, Allmers, & Dieris, 2017, p. 355 ff.). For this reason, central criteria, which can be seen as so-called basic criteria, are listed in

this subchapter, as they can be found in the broad-based literature (Steinke, 2009, p. 270 ff.; Kurze, 2018; Misoch, 2019, p. 245 ff.; Ferri, 2010, p. 60 ff.; Heiser, 2018; Carl, 2016; Müller S. , 2022; Rieß, 2018).

- **Intersubjective comprehensibility:** This criterion verifies the prerequisite for the evaluation of the research by third parties. It is primarily through documentation that a study and its results can be reconstructed. For this reason, intersubjective comprehensibility gets examined to determine how disciplined and methodologically consciously a study was conducted and how comprehensible this is to any third party. The documentation includes the methods used for data collection and data analysis, sampling strategies, transcription rules, methodological decisions, underlying data and evaluation criteria. In the course of theory generation, documentation can be facilitated primarily by software-based evaluation methods (Steinke, 2009, p. 270 ff.; Döring & Bortz, 2016, p. 111; Misoch, 2019, p. 245 ff.).
- **Indication:** This criterion of indication examines the indication, that is the appropriateness, of the choice of methods. The aim of this criterion is to prove that the methods used are suitable for the chosen object of investigation and that they do appropriate justice to it (Steinke, 2009, p. 270 ff.; Ferri, 2010, p. 60 ff.). This criterion extends further, in that it refers additionally to the appropriateness of the entire research process (Döring & Bortz, 2016, p. 111 ff.).
- **Empirical grounding:** The criterion of empirical grounding examines how well the theories formed are grounded in empirical data, which can be ensured, for example, by the codified procedures (Döring & Bortz, 2016, p. 111 ff.; Carl, 2016, p. 214 ff.).
- **Limitation / Generalizability / Transferability:** The quality criteria of generalizability test the extent to which the results of a study are generalizable to other contexts. Are the results developed in the research process for example, transferable to other persons,

situations, conditions? The goal is to determine the limits of the results of the analysis and the point to which the results are representative (Steinke, 2009, p. 270 ff.; Heiser, 2018, p. 50; Misoch, 2019, p. 245 ff.).

- **Reflected subjectivity:** Reflected subjectivity examines the extent to which researchers reflect on their own subjective positions and roles. It should be noted that the researcher's research interest and social background are reflected comprehensively and convincingly in relation to the phenomenon and individuals being studied (Döring & Bortz, 2016, p. 111 ff.; Müller S., 2022, p. 83).
- **Coherence:** The criterion of coherence is used to examine how consistent and contradiction-free the theory or interpretations are on the basis of the data (Döring & Bortz, 2016, p. 111 ff.; Herkenhoff, 2020, p. 172). In this regard, it is decisive for the research work that possibly contradictory data have been disclosed and processed (Rieß, 2018, p. 511).
- **Relevance:** The quality criterion of relevance states that the contribution of a qualitative study in basic science must be relevant for science and its progress in knowledge; this refers to the description of the object as well as to theory building. Furthermore, practical relevance is elementary for applied studies (Döring & Bortz, 2016, p. 113).

When comparing the quantitative quality criteria with those of the qualitative ones, it turns out that there is a substantial overlap, for both of these processes. This results from the obligation to research, which applies to both approaches. Another reason for the similarities is that Steinke, in developing the core criteria for the qualitative research approach, built on established quality criteria of quantitative research (Döring & Bortz, 2016, p. 111; Steinke, 2009).

4.6 RESEARCH DESIGN

In the previous subchapters, the research approach of qualitative and quantitative research was introduced and the justification for the qualitative research approach on which this dissertation is based was provided. Furthermore, the research process of qualitative research was presented. Subsequently, the basic principles of the qualitative paradigm of scientific theory and the quality criteria in empirical social research were described. In the following subchapter, the chosen research design of this thesis is explicitly explained in order to present the methodological approach of the study and to ensure the necessary intersubjective comprehensibility, which has already been described as a central criterion of scientific rigor (see Chapter 4.5.3) (Döring & Bortz, 2016, p. 182 ff.).

Döring and Bortz have defined nine classification criteria to characterize the research design of a study. These are presented in the following Table 7. In this table, the different possible main variants are listed on the right-hand side. The respective variant on which the present study is based is marked in bold. The individual research designs are then explained in the context of the study in the remaining sub-chapter (Döring & Bortz, 2016, p. 183):

Table 7: Nine classification criteria of research designs.

No.	Classification criteria of research designs	Variants of the classification criteria
1	Scientific approach of the study	Quantitative study Qualitative study Mixed methods study
2	Aim of the study	Basic research study Applied research study; non-commercial
3	Subject of the study	Empirical study Methodological study Theoretical study
4	Data basis of the study	Primary analysis Secondary analysis Meta analysis
5	Research interest of the study	Exploratory study Population descriptive study Explanatory study
6	Formation and treatment of study groups (only for explanatory studies)	Not applicable for this study, as only relevant for explanatory studies
7	Place of investigation of the study	Laboratory study Field study
8	Number of examination points for empirical studies	Studies without repeated measures Study with one time of investigation
9	Number of objects of investigation	Single participant study Study with several participants

[source: own representation based on (Döring & Bortz, 2016, p. 183)]

As already explained in Chapter 4.2, this dissertation is based on the **qualitative research approach**, as this is best suited to the research problem. Consequently, the research questions have already been outlined in Chapter 1.2, which are examined in detail using a limited number of investigation units, which in this case are the experts, using a semi-structured data collection method. The aim of this dissertation is to develop new theories based on an interpretative data analysis (Döring & Bortz, 2016, p. 182 ff.; Steffen & Doppler, 2020, p. 11; Jasti & Kodali, 2014, p. 1081). Regarding the knowledge objective, the orientation may be stated as an independent, **non-commercial applied research study**, as it is primarily concerned with solving practical problems using scientific methods and theories in along with the advancement of scientific knowledge. This study primarily aims to address practical challenges in DIY retail and to enhance methods and technologies. Additionally, it seeks to present its findings in a universally applicable format. The object of the study is to answer contextual research questions, which are to be processed on the basis of a new collection of data; this leads to the formulation of research hypotheses at the end of the dissertation. For this reason, this work is referred to as an **empirical study**, which is, albeit, introduced in advance by a theoretical study (see Chapter 3), which presents the current state of research based on a literature search in the form of a systematic literature review. As the empirical data is collected and analyzed independently, this constitutes a **primary analysis** (Döring & Bortz, 2016, p. 182 ff.; Bergin, 2018, p. 51; Sapsford & Jupp, 2006, p. 142).

Furthermore, in the course of the research design, it is necessary to define the interest in knowledge on which an empirical study is based. A distinction needs to be made as to whether a study is exploratory, explanatory, or descriptive. The following study aims to generate new findings on the basis of profound expert knowledge and intends to investigate the influence of digital technologies at the POS in DIY on customer satisfaction. As this involves the exploration and description of a previously defined set of facts with the aim of investigating previously defined research questions and subsequently formulating hypotheses and theories, the conditions for an **exploratory study** are fulfilled. In addition, the study deals with a topic that has been little researched and for which little theoretical knowledge is available, which emphasizes the explorative character (Döring & Bortz, 2016, p. 182 ff.; Steffen & Doppler, 2020, p. 9 f.). As the study is

not an explanatory study, point six, the formation and treatment of study groups, is not applicable (Döring & Bortz, 2016, p. 182 ff.).

One of the aims of the work in this dissertation was to interview the experts in their usual environment: The following conditions applied to the face-to-face interviews. One of the interviews was conducted in a public place. Another interview was conducted at the interviewer's home. For the remaining eight interviews, which were conducted by video conferencing or by telephone, care was also taken to ensure that the experts were mainly in their home environment or in their well-known work environment. One of these video telephone interviews was conducted in the interviewee's professional environment, but in a single office, where the interviewee was able to avoid any disturbance by closing the door and asking not to be disturbed, as well as by switching off the telephones. Another interview was conducted under similar conditions. All other interviews did not take place in a familiar, professional environment, but in a private, domestic setting, so that the avoidance was also familiar here. This procedure indicates in favor of a qualitative **field study** (Hahn, 2018, p. 212; Reinders, 2012, p. 160; Gladbach, 2015, p. 43). In addition, due to the author's twelve years of experience in the DIY sector, it may also be considered a field study in terms of the technical language and subject matter that the author possesses as a result of this experience (Hahn, 2018, p. 212).

The interviews on which the thesis is based were conducted over a total period of approximately seven weeks. Every interviewee was interviewed on a fixed date, so that there was one **time of investigation** in each case (Döring & Bortz, 2016, p. 182 ff.). In empirical studies, a further distinction is made between individual case studies and **group studies**. Group studies are widely used in empirical studies in the social sciences and humanities. This also applies to this study, as the sampling of study units from the research field of interest is formed and then this sample is used. The advantage of group studies is that they summarize several cases and thus allow an abstraction of the peculiarities of the individual case. This leads to generalizable findings (Döring & Bortz, 2016, p. 214 ff.).

4.7 OPERATIONALIZATION

After the research design of the study has been determined, the next step is the operationalization. Each research question or hypothesis contains theoretical constructs and as these cannot be observed directly, they need be linked to the observable reality of experience (Döring & Bortz, 2016; Tausendpfund, 2018). Therefore, theoretical constructs are also referred to as latent constructs. Since formulated hypotheses often refer to relationships between two concepts that are not directly observable, they need be linked to observable indicators for empirical testing. This phase, which serves to allow conclusions to be drawn about constructs that are not directly observable, is also referred to as operationalization in the research process (Tausendpfund, 2018; Döring & Bortz, 2016).

In quantitative studies, the research approach is deductive; in qualitative studies, however, the research approach can be inductive, deductive, or abductive (Wichmann, 2019, p. 33 f.; Brüsemeister, 2008; Strübing, 2018, p. 212 ff.; Heiser, 2018, p. 34 f.). Jäger and Reinecke note, particularly in the explicit case of expert interviews, that these are not subject to a sequential process. According to the authors, the process is characterized by a constant alternation of induction and deduction. This is not least due to the circular approach and the associated learning process of the researcher, and his questioning of the intermediate results obtained (see Chapter 4.3) (Jäger & Reinecke, 2009; Döring & Bortz, 2016; Witt, 2001).

While deduction infers from the general to the specific, that is from theory to empirical data, and the cognitive process begins with hypotheses derived from the theory, and the aim is to test the theory, induction infers from the specific to the general. The aim here is to derive generally valid theories from empirical data on a small number of cases (Döring & Bortz, 2016, p. 222 ff.). Another, third approach is to begin the cognitive process with an observable event, but then to observe unexpected combinations of characteristics. A so-called sudden mental leap then formulates an explanatory hypothesis from the data material during a creative process. This process of scientific reasoning between data and theories is known as abduction (Döring & Bortz, 2016, p. 222 ff.). Abduction includes the significance of people's motives and intentions that lead to a certain action, which is a key difference between the two approaches of deduction and induction (Wichmann, 2019, p. 33 f.; Brüsemeister, 2008, p. 44 f.).

As this study follows the approach of collecting data based on the previously defined research questions using non-standardized survey instruments, in this specific case by interviewing experts, and the concept development is based on a qualitative content analysis, the operationalization phase is not necessarily carried out. On the contrary, as already described in Chapter 4.4, this approach commits to theoretical openness. This paradigm rejects any fixed definitions of theoretical constructs through operationalization (Döring & Bortz, 2016, p. 222 ff.; Lamnek, 1995; Brüsemeister, 2008; Meinefeld, 2019), Lamnek even describes this as absurd in the context of qualitative social research (Lamnek & Krell, 2016, p. 216)

4.8 SAMPLING

As already mentioned in Chapter 4.1 and in Chapter 4.6, qualitative research studies are usually conducted based on a limited number of cases. Since qualitative research is concerned with differentiated, interpretative reconstruction and this requires a high degree of effort to be well-founded and of high quality, larger samples are not feasible due to research economic reasons (Döring & Bortz, 2016, p. 291 ff.; Baur & Fromm, 2011, p. 15). Instead of random case selection, as used in quantitative research, qualitative research involves the deliberate selection of sampling, also referred to as **purposeful sampling** (Sukowski, 2012, p. 52 ff.; Lewis-Beck, Bryman, & Liao, 2004, p. 993; Brady, McDavid, Huse, & Hawthorn, 2013, p. 208 ff.).

This purposeful sampling is used when knowledge is required from individuals who have special knowledge of a topic and are therefore particularly meaningful with regard to the research questions the study is based on (Dhivyadeepa, 2015, p. 111; Döring & Bortz, 2016, p. 291 ff.). As this situation applies to the study, it is based on purposeful sampling, precisely on the targeted selection of certain types of cases. Concretely, the **homogeneous, targeted sample** is used (Döring & Bortz, 2016, p. 304). This is defined, among other things, by the fact that the sample is approached via a small number of recruitment channels and thus a relatively small sample is compiled (Jürgens, 2023, p. 255; Altobelli, 2017, p. 391; Döring & Bortz, 2016, p. 291 ff.). This homogeneity enables a more profound analysis (Misoch, 2019, p. 138).

4.9 DATA COLLECTION IN FORM OF EXPERT INTERVIEWS

After the research design and the sampling for a study have been defined, the next step in the qualitative research process (see Chapter 4.3) consists of data collection. Data collection is an essential part of an empirical study in which the data material is systematically collected. In empirical social research, a distinction can be made between observations, oral interviews, written interviews, psychological tests, psychological measurements, and document analyses (Döring & Bortz, 2016, p. 322). The data collection in this study takes the form of an **oral survey**, for which the term **interview** became established (Gläser & Laudel, 2010, p. 40 ff.). Interviews are of crucial importance in the context of conducting qualitative social research (Träger, 2009, p. 87).

4.9.1 Classification Criteria for Scientific Interviews

Scientific interviews can be classified according to various characteristics. The following table shows these based on Döring and Bortz and Gläser and Laudel (Döring & Bortz, 2016; Gläser & Laudel, 2010). In this table, the different possible main variants are listed on the right-hand side. The structure of the table corresponds to that in Chapter 4.6: The classification criteria are listed on the left-hand side and the respective variants on the right-hand side. The respective variant on which the present study is based is highlighted in bold. The individual classification criteria, including the possible variants, are then explained below and the classification criteria on which this study is based are indicated and justified.

Table 8: Nine classification criteria of scientific interviews.

No.	Classification criteria of scientific interviews	Variants of the classification criteria
1	Degree of structuring	Structured, Semi-structured , Unstructured
2	Variants of semi-structured interviews	Telephone guided interview, Online guided interview, Expert interview , Problem-centered interview, Focused interview
3	Purpose of the interviews	specialists' opinions , interpretations, views, and attitudes, different purposes
4	Subject of the interview	Life story, Attitudes, Actions, observations, and knowledge of the interviewees
5	Interview-Situation	Individual interview , Group-Interview
6	Degree of standardization	standardized, Semi-standardized , Non-standardized
7	Form of communication	Face-to-face , Video call , Phone call , E-Mail, Post

8	Number of Interviewers	One interviewer, Several interviewers
9	Type of interviewee	Lay interview, Affected person interview, Expert interview

[source: own representation based on (Gläser & Laudel, 2010, p. 38 ff.; Döring & Bortz, 2016, p. 322 ff.)]

The first characteristic for classifying an interview is the degree of structuring. Qualitative data collection techniques are non-structured or semi-structured, which gives researchers and interviewees scope for case- and situation-specific flexibility. This is partly due to the openness that qualitative research preserves. The intention is to help explore the unexpected. Narrative interviews tend to be non-structured, as they generally only provide a narrative impetus. Guided interviews, which are used in this thesis, can be considered a **semi-structured** interview technique due to the presence of a questionnaire, which can be tailored to the interviewee's needs and allows spontaneous, new questions to be asked. However, the existence of the questionnaire itself ensures the desired comparability of the interviews (Döring & Bortz, 2016, p. 322 ff.; Gray, 2004, p. 215 ff.).

The semi-structured interview can also be described as a synonym for guided interviews. Guided interviews are based on a list of questions organized by topic, the so-called interview guide. In this study, the interview guide serves as a data collection instrument for the interview. The interview guide is determined in advance but should be adapted flexibly in the interview situation. Typically, guided interviews are conducted in the form of individual interviews, although group interviews are also possible (Döring & Bortz, 2016; Low, Taplin, & Scheld, 2005; Gray, 2004). Semi-structured or as described, also known as guided interviews can generally be divided into five specific variants: Telephone guided interview, online guided interview, expert interview, problem-centered interview, and focused interview (Döring & Bortz, 2016). With regard to this subdivision into the five different variants, the **expert interview** applies to this thesis (Gläser & Laudel, 2010; Flick, 2022). Expert interviews are conducted when the knowledge of experts

on a specific topic is of interest. They are suitable, for example, when the aim is to gain an understanding of processes or procedures (Wright, Breakwell, & Barnett, 1985).

Interviews can also be classified according to their purpose. There is the possibility that there are expert interviews, which pursue the purpose of **questioning the interviewees as specialists** for certain constellations. Interviews can be purposed for recording interpretations, views and attitudes of interviewees, along with a third classification, interviews with a different purpose. The purpose of this study is to interview the interviewees as specialists in order to generate expert knowledge (Gläser & Laudel, 2010, p. 40 ff.). The purpose of the interview and the associated objective define the subject of an interview. Subjects of interviews may, for example, be the interviewee's life story or there may be interviews that focus on the interviewee's attitudes. As expert interviews are reconstructive studies, they usually focus on the **actions, observations, and knowledge** of the interviewees (Gläser & Laudel, 2010, p. 38 ff.; Hildermeier, 2016, p. 46 ff.).

Another parameter of interviews is the interview situation. It is possible to conduct interviews with groups or with individuals. As the aim of the study is to generate the maximum amount of expert knowledge (Gläser & Laudel, 2010, p. 38 ff.), **individual interviews** are appropriate as they allow more time to present and clarify one's own perspective and reduce the risk of influence (Boedeker, 2011, p. 158).

Technically, interviews can be classified according to the degree of standardization or their communication-form. In terms of their degree of standardization, there are three different options: fully standardized interviews consist of identical questions and identical answer options. In semi-standardized interviews, the interviewer's wording and sequence of questions are predetermined, but the respondents' answer options are not. In the third standardization option, the non-standardized interview, neither questions nor answers are predefined (Gläser & Laudel, 2010, p. 38 ff.). This study uses **semi-standardized** guided interviews; this is because the questions are divided into topics and most of them have no answer options (Döring & Bortz, 2016, p. 358); only three questions have a few catchphrases for answers, but these do not claim

to be exhaustive, which was explained to the experts at length at the beginning of the interview. In this semi-standardized interview form, the questions are divided into different topics, each consisting of several questions. All questions have to be asked, but the order can be adjusted if necessary. In addition, questions that are not included in the interview guidelines may also be included. This should enable the interviewer to ask ad-hoc questions if necessary. The interview guideline therefore serves as an orientation (Gläser & Laudel, 2010, p. 38 ff.).

Another technical classification feature is the form of communication, which defines the method of communication. Surveys can be conducted in person (that is face-to-face), by video call, telephone call or, via e-mail or post (Gläser & Laudel, 2010, p. 38 ff.). The interviews conducted for this thesis were conducted **face-to-face**, by **video call** or by **telephone**. The focus is not on how the expert interviews are conducted, but on obtaining the experts' specialized knowledge. In addition, scientific interviews can be classified according to the number of interviewers. The interviews for this thesis were generally conducted by **one interviewer**, who is also the author of the thesis. Moreover, it is possible to classify according to the type of interviewee. For this dissertation, the interviewees are **experts**, as the alternative, laypersons or affected persons, would not be expedient with regard to the objective of the dissertation (Dröge, 2020; Döring & Bortz, 2016, p. 360).

4.9.2 The Guideline-based Expert Interview as a Social Research Method

The previous Chapter characterized the guideline-based expert interview underlying this dissertation as a semi-standardized interview, which is conducted using a guideline containing prepared questions sorted according to specific topics. The selection of this interview form was based on the fact that the pre-defined topics, which are given by the objective of the study, must all be dealt with. This is since individual, precisely defined information is to be collected (Gläser & Laudel, 2010, p. 111).

The **guideline-based, semi-structured expert interviews** aim to uncover how digital technologies at the point of sale in do-it-yourself stores affect customer satisfaction. This inquiry directly addresses the research question: "What insights can be gained into digital technologies that can be used at the point of sale in Do-It-Yourself stores, and how do they impact customer satisfaction?" It is therefore

intended to provide an essential contribution in the form of a concept development with concrete recommendations for academic research and practice. This is then based on the comprehensive literature research provided, the systematic literature review carried out and the expert knowledge. Regarding the expert interviews, representing the primary research part of the dissertation, in combination with the evaluation using qualitative content analysis, they contribute a significant amount of knowledge acquisition (Gläser & Laudel, 2010; Bogner, Littig, & Menz, 2014).

Guideline-based expert interviews as a social research method offer the opportunity to achieve exclusive insights into the structural relationships and transformation processes of action systems. In particular, the generation of knowledge acquisition in decision-making structures and problem solutions of companies should be mentioned. The experts provide insider knowledge based on their experience, which leads to the derivation of implicit rules. This dissertation aims to precisely utilize this privileged perspective on the problem. The interest of the work is aimed at gaining function-specific knowledge. Actor knowledge integrated into a functional context can make a significant contribution to the process and furthermore contributes to orientation in the context of the defined research problem. The expert interviews thus provide new insights into new fields of research without disregarding theoretical or secondary analytical considerations as well as preliminary conceptual considerations. On the contrary, these can be directly linked with each other. Thus, basic principles of qualitative research (see Chapter 4.4) are considered (Liebold & Trinczek, 2009, p. 53).

Consequently, the study utilizes the advantages of guideline-based expert interviews as a social research method: The guideline, which was developed on the basis of the theoretical literature (see Chapter 2) and on the basis of systematic literature research (see Chapter 3) with regard to the main topics of the study, enables the reconstruction of processes and facts (Pieper, 2006, p. 76; Gläser & Laudel, 2010). Expert interviews are therefore particularly suitable for the defined research question, as this dissertation focuses on processes that have partly taken place in the past and can no longer be observed. At the same time, these processes can be described as very complex due to their multi-layered nature and are therefore not observable at all points, which also speaks in favor of conducting expert interviews, as this form of qualitative interviews is advantageous for these

framework conditions (Bogner, Littig, & Menz, 2014). The opportunities for gaining insights from the qualitative approach are ensured by adhering above all, to the principles of communication, flexibility, and the process-character. Further advantages result from the thematic emphasis enabled by expert interviews and the formulation of subject-related hypotheses that do not merely test previously conceptualized knowledge. The order of the topics during the collection and evaluation of the data material also provides an advantage compared to other methods, as this contributes to comparative interpretation and allows the multi-layered information material obtained to be categorized into different types. This focuses on the goal of discovering the unknown and interpretative theory building (Liebold & Trinczek, 2009).

A critical success factor when conducting expert interviews regarding the generation of new, unknown knowledge is the selection of experts. For this reason, the following Chapter defines the term expert and emphasizes what needs to be considered when selecting them.

4.9.3 The Characterization of an Expert

There are numerous academic publications in the scientific literature that deal with expert interviews and with the definition of an expert. The following subchapter summarizes the key findings of a literature review on the term expert and concludes with a working definition on which this dissertation is based.

Meuser und Nagel define an expert as a person who is responsible for the conception, implementation or control of a problem solution or who has privileged access to information about decision-making processes or about certain groups of people (Meuser & Nagel, 1991, p. 441 ff.). Mieg and Brunner elaborate on the following central elements of expert competence: The respective expert performance is strongly dependent on the respective area; however, this expertise for the respective area is not transferable to other areas. To achieve the competence of an expert, it takes about **ten years of training and experience**. However, the importance of general personal skills, such as intelligence or memory for the professional performance of an expert is low. The authors therefore speak of a 10-year-rule. From this, the authors deduce that an expert describes a person who, in summary, has **many years of experience in field-specific knowledge and/or skills**

(Mieg & Brunner, 2001, p. 6). This rule is also used as a basis in numerous other publications (De Silva & Asmone, 2023; De Silva & Asmone, 2023; Strasser, 2006; Klemme & Siegmann, 2015; Niederberger & Renn, 2018).

Mundt classifies an expert as a person who has **comprehensive knowledge, which results from the fact that this person has knowledge that is not available in the literature, but has acquired this knowledge through his or her practical work and involvement in projects** (Mundt, 2008, p. 19). Gläser and Laudel define an expert as a **source of specialized knowledge about the respective issues to be researched**. Based on this specialized knowledge, the expert then has a specific role for them (Gläser & Laudel, 2010, p. 12). Bogner, Littig and Menz define an expert as a **person who is equipped with specific practical or experiential knowledge that relates to a clearly defined problem area**. On the basis of this knowledge, it is possible to structure a specific field of action for others in a meaningful and action-guiding way with people from this group (Bogner, Littig, & Menz, 2014, p. 13).

Based on these classifications (Meuser & Nagel, 1991; Mieg & Brunner, 2001; Mundt, 2008; Gläser & Laudel, 2010; Bogner, Littig, & Menz, 2014), **the relevant characteristics that classify a person as an expert are summarized and listed in the following:**

- The person is trained and experienced within a respective issue for about ten years, which contributes to the fact that this person is equipped with specific practical or experiential knowledge that cannot be found in the existing scientific literature.
- The person has a specific role in relation to a particular topic.
- The person has responsibility for designing, implementing, or controlling a solution to a problem or has privileged access to information about decision-making processes.
- The importance of general personal skills to the person's job performance is considered low.

Since a standardized, general definition of the term expert does not exist, and the concept of an expert must be viewed relationally, in the respective context of the certain underlying research question and the object of investigation (Meuser & Nagel, 1991, p. 443; Jaspert, 2010, p. 232), the following definition of an expert applies to this dissertation, based on the definitions listed above (Meuser & Nagel, 1991; Mieg & Brunner, 2001; Mundt, 2008; Gläser & Laudel, 2010; Bogner, Littig, & Menz, 2014):

*An expert provides **specific practical or experimental knowledge** on a **particular issue** to which he has **privileged access**, based on about **ten years of experience**, and therefore plays a **special role** in relation to a particular issue.*

4.9.4 The Process of an Expert Interview

Conducting an expert interview based on a guideline requires several preparations to be carried out. These can be subdivided into various phases. The dutiful and correct execution of the respective phases can be critical to the success of the results of the expert interviews; the process of the expert interview is outlined below and is divided into its respective phases (Döring & Bortz, 2016; Mieg & Brunner, 2001) (Gläser & Laudel, 2010).

4.9.4.1 Phase No. 1: Organizational and Content-related Preparation

The first phase of qualitative expert interviews is based on organizational and content-related preparation. Regarding the organization, the most important point is that the researcher(s) internalize the required resources, since these resources in the form of time, personnel, technology, skills or experience are often underestimated (Flick, 2020). In this context, it is important to ensure that the interviewer(s) are appropriately trained. For this purpose, it is essential that, among other things, role plays are carried out by the interviewers in advance in order to be able to take on both perspectives, that of the interviewer and that of the interviewee (Döring & Bortz, 2016). Regarding the content, it is essential that the

interviewer(s) are clear about the research interest and internalize the research question to be answered so that it can be answered in a targeted manner. It is also important that the interviewers familiarize themselves with the respective specialist field in advance, particularly regarding any technical terms and basic findings from the respective field. Communication with the experts during the interviews must be ensured at a technical language eye-level. This is essential for an interview in which the expert perceives the interviewer as an interlocutor at eye-level, as a meaningful and productive result can only be achieved if this condition is fulfilled (Mieg & Brunner, 2001).

4.9.4.2 Phase No. 2: Identifying, Selecting, and Addressing the Potential Experts

As the content of the interview is largely determined by the interviewee, the second phase of the expert interviews, in which the aim is to identify, select and contact potential experts for the qualitative interview, is of great importance. In this phase, Gläser and Laudel suggest that researchers consider four specific questions to facilitate a high-quality reconstruction of social processes using expert interviews (Gläser & Laudel, 2010, p. 117 ff.):

1) Who has the relevant information?

Related to this question, the researcher first must identify which potential interviewees are most likely to provide relevant information regarding the research question to be answered. In principle, it should be noted that several actors are to be interviewed, as each of them has different information due to their specific position in the process to be reconstructed. It is therefore not to be expected that one interviewee will possess all the relevant information (Gläser & Laudel, 2010, p. 117 ff.).

2) Who is most qualified to provide precise information?

In order to achieve the objective of the study in the best possible way, the second question is to deepen the identification and selection of experts who can precisely convey the relevant knowledge. Within the DIY sector, experts from both trade and industry represent the experts who can provide the highest level of quality knowledge, which is why they are repeatedly

consulted (BaumarktManager, 2022; Kolf, 2022; Kolf & Scheppe, 2023; BaumarktManager, 2014). For this reason, contact persons from these sectors have been selected for this dissertation, taking into account their affinity for the relevant research field, as they work in an organization that deals with the topic to be researched, or are personally involved with this subject area in a particular way (Thiering, 2006, p. 5). For this reason, interviewees from these two groups were selected for the interview requests for this study, possible experts from the retail sector (retailers) as well as those from the industry (suppliers). In addition, this is accompanied by the advantage that by interviewing possible experts from these two groups, on the one hand the information obtained from the respective groups, the retailer group and the supplier group, can be triangulated, and on the other hand a triangulation can be carried out with regard to the background of the interview partners, in which the different perspectives, that of the retailer and that of the suppliers, can be considered (Gläser & Laudel, 2010, p. 117 ff.). DIY store customers, who may represent a third perspective, were deliberately not selected as potential interview partners in this study, as they cannot be considered experts in the sense of the definition given in Chapter 4.9.3.

3) Who is most willing to provide information?

The third question relates to the willingness of potential experts to take part in an interview. From this perspective, it's important to acknowledge that the most straightforward access to potential interviewees is often through personal connections, such as family or friends. Although this group is generally the most willing to give an interview, as the people often feel personally connected, there is a risk of bias in case selection if the cases are chosen with regard to the least resistance to access to potential interview partners. It is therefore imperative to ensure that the interview partners are the most suitable from the methodological point of view (Gläser & Laudel, 2010, p. 117 ff.; Blatter, Langer, & Wagemann, 2018, p. 62; Pfaff-Rüdiger, 2016, p. 202 f.).

4) Which experts are available?

Determining how many interview partners are available depends, among other things, on the time available to potential interview partners. It is therefore important to ensure that interview partners are also considered within the scope of the time available. An interview partner who is only available when a conscientious evaluation is not possible due to a lack of time resources would therefore not be expedient (Gläser & Laudel, 2010, p. 117 ff.). Meuser and Nagel also point out that interview partners at the top level, who may have less time available, may not always be selected. This is due to the fact that decisions are often prepared and implemented by people at the second and third levels, who tend to have more detailed knowledge (Meuser & Nagel, 1991, p. 443 f.; Gläser & Laudel, 2010, p. 117 ff.; Albert, 2020, p. 103).

In addition to the theoretical and methodological considerations outlined above, the ethics of social science research constitute an indispensable part in this phase. In the course of social science research, it is essential that the researcher protects the rights and interests of those being studied. This means that no harm is done to people who are involved in social science research. Participation is also fundamentally voluntary (Gläser & Laudel, 2010, p. 48 ff.). The Code of Ethics of German Sociologists also states that participation in the study implies that the persons involved should be given as much information as possible about the aims and methods of the research project (Deutsche Vereinigung für Politikwissenschaft (DVPW) e.V., 2017). Accordingly, for this study, the principle of informed consent was already applied when the potential interview partners were contacted for the first time by informing them regarding the investigation directly at this stage. Care was taken to ensure that the individuals were informed about the aim of the research project, while also ensuring that any potential response behavior was not influenced in case of a willingness to be interviewed (Gläser & Laudel, 2010, p. 48 ff.). Furthermore, in accordance with the Deutsche Vereinigung für Politikwissenschaft (DVPW), the required anonymity of the persons examined was maintained (Deutsche Vereinigung für Politikwissenschaft (DVPW) e.V., 2017). After the interview, the interviewees were sent the transcript to be published and

asked to check whether all the information had been transcribed correctly and whether they agreed that all the information would be published accordingly or whether they requested corrections, additions, or deletions. Each interviewee was thus given the opportunity to comment before publication. Not until after this written permission of the material the interviews were utilized for this study (Çetin, 2014, p. 205). Generally, the names of the experts and the company in which they are employed have been omitted to preserve anonymity (Gläser & Laudel, 2010, p. 48 ff.).

4.9.4.3 *Phase 3: Planning the Expert Interviews*

Once the interviewees for the expert interviews have been successfully recruited, the next step in phase three is to plan the expert interviews. The development of the interview guideline plays a crucial role in this phase. The interview guideline serves as a survey instrument in the context of qualitative expert interviews and describes a document that contains the questions that the interviewer would like to ask the interviewee. In contrast to a standardized questionnaire, which is primarily used in quantitative research, the interview guideline serves more as an orientation and to ensure that the interviewer does not omit any important questions (Mieg & Brunner, 2001, p. 13; Gläser & Laudel, 2010, p. 142 ff.). In this way, the interview guideline follows the basic principle of the qualitative paradigm of openness (Gläser & Laudel, 2010, p. 115).

The challenge in drawing up the interview guideline arises from the fact that the guiding questions have to be operationalized in such a way that the interviewees can understand them (Gläser & Laudel, 2010, p. 142 ff.). For this reason, the questions should be formulated simply and clearly and should be based on the everyday language of the respondents (Hedderich & Hecker, 2009, p. 72). Only in this way can it be expected that the interviewees with their answers to the questions can contribute to the explanation of the process to be reconstructed (Gläser & Laudel, 2010, p. 142 ff.). Additionally, due to the predetermined list of questions that the interviewer intends to ask, the interview guideline fulfills the function of ensuring comparability of content between the interviews (Döring & Bortz, 2016, p. 372).

The structure of the interview guidelines should generally be clearly laid out, questions should also be arranged in such a way that they can be processed logically and stringently according to their content, and the document should not exceed two pages. At the beginning, the guideline should be organized in the way that some notes are listed, which the interviewer is able to use at the beginning in order to mention important information in advance based on the notes: This concerns, among other things, notes with regard to informing the interviewee about the objective of the interview, but also an explanation with regard to the protection of the interviewee's personal data (Gläser & Laudel, 2010). In the first step, basic biographical information such as the interviewee's age, decision-making role or education is often collected. Following this, general questions should be formulated, which will become more detailed during the interview. Any sensitive questions should be asked towards the end (Döring & Bortz, 2016, p. 372). A suitable final question is to ask the interviewees whether all the topics that are important to them have been addressed or whether they would like to mention additional aspects that they feel have been given too little consideration (Gläser & Laudel, 2010, p. 148 ff.).

Two guidelines were created for this dissertation, one aligned to the group of retailers, and one aligned to the group of suppliers. The reason for this is that the two perspectives of the interviewees were to be taken into account. In terms of content, both guidelines differ only in terms of the perspective of the interviewees. What both interview guidelines have in common is that they can be divided into six blocks: first, a few introductory questions are asked about the interviewee. This is followed in the second topic block by general questions about the POS in DIY stores. The third block then deals with digital technologies that are used at the POS in DIY stores today and their impact on customer satisfaction. In accordance with the funnel principle, which states that the most open questions should be asked first, and then more focused topics should be worked through, the fourth thematic block deals with the factors that customers expect from digital technologies at the POS in DIY and for which product ranges and for which customer groups they are suited. The fifth block of topics then focuses on the future situation at the POS in DIY stores. The interview guide then concludes with the final question as to

whether the interviewees would like to add further important aspects concerning digital technologies that lead to an increase in customer satisfaction, which in their opinion are not sufficiently considered in the interview.

In summary, it can be stated that the developed interview guidelines give both the interviewer and the interviewee the opportunity to ask questions if certain things are unclear. In this way, communication is ensured, and misunderstandings can be avoided. Similar to a pretest in quantitative research, a guided interview in qualitative research is also checked in advance in the form of a trial interview and is revised if necessary. This was also the case for this study. Four test interviews were conducted in advance: Two of them were conducted with people experienced in the DIY sector to obtain feedback on the content focusing not only on the completeness of the interview but also on its comprehensibility, particularly regarding the technical language used. Two further test interviews were conducted with individuals outside the DIY sector to gain general feedback on the structure, comprehensibility, and completeness from a non-specialist perspective. After appropriate revisions, the interviews were then conducted with the recruited experts (Döring & Bortz, 2016, p. 372 ff.).

4.9.4.4 *Conducting the Expert Interviews*

The phase of conducting the expert interviews can be divided into several steps: Starting the interview, conducting the interview, ending the interview and farewell, and finally writing the interview notes. The last step can be seen as a transition to data preparation, as it is a smooth transition.

With regard to the start of the interview, it should be ensured that a relaxed atmosphere is created at the beginning before the interview is opened. Furthermore, a pleasant proximity-distance regulation should be achieved in face-to-face interviews, for example through a seating arrangement that is not too intrusive on the one hand, but not too distant on the other (Döring & Bortz, 2016, p. 365 ff.). In addition, the aim of the investigation is discussed again, as well as any data protection issues (Scheiermann, 2022, p. 149 f.; Einramhof-Florian, 2017, p. 71 f.). One challenge in this step is dealing with the modalities of the audio recording. In order to handle this as effectively as possible, it is recommended that the

recording technology is checked in detail for suitability before the meeting and preferably already set up at the start of the interview so that the topic is not a cause for concern (Döring & Bortz, 2016, p. 365 ff.). In the context of these interviews, it should be mentioned that before the start of the interview, after clarifying and explaining the objective of the study, the definition of customer satisfaction was once again clarified together with the interviewees in order to achieve a common understanding of the specifics of the three characteristics mentioned in Chapter 2.6: dissatisfied, satisfied and extremely satisfied. As an understanding of these terms was essential for the targeted answering of some questions, this excursus was carried out with all participants in advance (Skala-Gast, 2012, p. 145 f.).

The next step, conducting the interview, is primarily determined by the interviewer's control of the course of the conversation: Reactions and behavior should be closely monitored in addition to the spoken content (Döring & Bortz, 2016, p. 365 ff.). Besides the general rules for expert interviews, Gläser and Laudel emphasize above all the importance of special rules of conduct: In this context, they particularly stress the rule of listening, which consists of active listening, not interrupting and allowing pauses. Furthermore, they explicitly emphasize the importance of asking flexible questions, clarifying what is not understood and asking for details. Additionally, it is recommended to ask questions briefly and clearly, to always show competence as an interviewer and to avoid judgments (Gläser & Laudel, 2010, p. 172 ff.). The interviewer should be prepared for the fact that there may be verbose respondents as well as taciturn respondents so an appropriate balance must be found between intervening (directive style) and letting respondents do as they prefer (non-directive style) (Döring & Bortz, 2016, p. 365 ff.; Smith & Albaum, 2005, p. 187 f.).

The next step, the end of the interview and farewell, usually consists of an informal discussion, feedback if necessary and the exchange of contact details so that documents can be exchanged afterwards, such as transcription documents for review and approval by the interviewees (Döring & Bortz, 2016, p. 365 ff.; Çetin, 2014, p. 205 ff.; Omeni, 2020, p. 79 ff.).

The intermediate step to the follow-up phase, the step of taking interview notes, is of utmost importance. Once the interview has been completed and the interviewee has departed, notes are to be taken immediately afterwards. This

resulting interview protocol should be created in addition to the transcription for each interview and provide a supplementary description of the interview: It is important to record any abnormalities, possible disorders and, if applicable, special observations such as the interviewee's mental state, state of health, external appearance, etc. This also includes the recording of the premises or the manifestation of the interview atmosphere. This is then included in the validity assessment of the material (Döring & Bortz, 2016, p. 365 ff.; Vogel & Funck, 2018).

The interviews for this study were conducted between 09/28/2023 and 12/07/2024. The nineteen interviews lasted a total of 13.4 hours. 31.5% of the interviews were conducted face-to-face, 31.5% by video call and 37.0% by telephone. Thus, the interviews were conducted either in person, via video call or by telephone. Since the aim of expert interviews is to gain expert knowledge, it is not relevant that the conditions and locations of the interviews differ to a certain extent (Oehlrich, 2019, p. 85, Bogner, 2014).

One interviewer refused an audio recording, so that the duration of the audio recordings amounted to 12.78 hours. This resulted in an approval rate for the audio recordings of 95,4 %. As part of the expert interviews, general managers, key account managers, purchasers, lead marketing technology managers, marketing managers, product managers, sales managers, regional managers, area managers, and deputy store managers were interviewed. The interviews were recorded using an audio recorder, subject to the consent of the interviewees. Insofar as this was not permitted, they were recorded by hand. The duration of the interviews ranges from 26 to 53 minutes. This is because some experts went into more detail than others. However, for none of the final interview participants could a relatively short interview time be interpreted as an indication that these people withheld information for any reason, thus compromising the quality of the interview.

4.9.5 Criteria for Selecting the Interview Experts in this Study

In the following, the criteria for selecting the experts interviewed for this dissertation will be stated:

Professional expertise

The selected experts should have in-depth knowledge and many years of experience in the DIY store industry. Therefore, the following conditions were set for any interviewees:

- at least 10 years of professional experience in the DIY store industry (either in retail or in industry or both)
- specific practical or experiential knowledge that relates to a clearly defined problem area
- working at different levels: top level, the second or third level (e.g. managing director, key account manager, senior sales manager, buyer, product manager, marketing manager) within their organization
- proven expertise in the relevant sub-areas (product range design, sales strategies, product development or marketing)

Several areas in the DIY sector

Furthermore, during this study, a particular focus has been placed on the fact that experts from retail and industry are represented in order to obtain a holistic perspective. To cover as broad a spectrum of perspectives and experiences as possible, the experts should come from different fields:

- **Retail:** Representatives belong to the TOP 5 DIY companies in Germany (BAUHAUS, OBI, Hornbach, Hagebau, REWE (toom / b1))
- **Industry:** Representatives work in companies that generate a turnover of > 100 million euros and that employ more than 500 employees

Independence and objectivity

To ensure the most unbiased perspective possible, experts should:

- be willing to talk critically and reflectively about industry developments
- have gained experience outside of their current organization

Availability and willingness to cooperate

Practical aspects, such as the following, were also assumed:

- willingness to participate in an extensive interview (approx. 30-90 minutes)
- consent to use the interview for this doctoral thesis
- possibility to conduct the interview within the planned research period

4.9.6 Characterization of the Interview Experts in this Study

According to these criteria, **two groups of interviewees** were identified and selected for this dissertation. One group consists of experts from the **retail sector (n = 9)**, the other group of experts from the industry, the **suppliers (n = 10)**. Thus, the **sample size of this study amounts to n = 19**.

For the interview partners from the retail sector, it was ensured that all interviewees had at least **ten years of professional experience in the DIY sector**. It was also ensured that the interviewees came from **different levels with different position backgrounds**. This was intended to **ensure that the interviewees' experiences were not exclusively from one perspective**. In addition, care was taken to ensure that they primarily came from **retail companies that are among the five largest in the DIY sector**. Consequently, eight of the nine interviewees came from one of the five largest German DIY companies by gross sales in Germany and abroad in 2022 (Figure 5). These companies generate around 80% of the sales of the top ten DIY companies in Germany. For this reason, the assumption that these interviewees have a high level of knowledge based on experience and various further training measures was reasonable (Fischer, 2007). However, the ninth retail interviewee, who does not come from one of the top five companies in the DIY sector, was chosen as an interviewee because he has **specific practical and experimental knowledge** on the particular issue of digital technologies to which he has privileged access. In addition, this person has at least ten years of experience with the DIY sector. For this reason, all nine finally selected interview partners fulfilled the conditions provided in Chapter 4.9.3, which, according to the definition, legitimize them as an expert. Initially, 18 retailers were approached in person, by telephone or by email as possible interview partners, but six people had to be excluded from the subsequent expert interview as they were unable to provide evidence of at least ten years of professional experience within the DIY sector. Three further interviewees did not respond to further inquiries, so the contact was then interrupted, as the willingness to take part in an interview was not considered to be given.

The potential **interview partners of the suppliers** were also selected on the basis of at least **ten years of professional experience within the DIY sector**. Ensuring that the interviewees came from **different levels and therefore had different position backgrounds** also helped to gain diverse perspectives. Furthermore, care was taken to select interviewees from a **company that generates a turnover of at least 100 million euros per year** and employ more than 500 employees, as it was assumed that companies with this volume of turnover and an background have a certain degree of professionalism and experience, which has a corresponding influence on employees. Initially, 20 potential interviewees were requested from the group of suppliers, of which in few cases some of these potential interviewees were recommended by the experts already consulted, which facilitated access to these individuals in the sample (Köchert, Ta, & Wojtal, 2016, p. 48). These were all also contacted in person, by telephone or by email. However, nine had to be excluded as they did not meet the requirements of the defined expert classification. A further person had to be excluded subsequently as it was not possible to ensure that this person was willing to pass on correct information.

The identification and selection of the experts therefore resulted in a total of 19 people being defined for the interview. The experts were assigned to **two groups: 10 key informants from industry, the supplier-group and 9 key informants from the retail sector, the retail-group.**

One peculiarity should be noted: Insofar as the interviewees had the ten years of professional experience or more in DIY, but worked both in retail and as a supplier, they were assigned to the group where they had completed the most professional experience in years. However, these interviewees were also very valuable for the interviews, as they held both the retail and the industry perspective.

A detailed overview of the interviewed experts can be found in Table 9, which shows (sorted by date of conduction) the respective date of the interview, the duration in minutes, the kind of the interview, the job-title of the interview partner, the age in years, its job experience in years, whether the respective

interview partner came from retail or industry and the appendix number. The interviews were all conducted in the German language. In accordance with the guidelines, the transcripts of these interviews were then translated into English for the appendix of the thesis using translation software for reasons of comprehensibility (see Appendixes 3-21).⁸

During this study, the particular focus was placed on the acquisition of experts, maximizing the diversity of data obtained from the respondents. This approach was justified by the intention to achieve saturation on a data spectrum as broad as possible. The interviewees were deliberately selected from the two groups mentioned, the retailers and the suppliers, and the interviews were scheduled in the best possible way so that not all interviews were conducted with one group at the beginning and then with the other but rather alternated as far as possible. This approach was also intended to further ensure **triangulation** in this dissertation. The aim of this was to achieve maximum differences in the sample, which should lead to the maximum of new data acquired. **After the nineteenth interview, however, the realization of theoretical saturation emerged, that is the realization that no further, new data could be found that would contribute to the defined objective of the dissertation.** This situation is referred to as theoretical saturation. For this reason, the sampling of further cases was stopped at this point, as the cases, especially towards the end, showed an extremely high degree of similarity, and the limits of the empirical data were reached (Glaser & Strauss, 2017, p. 61 ff.; Glaser & Strauss, 1967).

⁸ For the translation of the interviews, the DeepL SE software was used.

Table 9: Structure of the expert sample.

No.	Date	Duration (minutes)	Kind of Interview	Job Title	Age	Job Experience	Back- ground	Append. No.
R1	09/xx/2023	43:12	Video-Call	Lead Marketing Technology	31-40 years	> 10 years	Retailer	3
R2	09/xx/2023	44:27	Face-to-Face	General Manager	51-60 years	> 40 years	Retailer	4
S1	10/xx/2023	26:17	Video-Call	Area Sales Manager	41-50 years	> 30 years	Supplier	12
S2	10/xx/2023	46:29	Face-to-Face	Senior Sales Manager	51-60 years	> 20 years	Supplier	13
R3	10/xx/2023	33:20	Phone-Call	Deputy Store Manager	51-60 years	> 20 years	Retailer	5
S3	10/xx/2023	44:11	Phone-Call	Area Manager DIY	51-60 years	> 20 years	Supplier	14
S4	10/xx/2023	34:28	Phone-Call	Key Account Manager DIY	31-40 years	> 10 years	Supplier	15
R4	11/xx/2023	37:27	Face-to-Face	General Manager	31-40 years	> 10 years	Retailer	6
S5	11/xx/2023	37:01	Phone-Call	Regional Sales Manager	31-40 years	> 10 years	Supplier	16
R5	11/xx/2023	49:12	Phone-Call	Regional Manager	41-50 years	> 30 years	Retailer	7
R6	11/xx/2024	37:08	Face-to-Face	Purchaser	41-50 years	> 10 years	Retailer	8
R7	11/xx/2024	51:22	Face-to-Face	Purchaser	51-60 years	> 20 years	Retailer	9
S6	11/xx/2024	52:43	Video-Call	Key Account Manager	51-60 years	> 10 years	Supplier	17
S7	11/xx/2024	48:13	Video-Call	Product Manager	31-40 years	> 10 years	Supplier	18

R8	11/xx/2024	48:43	Video-Call	General Manager	51-60 years	> 20 years	Retailer	10
R9	11/xx/2024	43:11	Face-to-Face	General Manager	51-60 years	> 10 years	Retailer	11
S8	11/xx/2024	44:30	Phone Call	Regional Manager	41-50 years	> 10 years	Supplier	19
S9	11/xx/2024	39:13	Video-Call	Marketing Manager	31-40 years	> 10 years	Supplier	20
S10	12/xx/2024	43:17	Phone-Call	Marketing Manager	31-40 years	> 10 years	Supplier	21
		Σ 804:24						

[source: own representation]

4.10 DATA PREPARATION

After conducting the expert interviews, the next step is data preparation, which includes all substantiated and documented processing of the raw material. The aim is to increase the informative value and usability of the data, that is its quality. This then serves as preparation for the following step within this dissertation: the qualitative data analysis in the form of the qualitative content analysis. The following Chapter provides a concise overview of the various steps involved in data preparation and discusses their function and significance.

First, the 5 different steps of data preparation according to Döring and Bortz are explained (Döring & Bortz, 2016, p. 580 ff.):

- 1) **Creation of data sets:** The generation of the data sets includes sorting, allocation, digitalization, formatting, and transcription of the raw data material into structured data sets (Döring & Bortz, 2016, p. 580).
- 2) **Commenting on the data sets:** In this second step, meta information is added to the data records, such as the survey date (Döring & Bortz, 2016, p. 580), omissions or emphases (Schneider, 2016, p. 73 f.).
- 3) **Anonymization of the data records:** During of anonymization, information that would allow identification of the study participant is removed or replaced (Döring & Bortz, 2016, p. 580; Kargl, Erb, & Bösch, 2023, p. 462).
- 4) **Data cleansing:** Data cleansing removes unimportant details, such as bloopers (Döring & Bortz, 2016, p. 580; Allen, 2017, p. 337).
- 5) **Data transformation:** Data transformation searches for quantitative variables and summarizes them (Döring & Bortz, 2016, p. 580).

The importance of data preparation is of immense significance, as incorrectly prepared data can lead to incorrect decisions in practice, possibly contributing to high follow-up costs. For this reason, this step serves to avoid incorrect results. The aim is to prevent errors caused by the garbage-in, garbage-out principle. Data preparation should also simplify the subsequent data analysis. The stringent and sufficiently commented preparation enables a rather efficient analysis in the further course. An equally important aspect is the avoidance of ethical problems. For this

reason, anonymization must be carried out with utmost care during data preparation (Döring & Bortz, 2016, p. 581 f.; Sethi, 2001, p. 39).

Finally, it is important that the procedure during data preparation is meticulously reflected upon; for example, a negligent approach in the course of data preparation could lead to the omission of important data elements (Döring & Bortz, 2016, p. 581 f.; Ben-Gan, Kollar, Sarka, & Kass, 2009).

Qualitative data analysis can be carried out manually, with office software such as Microsoft Word or Microsoft Excel or using Computer-Assisted Qualitative Data Analysis Software (CAQDAS) software such as ATLAS, AQUAD or MAXQDA. In this case, we also speak of Qualitative Data Analysis (QDA). The data preparation of the data depends on the selection of these options (Döring & Bortz, 2016, p. 581 ff.; MAXQDA, 2023).

In this dissertation, a **complete transcription was conducted by hand** (provided in appendix 3-21). This method, which is more complex than partial transcription, was chosen for the following reason: With partial transcription, the risk occurs that it may not be completely clear during the transcription and thus before the evaluation, which passages of the expert interviews are relevant and which are not. It would therefore be unjustifiable to omit some passages in the course of transcription (Döring & Bortz, 2016, p. 581 ff.). Otherwise, this would lead to a methodologically uncontrolled situation (Gläser & Laudel, 2010, p. 193). These disadvantages, which would also have contributed to data transformation at a very early stage, had to be excluded by applying full transcription (Gläser & Laudel, 2010, p. 581 ff.).

The following **transcription system** was defined for the present study so that all interviews could be transcribed according to a uniform and comparable set of rules (Döring & Bortz, 2016, p. 581 ff.; Gläser & Laudel, 2010, p. 193 ff.; Dresing & Pehl, 2015; Mayring, 2022, p. 56):

- Complete and verbatim transcription (leave incompleteness and repetitions) (Mayring, 2022, p. 56),

- The interviews are transcribed in standard orthography (Dresing & Pehl, 2020, p. 847),
- No literary transcription is used (Gläser & Laudel, 2010, p. 194; Dresing & Pehl, 2020),
- Non-verbal utterances are only transcribed if significant (Gläser & Laudel, 2010, p. 194; Dresing & Pehl, 2020),
- In case of ambiguities, dots are added (...), depending on the length of what was not understood (Mayring, 2022, p. 56),
- For pauses, one or more dashes are used depending on the length (Mayring, 2022, p. 56),
- Unintelligible passages are marked (Gläser & Laudel, 2010, p. 194; Dresing & Pehl, 2020),
- When the interviewer asks a question or speaks, an "I" is used, followed by a colon and a space (Mayring, 2022, p. 56),
- If the interviewee, that is the expert, answers, the symbol "A" is used (Mayring, 2022, p. 56).

According to this set of rules, all nineteen expert interviews were transcribed manually and then anonymized before they were analyzed. The following subchapter addresses this topic in more detail (Döring & Bortz, 2016, p. 581 ff.; Gläser & Laudel, 2010, p. 193 ff.).

4.11 DATA ANALYSIS

Data analysis is used in both quantitative and qualitative research. In quantitative research, data analysis primarily aims to test previously formulated hypotheses. In qualitative research, the main purpose of data analysis is to answer previously formulated research questions systematically and comprehensibly based on the collected data and to form new hypotheses. Both approaches share the common goal of establishing a systematic connection between theoretical frameworks and experiential reality. The quantitative approach is more theory-

testing, the qualitative approach more theory-building (Döring & Bortz, 2016, p. 597 ff.).

Within this investigation, qualitative data material, which originates from the expert interviews, is evaluated hermeneutically, that is interpretatively, with regard to the research problem. This is an explorative interest in knowledge, which aims to explore the subject matter, develop theories and form hypotheses. There are numerous methods for evaluating qualitative data, such as objective hermeneutics, the documentary method, the grounded theory methodology (GTM) or qualitative content analysis (Döring & Bortz, 2016, p. 597 ff.). The last-mentioned method forms the basis of this dissertation.

4.11.1 Data Analysis in the Form of Qualitative Content Analysis

The qualitative content analysis is a structured evaluation procedure for text-based data for interpretation, classification and assessment (Kuckartz, 2018; Mayring & Fenzl, 2019). Originally, content analysis had a quantitative orientation (Rauschert, 2014, p. 196), the idea of which was to extract information from texts, convert it into a suitable format and process it separately from the original text. This was first carried out in the 1920s in the USA.

In order to be able to process information that is present in texts, various operations are necessary (Gläser & Laudel, 2010, p. 197):

- Before the analysis, the construction of a closed category system is carried out,
- the text is broken down into units of analysis,
- the text is searched for relevant information, and
- the information is coded, which means that it is assigned to the respective categories on the basis of codes (Gläser & Laudel, 2010, p. 197 f.).

As a result, frequencies of occurrence of the categories in the text are determined, resulting in a quantification. In terms of methodology, this procedure assumes that there is a relation between the frequency of occurrence of various categories and the significance of the facts described by these categories (Gläser & Laudel, 2010, p. 197 ff.).

This form of analysis was later criticized for reducing complexity by subsuming textual elements under one category, as it ignores the possible varying meaning of textual elements. This quantifying approach is thus in conflict with the qualitative paradigm, which aims to understand human behavior (Renner, Heydasch, & Ströhle, 2012, p. 115; Gläser & Laudel, 2010, p. 198; Raithel, 2008, p. 11).

At the beginning of the 1980s, Philipp Mayring then developed a method which, guided by rules, is oriented towards the complexity of information and towards understanding (Mayring, 1985; Gläser & Laudel, 2010, p. 197 ff.). Mayring defines this as qualitative content analysis and distinguishes it from quantitative content analysis by stating that quantitative analysis uses number concepts and their relating to something through mathematical operations in the survey or evaluation - everything that does not correspond to these cases is qualitative analysis (Mayring, 2022, p. 17). Mayring's method differs from quantitative content analysis in that the theoretically derived system of categories is checked and compared with the material (Gläser & Laudel, 2010, p. 197 ff.). Mayring describes this category-guided approach as a distinguishing feature of qualitative content analysis (Mayring, 2019).

4.11.2 Technique of Qualitative Content Analysis

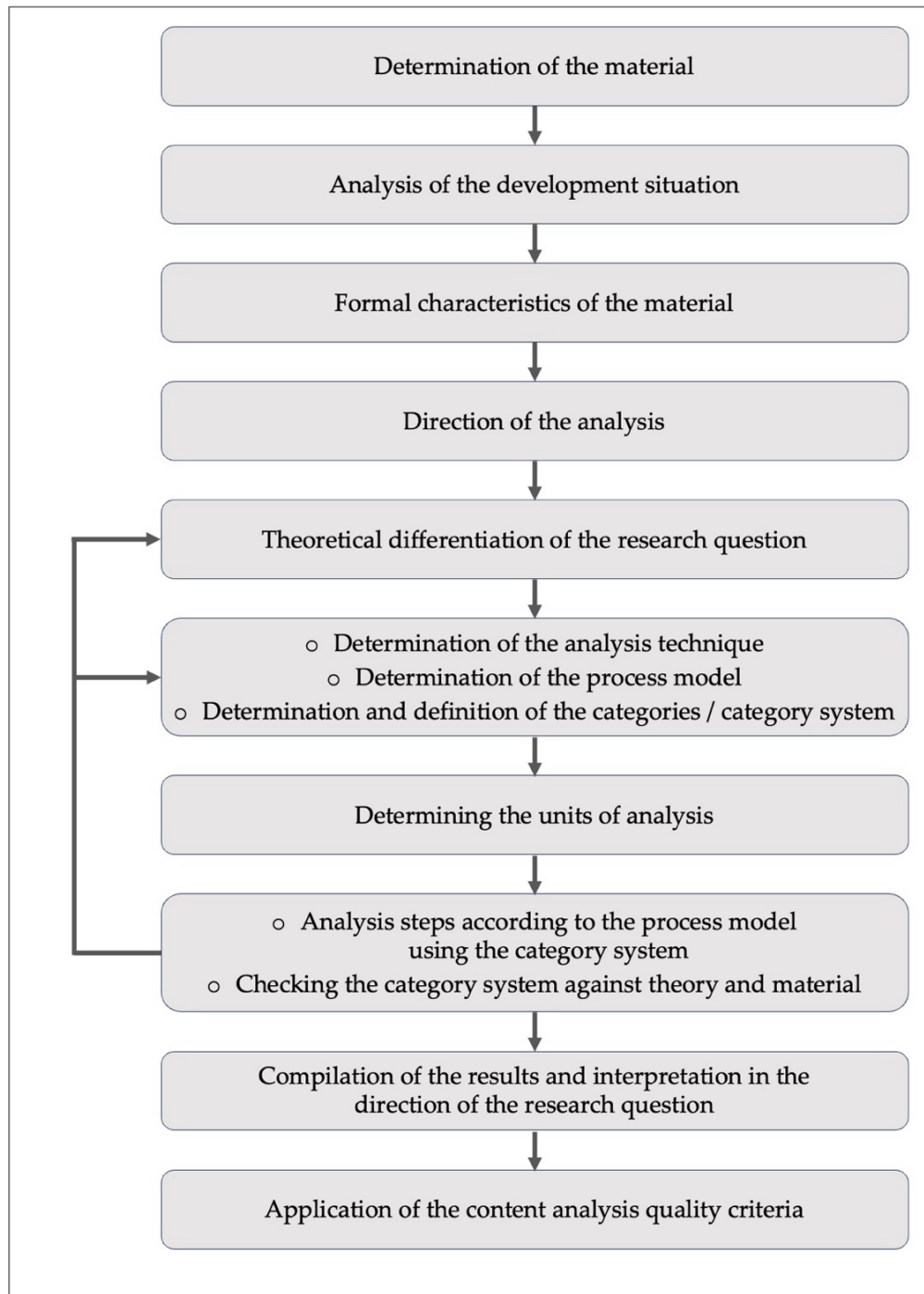
Mayring's qualitative content analysis follows the approach of retaining the strengths of quantitative content analysis and developing systematic, qualitatively oriented text analysis methods on this basis. The advantage of this approach is that it retains its grounding in communication science and the material is therefore always understood in the **context of communication**. Mayring's analysis is based on a **rule-based, systematic** approach. The procedure is oriented towards the rules of text analysis and a specific process model. It is important to note that Mayring explicitly points out in this context that **content analysis is not a standard instrument and therefore does not always look the same**. It must be adapted to the specific object and the respective material and constructed in a way that is specific to the question being asked. However, this is done while maintaining the requirement that the individual analysis steps are justified in the form of rules and thus remain comprehensible. The system is retained in the form of a dissecting

approach - also when using an inductive approach, even if it is kept rather open due to a correspondingly broad definition. But here too, units are theoretically justified and defined in order to remain comprehensible (Mayring, 2022, p. 49 ff.).

Another central point is the **category system**, which is a central instrument that attempts to concretize the objectives of the analysis in categories (Kuckartz & Rädiker, 2023; Mayring, 2022, p. 49 ff.). The category system enables others to understand the analysis, makes it possible to compare the results and thus also to assess the reliability of the analysis. In the qualitative content analysis, which achieves the **object reference** by being oriented towards the everyday handling of linguistic material, standardized instruments are deliberately avoided. Nevertheless, comparability is ensured through **pilot studies**, which are carried out and documented for the purpose of intersubjective comprehensibility. The **theory-driven** method also offers the possibility of **integrating quantitative methods**, if this serves the aim of the analysis and is permitted by the object of investigation (Mayring, 2022, p. 49 ff.).

4.11.3 Procedure of the Qualitative Content Analysis

Mayring presents a general process model for qualitative content analysis, which forms the basis for this research. This model is intended to provide a comprehensible procedure ensuring a systematic, rule-based approach. The following Figure illustrates this model and is explained in concise form below before it is applied to this dissertation in concrete terms (see Table 10) (Mayring, 2022, p. 53 ff.).

Figure 13: General content analysis process model.

[source: own representation based on (Mayring, 2022, p. 61)]

Figure 13 shows the general process of content analysis, which is briefly explained below according to Mayring (Mayring, 2022, p. 53 ff.):

- 1) **Determination of the material:** In the first step, the material on which the analysis is based is defined, which primarily concerns the following three points:
 - a. Population
 - b. Sample size (according to representativeness considerations)
 - c. Sample model (purely random selection, predetermined quota, etc.)
 - 2) **Analysis of the development situation:** The underlying conditions of material production are defined accordingly:
 - a. The author.
 - b. The emotional, cognitive and action background of the author.
 - c. The target group for which the material was written.
 - d. The specific situation in which it was created.
 - e. The socio-cultural background.
 - 3) **Formal characteristics of the material:** Description of the form in which the material is available (tape recording, transcript, interview notes)
 - 4) **Direction of the analysis:** Definition of the objective and the direction (statements about the object, socio-cultural background, etc.) in which the statements are to be analyzed.
 - 5) **Theoretical differentiation of the research question:** This point aims at clarifying the question of the analysis in advance, linking it theoretically to previous research on the subject and dealing with sub-questions in a differentiated manner.
 - 6) **Determination of the analysis technique:** Summary, explication, structuring
- Determination of the process model:** Defines the appropriate process model to be selected.
- Determination and definition of the categories / category system:** This step describes the category system and the associated categories.

- 7) **Determining the units of analysis:** To increase the precision of the content analysis, the following three units of analysis are defined:
 - a. Coding unit: defines the smallest text component that may be evaluated and the minimum text component that can fall under the respective category.
 - b. Context unit: defines the largest material component that can fall under a category.
 - c. Evaluation unit: defines which parts of the text are evaluated.
- 8) **Analysis steps according to the process model using the category system and checking the category system against theory and material.**
- 9) **Compilation of the results and interpretation in the direction of the research question.**
- 10) **Application of the content analysis quality criteria.**

The following steps of the process model were transferred to the dissertation as detailed and presented on this basis. As stipulated by Mayring, this is intended to ensure the traceability of the individual steps (Mayring, 2022, p. 53 ff.; Gränitz, 2016, p. 48 f.; Löffler, 2020, p. 105 f.):

Table 10: Presentation of the content analysis process model based on this dissertation.

Analysis step	Result in the context of this dissertation
Determination of the material	The material provided relates to nineteen experts (see Chapters 4.9.3 & 4.9.4.2) based on semi-structured expert interviews (see Chapter 4.9.4.4); the analysis is conducted on the basis of the available interview transcripts (see appendixes 3-21).
Analysis of the development situation	All interviewees were informed in advance by the author (see Chapter 4.9.4.2) and agreed voluntarily to participate in the interview. The interviews were conducted under appropriate interview conditions and the participants were informed in advance about the objective of the interview and data protection issues (see Chapter 4.9.4.4).
Formal characteristics of the material	The interviews were conducted using a semi-structured guideline; a transcript is available for each interview, as well as a complete transcript prepared according to predefined rules (see Chapter 4.10). Eighteen out of seventeen interviews were recorded; one interview was transcribed by hand.
Direction of the analysis	The analysis aims to obtain information from interviewees on the impacts of digital technologies at the POS in Do-It-Yourself brick-and-mortar stores.
Theoretical differentiation of the research question	The material contains expert statements from nineteen interviewees on the impact of digital technologies at the POS in DIY stores on customer satisfaction. The underlying terms are

	defined (see Chapters 2.2 - 2.7). The published literature was reviewed as part of a systematic literature search (see Chapter 3), which resulted in the conclusion that the subject is very scarcely researched. A research question with associated sub-research questions was defined for the material (see Chapter 1.2).
Determination of the - analysis technique - process model - of the categories / category system	The underlying analysis technique is the summarizing qualitative content analysis. The process model of summarizing content analysis forms the basis of the study. The categories were primarily formed on an inductive basis. However, the guidelines for the expert interviews also contained three questions that provided possible terms as impulses for thought, but which are only to be taken up by the expert as a suggestion and supplemented by further terms.
Determining the units of analysis	The minimum coding unit is prepositions. The maximum context unit amounts to the entire material of each case. The statements of the experts regarding the relevant questions form the evaluation units.
Analysis steps according to the process model using the category system and checking the category system against theory and material	An excerpt of the analysis steps according to the process model using the category system is shown (Tables 11 and 12).
Compilation of the results and interpretation in the	Results and interpretation of the impacts of digital technologies at the POS in DIY on

direction of the research question	customer satisfaction are available in a compilation (see Chapters 4.12 & 4.13).
Application of the content analysis quality criteria.	

[source: own elaboration based on (Mayring, 2022, p. 53 ff.; Gränitz, 2016, p. 48 f.; Löffler, 2020, p. 105 f.)]

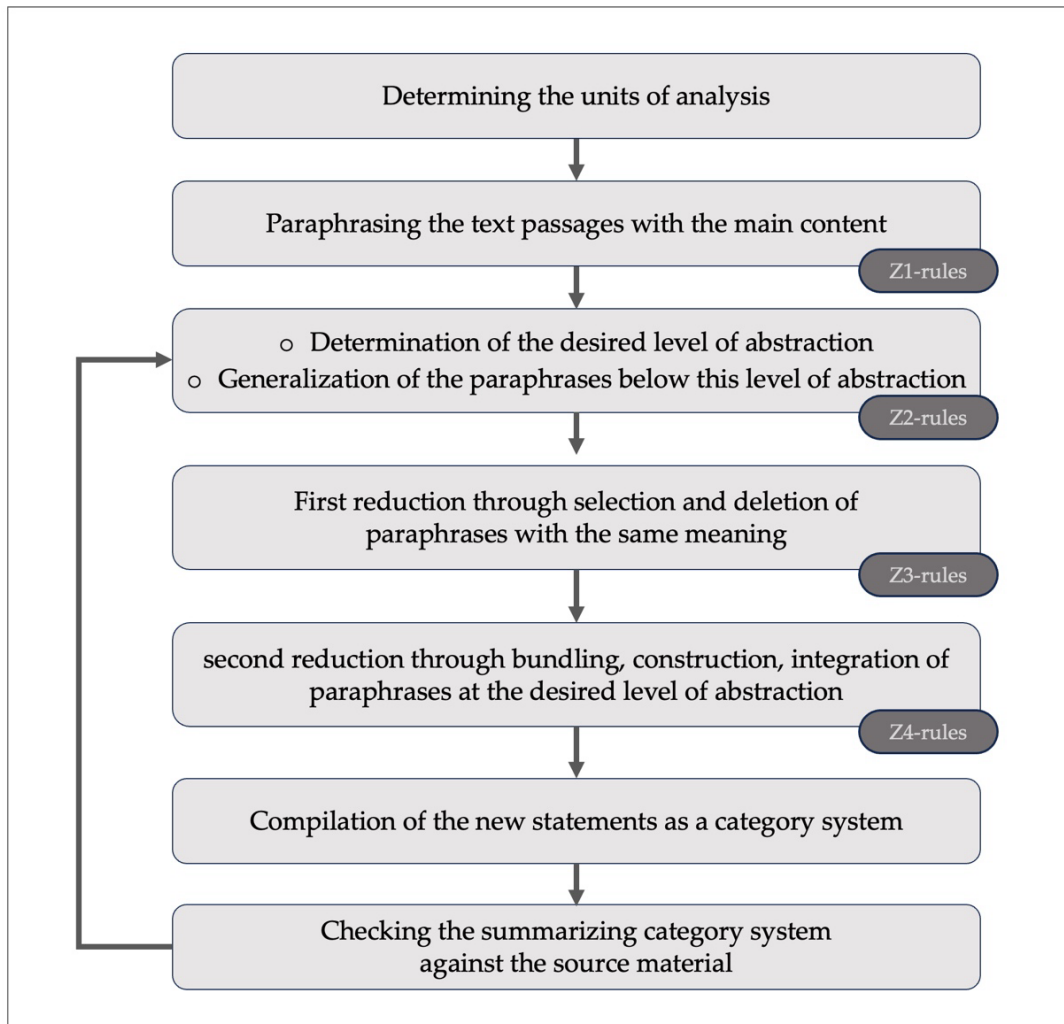
After the general process of qualitative content analysis for this dissertation has been outlined, the following section provides an overview of the individual analytical steps on which the summary and the associated category formation are based, as this form of analysis determines the research.

4.11.4 Summarizing as a form of Qualitative Content Analysis

If the decision is made to carry out a qualitative content analysis, two things in particular must be determined according to Mayring: The selection of the basic form (summarizing, explication or structuring) and the procedure of category formation (inductive, deductive or both variants) (Mayring, 2022, p. 64 ff.; Mayring, 2022a, p. 73 ff.).

Mayring distinguishes between **three basic forms of interpretation**: summarizing, explication, and structuring. While the aim of summarizing is to reduce the material in such a way that the essential content is retained, the aim of explication is to bring additional material to individual parts of the text in order to expand understanding. Structuring as the third basic form aims to filter out certain aspects from the material or to assess the material on the basis of certain criteria (Mayring, 2022, p. 64 ff.; Flick, 2009, p. 325 ff.).

Furthermore, a decision is required to how the **procedure of category formation** will be carried out (Mayring, 2022, p. 64 ff.; Mayring, 2022a, p. 73 ff.). Qualitative content analysis can be carried out inductively, that is on the basis of the data collected, or deductively, that is on the basis of categories derived in advance from theory (Gläser & Laudel, 2010, p. 199 ff.; Döring & Bortz, 2016, p. 541 ff.). However, Mayring himself describes the inductive category definition, which derives categories directly from the material in a generalization process without referring to previously formulated theoretical concepts, as particularly fruitful and attests this approach a “great importance within qualitative research” (Mayring, 2022a, p. 81; Mayring, 2022, p. 84 f.).

Figure 14: Process model of summarizing content analysis.

[source: own representation based on (Mayring, 2022, p. 69)]

Mayring's process model of summarizing content analysis serves as the basis for the analytical process implemented in this dissertation. The process model shows the general procedure and also indicates at which point certain rules of interpretation (numbered from Z1 to Z4 in Figure 14) must be followed, which are defined in detail and comprehensibly by a set of rules. In the following, the individual process steps are explained followed by the rules of interpretation (Mayring, 2022, p. 68 ff.):

After **determining the units of analysis**, the first step involves **paraphrasing**: this entails summarizing individual coding units in a grammatical, descriptive short form that is confined to the content (cf. Z1-rules) (Mayring, 2022, p. 70; Mayring, 2022a, p. 75 ff.; Döring & Bortz, 2016, p. 545). In the following step, the **level of abstraction** of the first reduction is determined on the basis of the available material. During **generalization**, all paraphrases that lie below the abstraction level are generalized; paraphrases that lie above it initially remain unchanged (cf. Z2 rules). Paraphrases with the **same meaning** are **deleted** in this process, as well as meaningless and unimportant ones (**selection and deletion**) (cf. Z3 rules). In the following step, related paraphrases are then summarized and, during a second reduction step, reproduced by a new statement (**bundling, construction, integration**) (cf. Z4 rules). Once these steps have been completed, it is checked whether the statements compiled as a category system represent the source material. The result is then the new, general, concise, and precise category system. This is then reviewed until the result of the desired reduction fully corresponds to the material (Mayring, 2022, p. 70 ff.; Mayring, 2022a, p. 75 ff.).

The description of the process model of summarizing content analysis and the descriptions of the macro-operators can be used to establish Mayring's **rules of interpretation**, which refer to the four points at which the material is reduced. Generally, when applying this set of rules, theoretical assumptions must be used for each step of the interpretation rules in cases of doubt (Mayring, 2022, p. 71):

Z1: Paraphrasing

- **Z1.1:** Delete all text components that are not relevant to the content (embellishing, repetitive, clarifying phrases).
- **Z1.2:** Transfer content-bearing text passages to one language level.
- **Z1.3:** Transform to a grammatical short form.

Z2: Generalization to the level of abstraction

- **Z2.1:** Generalize the paraphrase objects to the defined level of abstraction, considering that old objects are implied in the newly formulated generalizations.
- **Z2.2:** Generalize the sentence statements in the same way.
- **Z2.3:** Paraphrases that are above the desired level of abstraction remain untouched.

Z3: First Reduction

- Z3.1: Paraphrases with the same meaning are to be deleted.
- Z3.2: Paraphrases without meaning are to be deleted.
- Z3.3: Content-bearing paraphrases are selected for transfer.

Z4: Second Reduction

- Z4.1: Paraphrases with the same subject and a similar statement should be combined into one paraphrase (bundling).
- Z4.2: Paraphrases with several statements are to be combined into one object (construction/integration).
- Paraphrases with the same subject and different statements are to be combined into one paraphrase (construction/integration).

As the last step of this procedure, the summarizing categories were checked against the source material. As a result, this leads to a category system for the respective topics with an explanation of the respective text passages. For the findings of the dissertation, this now enables the possibilities of:

- interpretation in terms of the research question,
- **formation of** both inductive (in the sense of summarizing content analysis) and deductive (with the help of theoretical considerations) **main categories** or
- **quantitative analysis** (e.g. of frequencies of the categories) (Mayring, 2022, p. 86; Mayring, 2022a, p. 84 f.).

4.11.5 Characterization of the data analysis used in this study

The underlying form of analysis chosen for this dissertation is the **manually conducted summarizing qualitative content analysis**, since the aim of the analysis is to obtain the essential content from the expert interviews and thus create a manageable corpus that reflects the basic material (Mayring, 2022, p. 66).

As the dissertation also intends to achieve a representation of the material that is as naturalistic and close to the object as possible - without distortions due to prior assumptions - in addition, the **inductive category definition** recommended by Mayring was primarily used (Mayring, 2022, p. 84 ff.; Mayring, 2022a, p. 75 ff.). Specifically, in the attached interview guidelines (See Appendixes 1-21), 16 out of 19 questions were asked in an open-ended manner, with only three answers having a few predefined terms were predefined. However, these terms were only mentioned to the interviewees as a suggestion and should be supplemented by further terms.

In this dissertation, **the qualitative content analysis method according to Mayring was conducted by hand**. The reasons for choosing manual content analysis over automated, software-based content analysis in this thesis derive from considerations of various scientific authors (Rössler & Wirth, 2001; Rüb et al., 2015; Senger, 2021, p. 174, as seen in Günther, Nagel, Fuhrmann, & Graßmann, 2019; Wettstein, 2016; Veitl, 2018):

Interpretive depth:

The manual analysis allows the researcher to perform a deeper and more interpretive analysis. Since the author of the thesis works in the DIY industry for over 14 years, the professional expertise and understanding of the research field could be directly incorporated into the analysis process.

Ensuring validity:

Automated, software-based content analysis achieves a reliability of 100%, which, however, results in a loss of validity. This trade-off manifests itself in a reduction of the analysis indicators to a merely syntactic level.

Ensuring context sensitivity:

Rössler and Wirth (2001) identify a lack of context sensitivity as a significant criticism of computer-assisted content analysis. This implies insufficient consideration of the semantic level in the analysis.

Comprehension of complex meanings:

Manual content analysis provides a way to capture ambiguous and complex content that can be problematic for automated systems, which is particularly important in the specialized DIY store sector.

For these reasons, the research methodology of this thesis, implies that the content analysis of the data should be carried out using a manual content analysis, a method that strikes a balance between high reliability and adequate validity, especially regarding the recording of semantic nuances and contextual factors, which is considered necessary for this topic, given the special position of the DIY sector in retail. In addition, this study contains complex text structures and ambiguities, which indicates that the application of this very time-consuming, context-sensitive manual analysis is preferable compared to an automated, software-based analysis (Rössler & Wirth, 2001; Rüb et al., 2015; Senger, 2021, p. 174, as seen in Günther, Nagel, Fuhrmann, & Graßmann, 2019; Wettstein, 2016; Veitl, 2018).

In the interest of scientific integrity and to ensure methodological transparency and intersubjective traceability, a detailed description of the individual, rule-based, process steps of the manually conducted qualitative content analysis according to Mayring is presented in the following Tables 11 and 12.

Table 11: Summarizing content analysis procedure: Part 1 of the summary (excerpt).

For which product ranges do you think the use of digital technologies is particularly suitable?			
Interview	Question-No.	Transcription	Paraphrase
R1	No. 10	I believe that digital technologies can be used above all for highly configurable products and goods. For example, in garden displays and bathroom fittings. There is the issue of documentation and security. These play a major role there. You can certainly achieve a lot here, far away from specialist advice from employees on site, with the help of screens, QR codes, tutorials on your own media or on YouTube, for example. You can certainly get a lot out of it, including explaining it to customers. The higher the level of configuration, the more digital technology can help to positively influence customer satisfaction. An opposite example here would be a trivial item, such as the screw. The case is so trivial that, in my view, it is a basic requirement that the screw can also be found where the digital assistant (e.g. an app) indicates it.	Digital technologies can be used for highly configurable products and goods. Example product ranges come from the garden or bathroom departments. The higher the degree of configuration, the more digital technology can help to positively influence customer satisfaction.

Interview	Question	Transcription	Paraphrase
I2	No. 10	Where I find digital technologies very useful is for technical products or modular products or projects. Where I consider digital technologies to be important is for emotional products. Unless you later have avatars or something similar that represents your personal situation at home and brings it to the screen and simulates your actual and target situation. I see great opportunities there.	The use of digital technologies is suitable for technical products, modular products or projects. Emotional products in which the personal situation at home can be displayed on the screen and the target situation simulated are suitable for the use of digital technologies.
I3	No. 10	Two ranges immediately came to mind. One area is color and design. There are areas where you bring a photo from home and then say, I want to redesign it like this. It's important to give the customer an idea. It's always easier for me, at least, if I can see what it might look like afterwards, given the circumstances at home. A second area is machines and tools. The intended use	Example product ranges come from the Color and Design departments. The use of digital technologies is suitable for product ranges that can be visually simulated.

Interview	Question-No.	Transcription	Paraphrase
		dictates the choice of machine and tools. It is important that customers are given an answer to their intended use, so that they are helped.	Example assortments come from the Machinery and Tools departments.
I4	No. 10	So, I believe that digital technologies can help very well with project thinking, such as a bathroom planner. I think that technology can tell me how much I need and what I need for flooring works. In general, you can say that the more extensive the product range is, the more it needs to be explained, the more helpful technology can be. Even a roller shutter curtain, for example, it can be important to find instructions, for example a video that explains it.	The use of digital technologies is suitable for project thinking, such as when planning a bathroom or for flooring installation. The more explanation a product requires, the more suitable digital technologies are. Example articles are roller shutter panels.

[source: own elaboration based on (Mayring, 2022, p. 73 ff.)]

Table 12: Summarizing content analysis procedure: Part 2 of the summary (excerpt).

For which product ranges do you think the use of digital technologies is particularly suitable?					
Interview	Question	Paraphrase	Generalization	1. Reduction	2. Reduction
R1	No. 10	Digital technologies can be used for highly configurable products and goods. Example product ranges come from the garden or bathroom departments. The higher the degree of configuration, the more digital technology can help to positively influence customer satisfaction.	Digital technologies are suitable for highly configurable products. Bathroom and garden product categories are suitable for digital technologies.	Configuration article (K1) Product category: Garden and Sanitary (K6)	K1: Configuration articles K2: Visualizable articles K3: Project-related articles K4: Technical articles K5: Articles requiring explanation

Interview	Question	Paraphrase	Generalization	1. Reduction	2. Reduction
I2	No. 10	The use of digital technologies is suitable for technical products, modular products, or projects. Emotional products in which the personal situation at home can be displayed on the screen and the target situation simulated are suitable for the use of digital technologies.	The use of digital technologies is suitable for technical products, modular products, or projects. Emotional products in which the personal situation at home can be displayed on the screen and the target situation simulated are suitable for the use of digital technologies.	Technical articles (K4) Modular articles (K3) Project construction (K3) Visualizable products (K2)	K6: Product categories: - Garden ($\Sigma = 2$) - Sanitary ($\Sigma = 3$) - Paint & Wallpaper ($\Sigma = 2$) - Living & Decoration ($\Sigma = 1$) - Tools & Machines ($\Sigma = 1$) - Floor coverings ($\Sigma = 1$) - Windows, Doors & Stairs ($\Sigma = 1$)
I3	No. 10	Example product ranges come from the Color and Design departments. The use of digital technologies is suitable for	Example product ranges come from the Color and Design departments.	Product category: Paint & Wallpaper, Living & Decoration,	

Interview	Question	Paraphrase	Generalization	1. Reduction	2. Reduction
		product ranges that can be visually simulated.	The use of DT is suitable for product ranges that can be visually simulated. Example assortments are Tools & Machines	Tools & Machines (K6) Visualizable products (K2))	
I4	No. 10	The use of DT is suitable for project thinking, such as when planning a bathroom or for flooring installation. The more explanation a product range requires, the more suitable DT is. Example articles are roller shutter panels.	Project buildings are suitable for DT, such as bathrooms or floor coverings. Items that require explanation are suitable for digital technologies. Example articles are roller shutter panels.	Articles requiring explanation (K5) Product category: Sanitary, Floor coverings, Windows, doors & stairs (K6)	

[source: own elaboration based on (Mayring, 2022, p. 82 ff.)]

Based on the analysis carried out and the resulting numerous possibilities for a profound and comprehensive analysis, the findings of the dissertation are presented in the following Chapter.

4.12 FINDINGS

The summarizing qualitative content analysis led to the development of several main categories, which can be assigned to the respective research questions. The first main category deals with factors that result in a satisfactory DIY store visit for a customer (see Chapter 4.12.1). This is followed by an examination of which digital technologies are currently used in DIY at the POS and which factors of these technologies have an influence on customer satisfaction (see chapter 4.12.2). Chapter 4.12.3 then addresses the product ranges and articles for which the use of digital technologies at the POS in DIY is particularly suitable. This is followed by an examination of the question of how the success of the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction can be measured (Chapter 4.12.4). Chapter 4.12.5 examines which digital technologies can be used at the POS in DIY stores, which will have become established in the future and how this will affect customer satisfaction compared to today. This sub-chapter then ends with a recommendation for action based on the key findings of this thesis

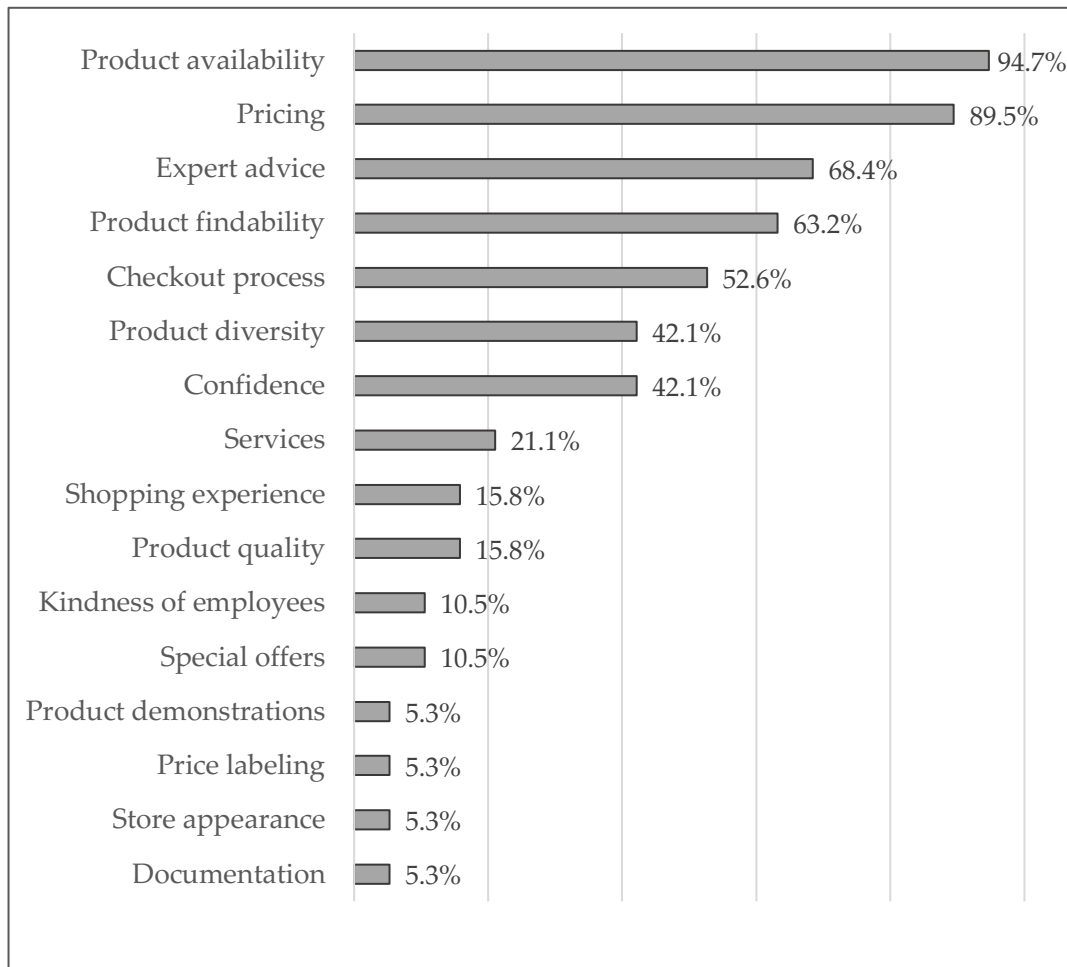
4.12.1 Findings on Factors of a Do-It-Yourself Store Visit and their Impact on Customer Satisfaction

The first main category deals with factors that lead to a satisfying, and possibly even extraordinarily satisfying, Do-It-Yourself store visit for a customer and the extent to which DIY stores today fulfill these factors. For this purpose, the following research question was established, which led to the following results with the aid of its sub-questions.

RQ 1: Which factors of a DIY store visit lead to customer satisfaction and to what extent are they fulfilled?

SRQ 1.1: Which factors of a DIY store visit lead to a (extraordinary) satisfied customer?

The unique characteristics of the DIY industry, such as the combination of intensive customer service and physical product presence, require specific research that goes beyond general retail studies. For this reason, the first step was to examine **general factors that lead to (extraordinary) customer satisfaction during a visit to a DIY store**. All respondents (n=19) provided a contribution to this question. These answers have been divided into 16 sub-categories, which are listed in the following Figure 15 (according to the number of mentions of the individual factors in percent):

Figure 15: Factors of a DIY store visit that lead to customer satisfaction.

[source: own representation]

The analysis of the expert interviews clearly shows which factors make a significant contribution to customer satisfaction when visiting a DIY store: The most important factors leading to customer satisfaction during a visit to a DIY store are, above all, **product availability** (94.7%) and the **selling price** (89.5%).

Expert advice (68.4%) is also considered an important factor. In addition, the **findability of the products** is a decisive factor (63.2% of the experts named this as a critical success factor). The **checkout process** was identified an important factor

by ten out of nineteen experts (52.6%), emphasizing in this context above all that this refers to a frictionless, uncomplicated, and fast process at the checkout.

The **confidence** factor, which was named at 42.1% of the experts, refers to the good feeling that the customer would like to get about finding the right product for their project or that the article is suitable in terms of technical dimensions. **Product diversity**, meaning a wide variety of products, was mentioned just as often as the factor of confidence (42.1%).

The **service** factor was mentioned by 21.1% of the experts. Service, which is understood to mean that help is provided over and above expert advice, in this case refers, for example, to the additional service of cutting a worktop to the desired size for a customer.

The remaining factors were only mentioned by a maximum of three experts: **shopping experience** and **product quality** (mentioned by three experts, hence 15.8% each), **kindness of the employees** within the store and **special offers** (10.5% each) and **product demonstrations**, **price labeling**, **store appearance** and **documentation** (5.3% each), whereby the expert who mentioned documentation meant documentation in the context of order confirmations for particularly expensive, custom-made items such as garage doors or windows.

One important finding from the interviews conducted in the course of the first research question should additionally be mentioned: Some experts differentiated between business customers and private customers. For example, one expert made a distinction in relation to this topic to the effect that business customers consider the documentation factor to be important, while private customers do not. It has been established that the **needs of a business customer differ from those of a private customer** in some aspects. This was emphasized by the following statement from an expert:⁹ „In my view, these are two different customers with different customer demands.“¹⁰

⁹ Quotations from the expert interviews (appendixes 3-12) have been translated into English to ensure uniform readability for the dissertation's reader.

¹⁰ Appendix 3: Retailer Expert Interview: R1; Appendix 10: Retailer Expert Interview: R8; Appendix 11: Retailer Expert Interview: R9

SRQ 1.2: *To what extent do DIY stores fulfill these factors today?*

Sub-research question 1.2 aimed to find out which of the factors mentioned that lead to customer satisfaction or even extraordinary customer satisfaction are currently fulfilled by DIY stores and which are classified as in need of improvement.

Figure 16 illustrates eight factors that contribute to customer satisfaction during a visit to a DIY store and that are already being met today, based on the experts' statements: **product availability** (52.6%%), **pricing** (47.4%), **product diversity**, expert advice, confidence and **product findability** (21.6% each) and **shopping experience** (10.5%) and the **kindness of employees** (5.3%).

The satisfactory fulfillment of the **availability of products** factor is primarily because DIY stores have **large storage areas**. Seasonal effects can also be assessed well; As these are well-known, “they can be **well adapted** to them in terms of product range design and also in terms of **procurement**.”¹¹ The fulfillment of the second most frequently mentioned factor, **pricing**, was primarily explained by the fact that the easy **comparability of prices via the Internet** contributes to this, and the **price guarantees** offered by some DIY retailers fulfills the pricing factor relatively well.

¹¹ Appendix 3: Retailer Expert Interview: R1

Figure 16: Overview of the extent to which DIY stores fulfill customer satisfaction factors today.

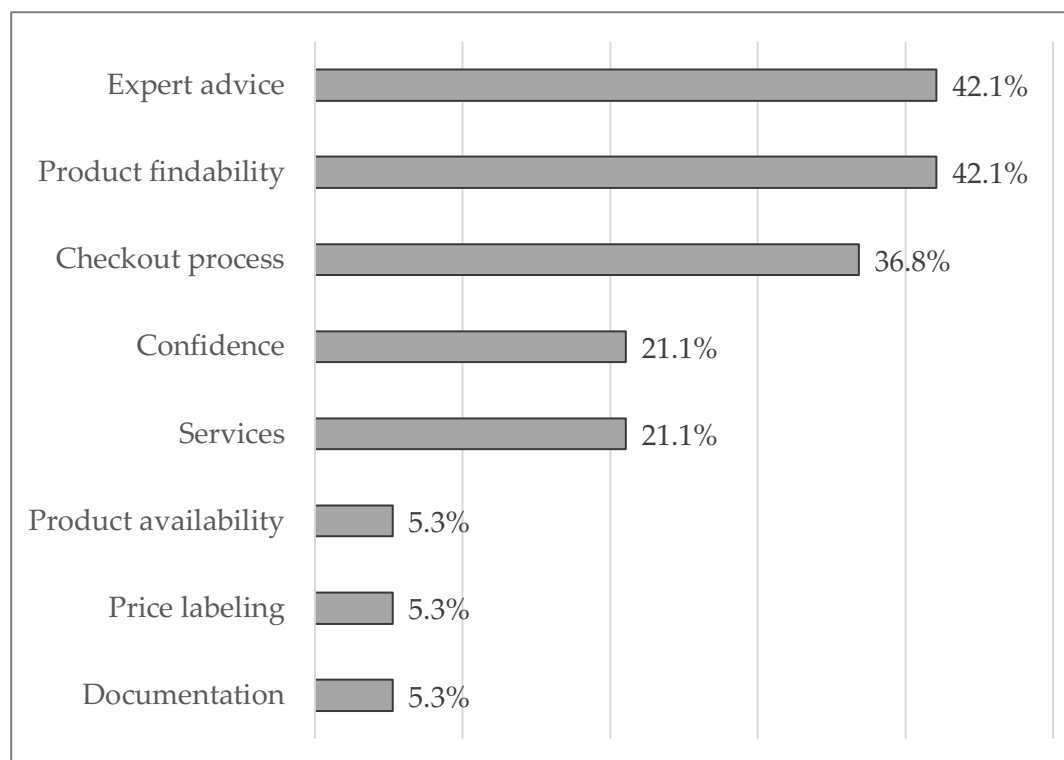


[source: own representation]

Furthermore, the experts named a total of eight different factors (shown in Figure 17) that lead to customer satisfaction, but which nonetheless require improvement on the part of DIY stores: **expert advice** (42.1%), **product findability** (42.1%), **checkout process** (36.8%), **confidence** and **services** (21.1%), **product availability**, **price labeling** and **documentation** (each 5.3%).

When looking at the results, it is initially apparent that the factor of **product findability** from four of the experts is classified as well fulfilled, but eight other experts are of the opinion that this factor has potential for improvement (cf. Figures 16 and 17). Thus, a contradiction between the experts was identified on this point. However, this point is considered to be relatively important, since a total of 12 experts mentioned it.

Figure 17: Factors that are in need of improvement in terms of their fulfillment by DIY stores.



[source: own representation]

Figure 18 presents a detailed analysis by comparing the factors identified as needing improvement (see Figure 17) with those contributing to customer satisfaction as outlined in SRQ 1.1 (see Figure 15), in order to identify the factors that require the greatest need for action, which is particularly evident in the factors that show a high need for improvement and are, at the same time, often mentioned in connection with contributing to customer satisfaction.

The Figure clearly illustrates the significant need for improvement in a few very frequently mentioned factors regarding their importance for achieving customer satisfaction: **68.4% of experts state that expert advice leads to customer satisfaction, but at the same time 42.1% of experts are of the opinion that this factor should be improved.** The fact that the need for expert advice is of enormous importance, but at the same time needs to be met more effectively, is also evident from the interview statements: "Employee expertise is developing in a bad direction. Compared to the past, the range of unskilled employees is significantly higher. Fluctuation also plays a major role here, of course"¹², "Then there is the issue of expert advice, which is certainly a sticking point"¹³ or "In my view, the expert advice service at the POS is the biggest weakness."¹⁴

Regarding the factor of **product findability, a disparity is also evident**, albeit to a slightly lesser extent. 63.2% of the experts stated that the ability to find products contributes to customer satisfaction. However, 42.1% of the experts also see a need for improvement for DIY stores in this area. An expert statement clarifies this with the following statement: "Normally, it is the case that the customer wants to go to the store because they need one or more products for a project involving building or renovation. For this project, they want to come to the store, quickly find the product or products, and take them with them. The customer doesn't need any bells and whistles. Find it and go, so they can move on. That's what's important."¹⁵

More than half of the experts (52.6%) consider the checkout process to be a crucial factor in contributing to customer satisfaction. At the same time, however,

¹² Appendix 7: Retailer Expert Interview: R5

¹³ Appendix 15: Supplier Expert Interview: S4

¹⁴ Appendix 16: Supplier Expert Interview: S5

¹⁵ Appendix 9: Retailer Expert Interview: R7

36.8% of respondents state that there is a need for improvement in this area as well. One retailer articulated this clearly with the statement: "The checkout process itself takes too long for us, from the beginning to the end. We have different target groups, private and business, the private customer receives a receipt, the business customer receives an invoice, we have a customer card system, a discount system, and it takes too long to process these things."¹⁶ In addition to the **duration**, this statement also indicates the **complexity of the checkout process**, which is considered to be in need of improvement.

In addition, the factor of **confidence** (42.1%) was mentioned as a factor that leads to customer satisfaction, but at the same time there is a need for improvement, which is considered necessary by 21.1% of the experts. The importance of fulfilling confidence became clear in the following interview excerpt: "Especially with expensive products that are customized and configured, I think it's essential to give the customer the good feeling that the product fits, it's not too small, it's not too big, it has exactly the dimensions you need."¹⁷ This underlines the importance of ensuring that the customer feels comfortable, especially when it comes to more expensive, customized products.

It also shows that the **service factor** needs to be improved and at the same time is an important factor that leads to customer satisfaction (21.1% each). The following statement was given by a retailer in this regard: "I think that it is above all the service that goes beyond product advice that gives the hardware store a unique selling proposition compared to online shops. [...] letting them touch products that are, for example, haptic, explaining the function of a security door on the product within the store [...]. That's why people come to the hardware store. [...] there is room for improvement."¹⁸

Another important finding is that there are factors that, according to the experts, are important for generating customer satisfaction, such as competitive pricing (94.7%) or product variety (42.1%), which none of them consider to be in need of improvement. From this, it can be concluded that the DIY store is already fulfilling these factors very well.

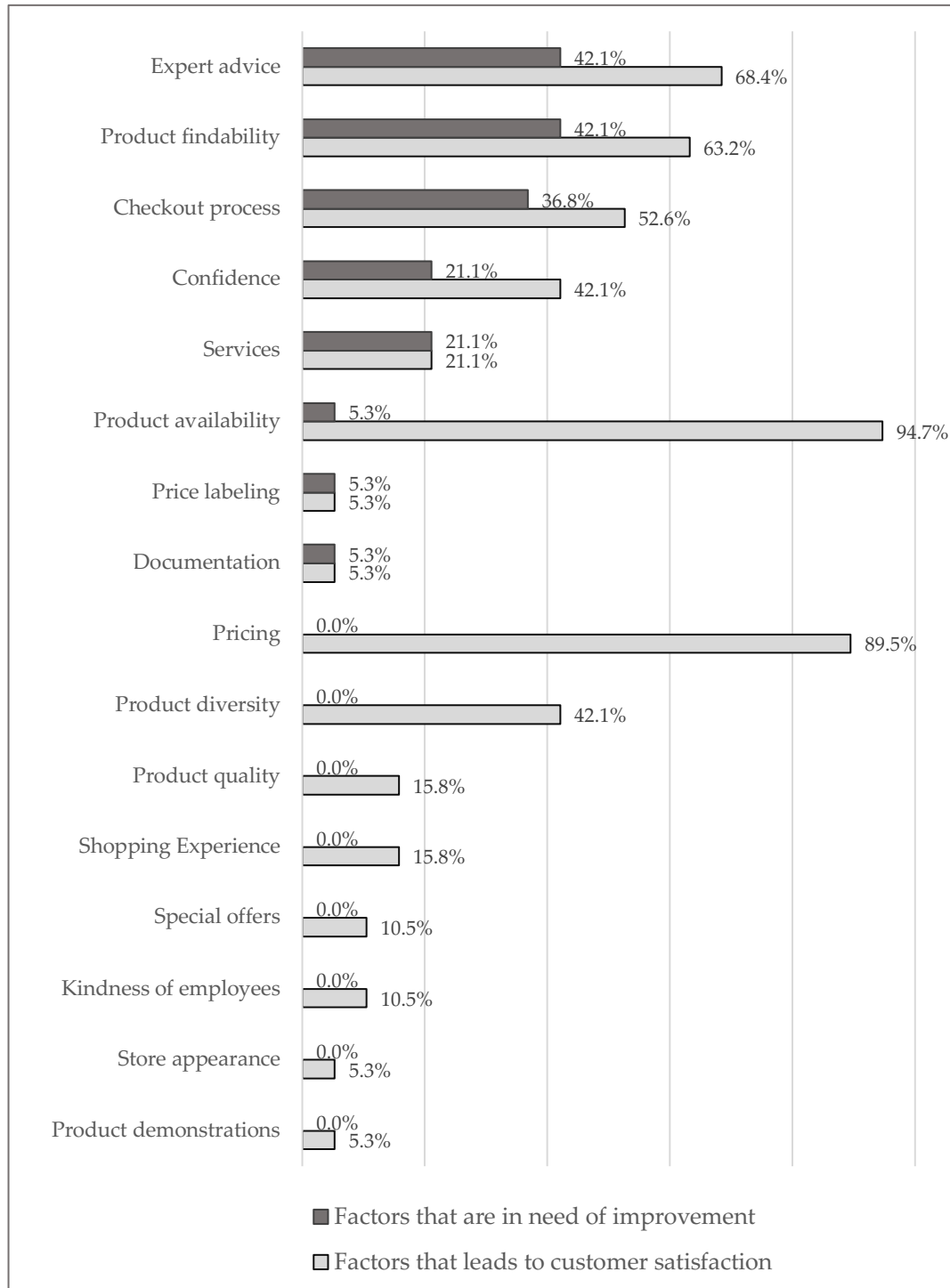
¹⁶ Appendix 4: Retailer Expert Interview: R2

¹⁷ Appendix 18: Supplier Expert Interview: S7

¹⁸ Appendix 8: Retailer Expert Interview: R6

Figure 18 also underlines, that some factors have a very decisive influence on positive customer satisfaction and are not in need of improvement, instead being seen as fulfilled by the DIY stores, such as a fair price-performance ratio, product diversity or product quality.

Figure 18: Comparison of the ratios of mentions of factors that need improvement with those that lead to customer satisfaction.



[source: own representation]

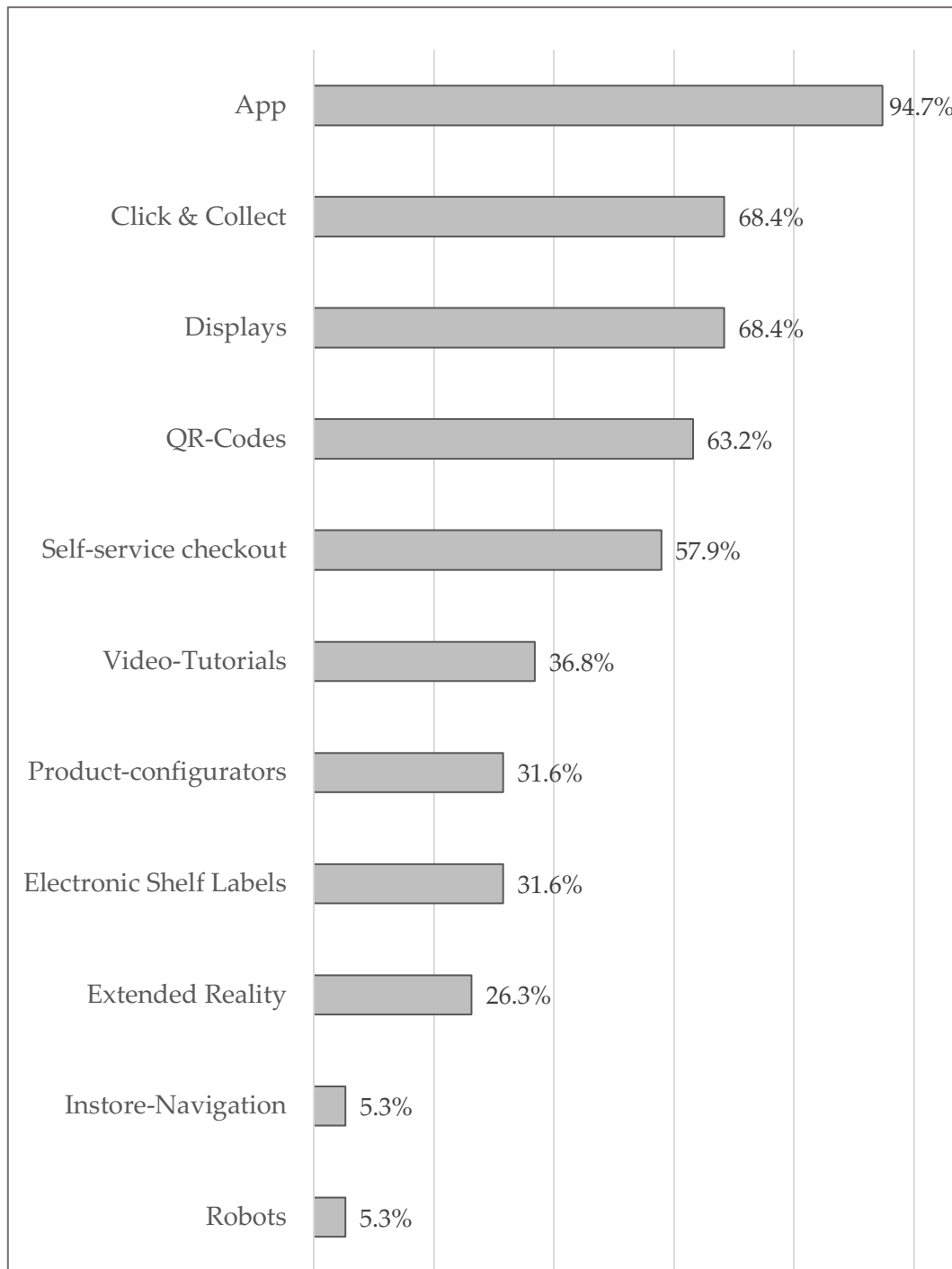
4.12.2 Findings on Digital Technologies used Today at the Point of Sale in Do-It-Yourself Stores and their Impact on Customer Satisfaction

At the point of sale in DIY stores, sales promotions take place in a wide variety of ways - both analog and digital. This subchapter deals exclusively with the digital technologies used today at the Do-It-Yourself's point of sale: First, an overview is provided of which digital technologies are used today. Then the factors of digital technologies that influence customer satisfaction are presented and evaluated.

RQ 2: Which factors of digital technologies used today at the POS in DIY stores influence customer satisfaction?

SRQ 2.1: Which digital technologies are used in DIY stores today?

To determine the current situation, the experts first verified the digital technologies currently used in DIY stores at the POS. All respondents (n=19) identified digital technologies, which were grouped into eleven subcategories. The following Figure provides an overview of these digital technologies according to the number of mentions (in percent):

Figure 19: Digital technologies used in DIY stores today.

[source: own representation]

Figure 19 shows which digital technologies are used in DIY stores today, according to the experts. The **app**¹⁹ is the most widespread technology (94.7%), followed by **Click & Collect and displays**²⁰ (68.4% each). This is followed by **QR codes** (63.2%) and the **self-service checkout** (57.9%). This is followed in the ranking by **video tutorials** (36.8%) and **electronic shelf labels** and **product configurators** operated by the customer (31.6% each). **Extended reality** was named by 26.3% of the experts and **instore-navigation** and **robots** were mentioned by one expert each (5.3%).

Not listed in the Figure are **configuration programs**, which were named by 13 out of 19 experts, which may only be used by store employees and are not available for use by customers. Nevertheless, this technology is also widely used at 68.4%.

SRQ 2.2: Which factors of digital technologies used at the POS in DIY stores influence customer satisfaction and in what way?

In order to analyze the influence of digital technologies at the POS in DIY stores, it is first necessary to classify them. The overview performance dimensions and characteristics of digital technologies at the point of sale (Spreer, 2013; Rowley & Slack, 2003; Silberer, 2010; Spreer, 2013a as seen in Spreer, 2013; Spreer P., 2013a) presented in Chapter 2.5 (see Figure 6), which divides digital technologies into static, dynamic and interactive, is particularly suitable for this purpose:

¹⁹ In this context (and in the following), apps refer exclusively to the retailer's own app, which almost every DIY store already offers. Any other apps that are not provided directly by the DIY store company are not included.

²⁰ In this context, the term display is used to describe screen advertising, i.e. a form of advertising that is presented graphically on a screen (display), such as videos, animations, or images, which may be accompanied by sound. Some experts in the interviews spoke of terminals but described them in such a way that they were assigned to displays.

Table 13: Digital technologies at the point of sale in DIY stores.

Digital technologies at the point of sale in DIY stores		
static	dynamic	interactive
Electronic Shelf Labels	Displays	App
	Video-Tutorials ²¹	Self-Service Checkout
		Click & Collect
		QR-Codes
		Extended Reality
		Product-Configurators
		Instore-Navigation
		Robots

[source: own elaboration based on (Spreer, 2013; Rowley & Slack, 2003; Silberer, 2010; Spreer, 2013a as seen in Spreer, 2013)]

Table 13 shows that the only one of the static digital technologies in use today are electronic shelf labels. Two digital technologies used today at the point of sale in DIY stores were identified as dynamic: Displays (as these terms were used interchangeably in the context of this dissertation in the interviews, they have been grouped together under one sub-category) and video tutorials. Interactive technologies, by contrast, are clearly the most widespread at the POS in DIY today.

Static Digital Technologies:

Static digital technologies today only include the topic of **electronic shelf labels**. This technology has been named by 31.6% of the experts in this context.

²¹ Video tutorials have been assigned to dynamic digital technologies in this overview, as they were described most frequently by the experts in this context.

Dynamic Digital Technologies:

Two **dynamic digital technologies** have been mentioned by the experts: Displays (68.4%) and video-tutorials (36.8%). A closer look at the impacts of these digital technologies on customer satisfaction reveals the following:

Seven experts listed **video tutorials** (68.4%) as being used today. The influence of these tutorials on customer satisfaction was rated as thoroughly positive: While one expert categorized this digital technology as one that can even lead to extraordinary satisfaction²², a second expert stated the following: "Video tutorials, essential, especially for today's generation."²³ The experts therefore assume that video tutorials will also appeal to younger customers, who will therefore become regular DIY store visitors as a result of the satisfaction achieved. This would not only increase the number of regular DIY customers, but also rejuvenate the average age of today's DIY customer, who is 55 years old.²⁴ In this context, the experts attribute the following factors to video tutorials: **Constant availability** (24 hours a day, seven days a week), video tutorials give the customer a feeling of **confidence** when using products or during installation.²⁵ Although it is also pointed out in this context that video tutorials cannot completely replace personal expert advice²⁶, they are also considered a suitable way of **counteracting staff shortages**,²⁷ which according to numerous experts are seen as a major problem.²⁸ Video tutorials are therefore considered to have the potential to increase customer satisfaction.²⁹

²² Appendix 7: Retailer Expert Interview: R5

²³ Appendix 12: Supplier Expert Interview: S5

²⁴ Appendix 4: Retailer Expert Interview: R2

²⁵ Appendix 6: Retailer Expert Interview: R4

²⁶ Appendix 4: Retailer Expert Interview: R2

²⁷ Appendix 3: Retailer Expert Interview: R1

²⁸ Appendix 5: Retailer Expert Interview: R3; Appendix 7: Retailer Expert Interview: R5; Appendix 9: Supplier Expert Interview: S2; Appendix 10: Supplier Expert Interview: S3; Appendix 12: Supplier Expert Interview: S5

²⁹ Appendix 7: Retailer Expert Interview: R5; Appendix 6: Retailer Expert Interview: R4

Regarding **displays** (36.8%), several experts explicitly pointed out that **one-sided**, dynamic communication is perceived as unsatisfactory in this case. This becomes clear in the following statements: "First of all, I believe that displays with a one-sided tone have a negative impact on customer satisfaction."³⁰, "In my opinion, advertising that runs automatically on screens and plays sound on one side has a negative impact, this annoys the customer [...]"³¹, "However, they [one-sided, dynamic communication technologies] are rather disruptive for the customer, as the video usually doesn't tell you what you really need. That's rather negative."³² or "I think that screens on which the customer is exposed to one-sided sound and where content is shown without the customer wanting it are superfluous. This tends to annoy the customer."³³ Against the following background, this is a crucial finding: 13 out of 19 experts mentioned that dynamic displays are used today. Of these 13 experts, however, nine explicitly point out that these digital technologies have a negative impact on customer satisfaction, as they are described as **disruptive**, **annoying**, and **superfluous**. As a result, customers are more likely to leave the shelf and purchases are reduced.

In general, it cannot be said that dynamic digital technologies at the POS are useful or less useful in terms of increasing customer satisfaction. On the one hand, video tutorials are considered useful for raising customer satisfaction. On the other hand, one-way displays lead to customer dissatisfaction.³⁴

³⁰ Appendix 8: Supplier Expert Interview: S1

³¹ Appendix 10: Supplier Expert Interview: S3

³² Appendix 9: Supplier Expert Interview: S2

³³ Appendix 11: Supplier Expert Interview: S4

³⁴ Appendix 6: Retailer Expert Interview: R4; Appendix 8: Retailer Expert Interview: R6; Appendix 19; Appendix 20: Supplier Expert Interview: S9

Interactive Digital Technologies:

Most of the digital technologies used in DIY stores today are **interactive digital technologies**. The **app** was mentioned by 94.7% of experts as being in use today. An app is seen as very positive for the DIY store, primarily because of their great **versatility**. This technology also has great potential to contribute to extraordinary enthusiasm:³⁵ An app has the potential to serve as a **source of information**, a **source of inspiration**, a tool for locating products at the POS³⁶, **support for checkout processes** (exchange, payment, voucher activation), a **documentation memory** (digital memory for receipts)³⁷, a medium for displaying advertising, a **tool that can be used to receive expert advice** (via chat, video call, telephone call or the option to watch video tutorials).³⁸ It is also considered an advantage of the app that it cannot only be used from home, but it can also be designed for use specifically at the POS in DIY stores (e.g. for scanning items, locating products, **activating vouchers at the checkout**, or **scanning QR codes on the shelf**).³⁹ This digital technology is also considered to have the greatest potential to reach different customer groups: "The app we offer must be so intuitive and convenient that any customer segment could use it. Whether it's the older man over 60 who is downloading an app for the first time or the 14-29 target group that has grown up with this technology. Everything should be convenient, and no time should be wasted at the POS."⁴⁰ The last sentence of this quote introduces another important aspect: several experts also point out that an app can only lead to satisfaction if it works reliably and offers added value. In this context, one expert clearly points out that a DIY store should not just offer technological possibilities just for the sake of being innovative; the most important requirement is that the app works reliably,

³⁵ Appendix 4: Retailer Expert Interview: R2

³⁶ Appendix 3: Retailer Expert Interview: R1; Appendix 8: Retailer Expert Interview: R6; Appendix 21: Supplier Expert Interview: S10

³⁷ Appendix 4: Retailer Expert Interview: R2

³⁸ Appendix 7: Retailer Expert Interview: R5

³⁹ Appendix 3: Retailer Expert Interview: R1; Appendix 4: Retailer Expert Interview: R2; Appendix 7: Retailer Expert Interview: R5

⁴⁰ Appendix 3: Retailer Expert Interview: R1

otherwise it will have the opposite effect of creating customer dissatisfaction. In this case, it is better to do without it until it works reliably.⁴¹

Looking at the factors of a DIY store visit that result in customer satisfaction (see Figure 15), it is noticeable that nine of the 16 factors shown can be addressed through an **app** (expert advice, product fundability, check-out process, services, shopping experience, product demonstrations, special offers, price labeling, documentation). The following statement also indicates that the app can be a more effective digital technology than, for example, a computer provided in a DIY store: "In one store, however, we have installed a [...]finder from the supplier, where the customer can enter their product description on a monitor, and this finder then tells the customer, if we have the item, in which aisle is the item, on which shelf is the item. Interestingly, the customer doesn't use the computer at all, there is no effect, but there is a QR code on the shelves that the customer can use to find the product they are looking for in our store, which is used regularly."⁴² This could be an indication that the customer prefers to use their smartphone for advice, as this is **more private** than entering data on a publicly accessible computer, which may be seen as an admission of lack of expertise.

A further comment regarding the triangulation based on the two expert groups, consisting of retailers and suppliers, indicates that the topic of apps seems to be driven more by retailers. It could be deduced that the industry is not yet intensively involved into this topic. Accordingly, there could be potential in this topic if the industry partners also deal with it intensively and contribute their knowledge to the development of an app.

In addition, the following digital technologies are among the most used interactive digital technologies in DIY stores: Click & Collect (68.4%), QR-codes (63.2%), self-service checkouts (57.9%), product-configurators operated by the customer (31.6%), extended reality (26.3%), instore-navigation and robots (5.3% each).

⁴¹ Appendix 3: Retailer Expert Interview: R1; Appendix 5: Retailer Expert Interview: R3

⁴² Appendix 4: Retailer Expert Interview: R2

Click & Collect, which was also declared to be in use by 68.4% of the experts, is today seen as an **established standard**. Statements such as: "I think Click & Collect leads to a satisfied customer."⁴³, "The customer is satisfied with Click & Collect [...]"⁴⁴, "Far away from these simple things like Click & Collect."⁴⁵ or "[certain technologies] contribute to satisfaction. The same applies to Click & Collect"⁴⁶ demonstrate that these technologies were mentioned by the interviewees without further explanation and without emotion if there were no follow-up questions from the interviewer. No experts named this technology as one that might generate extraordinary enthusiasm. On the contrary, "What we are now quite good at is Click & Collect, but these are more basics. If it doesn't work, then we differentiate ourselves negatively from the competition"⁴⁷ underlines the fact that not providing this technology today tends to lead to dissatisfaction, as customers expect it as standard. As a result, Click & Collect has the advantages of **shortening waiting times and the purchasing process**, but at the same time it has to be understood as state-of-the-art, since its absence leads to dissatisfaction.⁴⁸

63.2% of the experts perceive **QR codes** as a digital technology used in DIY stores today. The code is mainly used for **links** to websites, for example with video **tutorials**⁴⁹ or **instructions**⁵⁰, to **support product location** in the store⁵¹ or for **services** that can be booked, for example for rental cars that are rented out by DIY stores.⁵² The QR code primarily serves as a technical medium for accessing links to video tutorials, instructions, or websites. Consequently, its direct impact on customer satisfaction is challenging to evaluate, as this depends on the quality of

⁴³ Appendix 6: Retailer Expert Interview: R4

⁴⁴ Appendix 7: Retailer Expert Interview: R5

⁴⁵ Appendix 3: Retailer Expert Interview: R1

⁴⁶ Appendix 9: Supplier Expert Interview: S2

⁴⁷ Appendix 4: Retailer Expert Interview: R2

⁴⁸ Appendix 4: Retailer Expert Interview: R2; Appendix 7: Retailer Expert Interview: R5

⁴⁹ Appendix 3: Retailer Expert Interview: R1

⁵⁰ Appendix 7: Retailer Expert Interview: R5; Appendix 11: Supplier Expert Interview: S4

⁵¹ Appendix 4: Retailer Expert Interview: R2

⁵² Appendix 7: Retailer Expert Interview: R5

the content accessed through these links. The target websites or platforms provided via the QR codes ultimately determine the user's satisfaction. Nevertheless, the experts generally agree on the utility of this technological feature.⁵³ However, two experts take a relatively extreme view of the code. While one expert believes that the QR code will be replaced in the future⁵⁴, one is of the opinion that this technology should be used much more widely and that it has the potential to achieve extraordinary levels of satisfaction if used more extensively.⁵⁵

Self-service checkouts were also mentioned as relatively widespread at 57.9%. In this context, however, it should be noted that although the technology is already being used in several DIY stores, the potential behind it is not yet fully exploited. Today, this technology is often used for self-scanning products and for the payment process. Other possibilities that can be handled with this technology (e.g. the handling of exchange services or further developments that mean that a store can be operated entirely without staff and that these technologies handle the purchase transaction in its entirety) are not yet being implemented in DIY stores.⁵⁶ Factors mentioned by the experts that contribute to achieving customer satisfaction include **saving time** and **reducing complexity**.⁵⁷ However, one expert also pointed out that for customers who are not very open to new, digital technologies, "there is a latent feeling [...] that these technologies go along with reducing personnel costs."⁵⁸

In terms of the technological innovations currently available for checkout systems (see also Table 5 in Chapter 2.7), one expert pointed out that the DIY store sector is not among the pioneering industries in terms of willingness to test innovations: "Generally speaking, other industries are often further ahead than the DIY sector. Based on the possibilities that currently exist for checkout systems, it is once again very clear that the DIY store sector is not a forerunner compared to other industries. When

⁵³ Appendix 4: Retailer Expert Interview: R2; Appendix 3: Retailer Expert Interview: R1

⁵⁴ Appendix 11: Supplier Expert Interview: S4

⁵⁵ Appendix 7: Retailer Expert Interview: R5

⁵⁶ Appendix 4: Retailer Expert Interview: R2

⁵⁷ Appendix 5: Retailer Expert Interview: R3; Appendix 7: Retailer Expert Interview: R5; Appendix 7: Retailer Expert Interview: R5

⁵⁸ Appendix 12: Supplier Expert Interview: S5

other industries are already testing just-walk-out technologies, or purchases in other industries can already be paid for automatically using camera technology, without the customer having to do anything, our sector is usually not that far along. We learn a lot from other industries, or, to put it positively, we certainly save a lot of money that would be spent on testing in other sectors. The DIY sector is more likely to move only when innovative technologies have been successfully implemented and tested in other sectors, and then it participates in these results and uses them.”⁵⁹ Triangulating this statement with the literature reviews from chapters 2.7 and 3, it clearly becomes apparent that the food industry, for example, with players such as REWE or Amazon, is significantly further ahead in terms of its willingness to use innovative technologies (German Federal Ministry for Economic Affairs and Climate Action, 2024; Proschofsky, 2024; Lebensmittel Zeitung, 2024; REWE Markt GmbH, 2024).

Product configurations operated by the customer have been described by experts as having a positive effect on customer satisfaction: “Product configurators often help customers to get a first idea of what is possible. If they can configure a storage shed, for example, the customer can see which colors are available, which materials can be selected, and which special features are available. This is always good, so that the customer can get to know the options that are available, especially for products that they don't buy regularly, but only every ten to twenty years.”⁶⁰ Another expert compared product configurators operated by the customer with configuration programs operated by the store employees: “Product configurators help customers get a first idea of what an item that requires a lot of explanation and is often custom-made might look like, such as different features. These are available for numerous items even today. This is always a good basis for a technical consultation with the advisor in the store. However, the customer often only gains the confidence to purchase expensive items that require explanation after they have created the item in the specialist program with the advisor.”⁶¹ A further interviewee complements this comparison with the statement: “When the self-configured article is entered into our configuration program and, ideally, sketches and illustrations are added,

⁵⁹ Appendix 10: Retailer Expert Interview R8

⁶⁰ Appendix 20: Supplier Expert Interview S9

⁶¹ Appendix 10: Retailer Expert Interview R8

and the salesperson then validates all critical points, such as terms like internal dimensions or stump, then that is the moment when customer expectations are exceeded, and enthusiasm is aroused. The customer feels taken by the hand, confident and motivated to continue with their project.”⁶² This suggests that, in the context of the Kano model, product configurators operated by the customer are likely to lead to customer satisfaction, albeit often taken for granted. Configuration programs (coupled with personal advice) can lead to **confidence**, enthusiasm and thus to extraordinary customer satisfaction.

According to the experts, the use of **extended reality** in the home improvement sector offers significant advantages, particularly due to the **project-oriented needs** of its customers, which can be **visualized** and thus created in a imaginable way using this technology. This is underlined by several expert opinions: “It's the top of the range when customers have the opportunity to see a bathroom that they want to renovate fully visualized in front of them and, if necessary, they can carry out virtual adjustments.”⁶³ or also “VR is perfect for the DIY market. Our sector supports customers in creating new things, and being able to visualize these visions in pictures seems like it was made for it. This is the enthusiasm factor that needs to be more prevalent in our sector.”⁶⁴

However, the experts also point out that the functionality of the technology is essential for success, especially with VR: “I think virtual reality always comes down to the software: if it works well, it can contribute to satisfaction. But if fundamental things are missing, it can also lead to dissatisfaction.”⁶⁵ or “The fact is, if it doesn't work well, the customer will take off the glasses and be dissatisfied and won't buy from our company. We have to be very sure that everything is technically flawless, then it will be a groundbreaking success. As long as that is not the case, I would be very careful with widespread implementation.”⁶⁶

⁶² Appendix 11: Retailer Expert Interview R9

⁶³ Appendix 18: Supplier Expert Interview: S7

⁶⁴ Appendix 9: Retailer Expert Interview R7

⁶⁵ Appendix 16: Supplier Expert Interview: S5

⁶⁶ Appendix 20: Supplier Expert Interview: S9

Instore navigation, which aims to **guide** the customer to the required product using a smartphone, is also used at the point of sale in DIY, even if only one expert mentioned this. For the expert, this is a factor that leads to customer satisfaction: "Above all, this offers the advantage of customer satisfaction, even in times of staff shortages, since guiding customers to a product on the shelf is one of the main tasks of the staff."⁶⁷

The use of **robots** was mentioned by one retail expert. In this case, the aim is for the robot to help with the task of **finding** the desired product in the store. The expert described this technology as extraordinarily inspiring and as a technology that contributes to the shopping **experience**.⁶⁸

Configuration programs occupy a special position, as they may only be operated by DIY store employees. 68.4% of the experts identified them as technologies used in DIY stores today. Configuration programs are described by the experts as follows: "Digital technologies that are satisfying or very satisfying for me are configurators because that's not necessarily what the customer expects when they buy, for example, a worktop with a sink cut-out or maybe a door."⁶⁹ or "Configurator programs can be good because the customer is shown the entire product range with this tool and can therefore also see and understand the dimensions."⁷⁰ This shows that the configurator programs have the potential to lead to satisfaction or even contribute to extraordinary satisfaction. In this context, the experts cite the advantages of **visualization, conveying an idea of dimensions**, but also the **confidence** to which this program contributes. However, it is also noted that - as with the self-service checkouts or apps - the potential has not yet been fully exploited and other sectors are already further ahead: "I don't think the configurator software is optimal yet, [...] The automotive industry is certainly leading the way."⁷¹

⁶⁷ Appendix 21: Supplier Expert Interview: S10

⁶⁸ Appendix 11: Retailer Expert Interview R9

⁶⁹ Appendix 8: Supplier Expert Interview: S1

⁷⁰ Appendix 12: Supplier Expert Interview: S5

⁷¹ Appendix 9: Supplier Expert Interview: S2

4.12.3 Findings on Do-It-Yourself Product Ranges for which the use of Digital Technologies is Beneficial

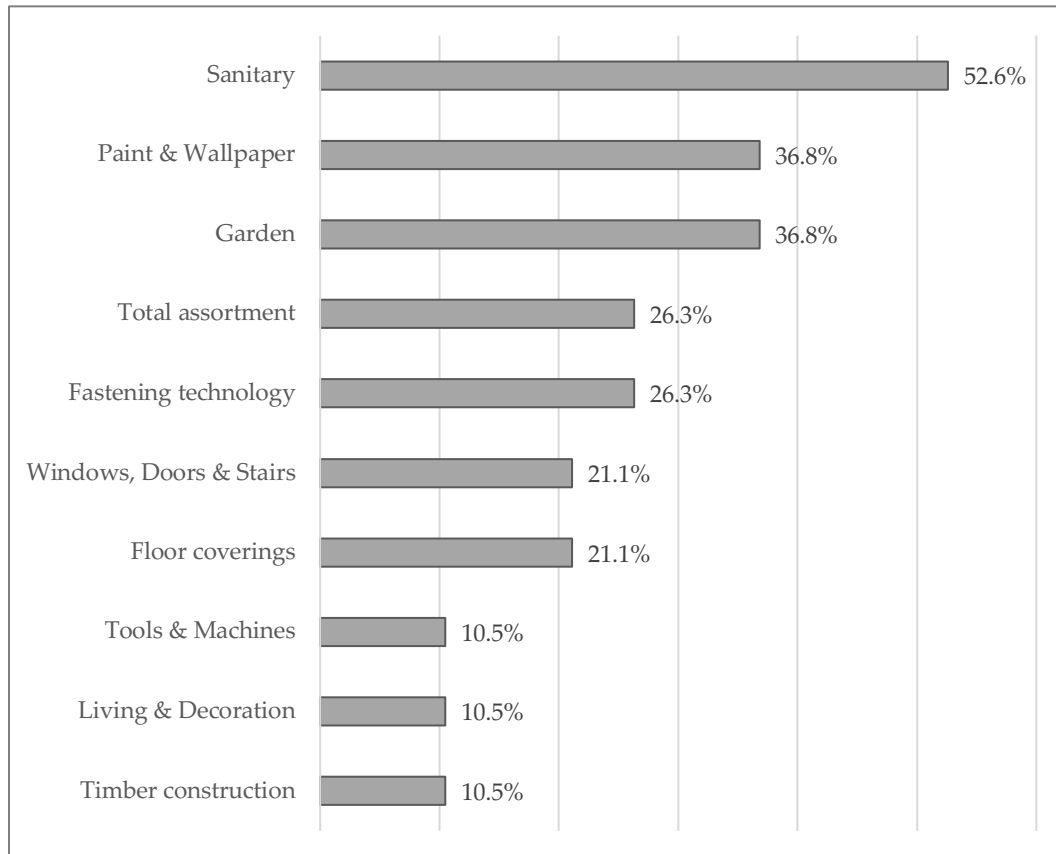
After the previous three sub-chapters have provided findings on the factors that lead to a satisfactory DIY store visit and have shown the impact of digital technologies used at the POS in DIY stores on customer satisfaction, this Chapter now provides an overview of which DIY product ranges are suitable for the use of digital technologies.

RQ 3: For which product ranges are digital technologies suitable in the DIY sector and for what reasons?

SRQ 3.1: Which product ranges are suitable for the use of digital technologies at the POS in DIY stores?

Since the specific features of the DIY store product range have already been described (see Chapter 2.2.3.1 - 2.2.3.4), the aim of this research question is to shed light on these specific features regarding the possibilities of using digital technologies in this context. To this end, sub-categories were formed in a first step, which name specific product ranges that are suitable for the use of digital technologies. The results were quantified and are presented in the following Figure 20:

Figure 20: Product ranges that are suitable for the use of digital technologies at the POS in DIY stores.



[source: own representation]

The respondents named a total of nine specific product ranges that they consider to be particularly suitable for the use of digital technologies at the POS in DIY stores. Figure 20 shows that the sanitary sector (52.6%) is seen as particularly predestined. This is followed by the paint & wallpaper and garden product categories (36.8% each). The same number of experts also consider the range of fastening technologies to be suitable for the use of digital technologies. The ranges windows, doors & stairs, as well as the floor coverings assortment, is considered suitable for the use of digital technologies by 21.1% of the experts. 10.5% of the

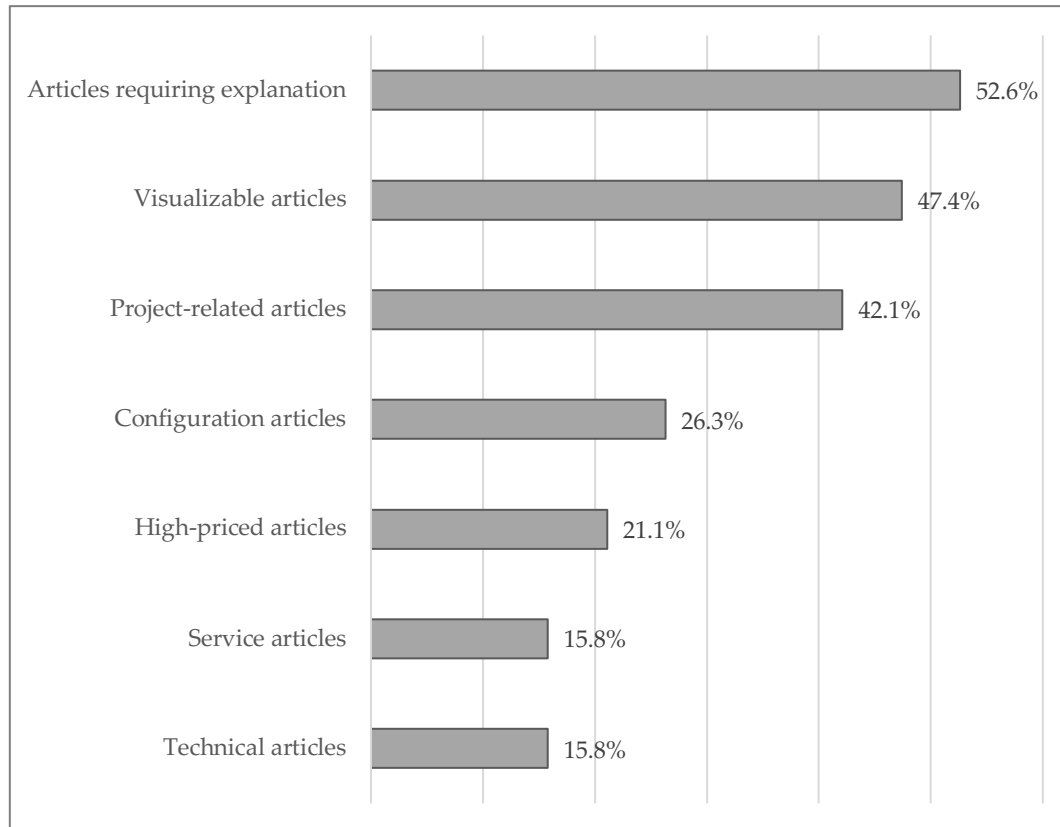
experts also named the tools & machines, living & decoration and timber construction assortments.

The characterizations used by the experts to define this were clarified in the course of the second sub-research question:

SRQ 3.2: What characterizes the articles that are suitable for the use of digital technologies at the POS in DIY stores?

In addition to explicitly formulated product ranges from the DIY store, the experts characterized the product ranges that they consider suitable for the use of digital technologies. The findings can be divided into seven sub-categories and presented in quantified form as follows:

Figure 21: Characterizations of articles that are suitable for the use of digital technologies at the DIY store POS.



[source: own representation]

Figure 21 provides an overview of the characterizations of the articles that are suitable for the use of digital technologies. It becomes clear that **articles that requiring explanation are seen as particularly predestined** (52.6%). This was formulated, for example, as follows: "The higher the degree of configuration, the more digital technology can help to positively influence customer satisfaction."⁷² Another statement was: "In general, you can say that the more extensive the product range, the more it needs to be explained, the more technology can be helpful."⁷³ Another statement

⁷² Appendix 3: Retailer Expert Interview: R1

⁷³ Appendix 11: Supplier Expert Interview: S4

refers to the **confidence** that must be achieved with customers for items that require explanation: "I believe that the product ranges where the customer needs advice are very important, simply to give them **confidence**."⁷⁴

Visualizable articles have been defined by 47.4% of the experts as useful for digital technology support. The experts point out that product ranges that have to do with design (wallpaper, paint, doors, sanitary articles, etc.) can be visualized with the help of digital technologies and provide the customer with a better **idea of the target situation**: "There are areas where you [...] say, I want to redesign this in such [a new] way. It's important to give the customer an idea. It's always easier even for me, at least, if I can see what it might look like afterwards, given the circumstances at home."⁷⁵ This emphasizes how, using technology, the visualization of target states may result in customer satisfaction, as the customer is given an idea of what the implementation or the installation of various products will look like. This also contributes to the factor of **confidence** mediation.

Project-related articles (42.1%) have also been classified as suitable for the use of digital technologies. Since numerous items are purchased in the DIY store in the course of a project (see also the explanation in the footnotes from Chapter 2.2.3.3), and this means that several products from several DIY store departments are required. As a result, the experts see a particular need here to support this **necessary, cross-departmental knowledge** in the form of digital technologies: "However, if I am working constructively, that is planning, and digital technologies can give me information that is relevant to my construction project, then these can certainly be important."⁷⁶

Configuration articles describe items that are individually customized to the customer's requirements. 26.3% of experts consider these items to be suitable for

⁷⁴ Appendix 5: Retailer Expert Interview: R3

⁷⁵ Appendix 10: Supplier Expert Interview: S3

⁷⁶ Appendix 8: Supplier Expert Interview: S1

use of digital technologies at the DIY-POS. According to the experts, the main reason for this is the **confidence** that digital technologies can ensure, for example by enabling illustrations, dimensions or even visualized images and videos using VR. The experts are convinced that digital technologies can be used to convey confidence to customers, especially with these items, which is an important factor, especially for expensive products: “If, for example, a customer wants to buy a storage shed for several hundred euros that can be configured, for example, to place doors, place windows, install lighting, define floors, configure pre-installed shelves, all these points and all these configuration steps can be displayed visually, similar to a car configurator, until the final product can be viewed from all sides and even the dimensions are written down on an offer, then this is a very strong confidence aspect, which gives the customer the assurance that everything has now been entered correctly and as desired and he orders with a clear conscience.”⁷⁷ Another expert describes the advantages of using digital technologies in the sales process and their positive impact on customer satisfaction as follows: “For items that are customized, the customer expects **transparency**, **plausibility**, and **confidence**.”⁷⁸

Furthermore, **high-priced articles** were identified (21.1%), as well as articles that require a certain level of **service** or generally **technical articles** where detailed knowledge is important⁷⁹ (15,8% each).

⁷⁷ Appendix 11: Retailer Expert Interview 9

⁷⁸ Appendix 9: Retailer Expert Interview 7

⁷⁹ Appendix 10: Retailer Expert Interview 8

4.12.4 Findings on Digital Technologies that will be used at the Point of Sale in Do-It-Yourself Stores and how their Impact on Customer Satisfaction can be measured

The fourth research question investigates how the impact of the use of digital technologies at the point of sale in DIY stores on customer satisfaction can be measured in order to provide appropriate recommendations for using the technologies.

RQ 4: How can the impact of the use of digital technologies at the POS in DIY stores be measured in terms of customer satisfaction?

Research question 4 was included in the interview guide for this study from interview number 11 onwards, as it was considered to be of considerable importance to investigate this question. It was included in accordance with the existing flexibility of the chosen interview form, that of semi-structured guideline-based interviews (Döring & Bortz, 2016; Gläser & Laudel, 2010). Consequently, the following results derive from interviews 11-19.

In the context of RQ4, how the success of the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction be measured, the experts first distinguished between objective (quantitative) and subjective (qualitative) methods, which will be discussed in more detail in the following:

SRQ 4.1: What objective measurement methods can be used to determine the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction?

In terms of **objective (quantitative) metrics**, the experts first mentioned **key figures** such as **turnover** or **sales**.⁸⁰ In their opinion, these KPIs could be used to measure success for a variety of technologies: “The success of a product configurator, for example, can be derived from the turnover it generates. This could also be applied to

⁸⁰ Appendix 17: Supplier Expert Interview: S6; Appendix 20: Supplier Expert Interview: S9

the app to see how much turnover is generated directly through the app or through Click & Collect.”⁸¹ Several experts also defined the **number of users, clicks, views and shares**⁸² of digital technologies as a key figure that allows conclusions regarding customer satisfaction.⁸³ In addition, the key figures **usage duration** and **time to resolution** were mentioned by the experts: “In terms of digital technologies, it would of course be interesting to analyze how often they are used, for how long, and how long it takes for the customer to reach their goal.”⁸⁴ Another addition states that, in addition to the value-based key figure, the share should also be analyzed as a basis for measurement: “Using the example of the digital checkout: on the one hand, I can analyze the turnover generated by it, but I also recommend comparing the share of turnover generated by it in relation to all checkouts, including traditional checkouts operated by employees, since the share in relation to a single value can be less meaningful.”⁸⁵

Furthermore, the experts consider the analysis of several **rates** to be a suitable way of determining the impact of digital technologies on customer satisfaction. For example, the **conversion rate** has been identified to measure the proportion of buyers in relation to the total number of users of technologies suited to this approach. In this context, the **customer retention rate** (to measure customer loyalty regarding the individual digital technologies), the **interaction rate, the drop-out rate and the exit rate** were also mentioned.⁸⁶ “[...] examine the interaction rate to determine how actively the customer uses the technology provided. This then indicates how appealing and relevant the technology is for the customer. But then, to take it a step further, the drop-out rate and the exit rate would also be crucial to know what the situation is regarding the percentage of people who don't complete the process, or, in the worst case, a customer starts with a technology and then immediately decides to exit. And then at the

⁸¹ Appendix 19: Supplier Expert Interview: S8

⁸² This refers to the number how often content is shared by customers, for example, sharing a product with other people or recommending it to others from an app.

⁸³ Appendix 8: Retailer Expert Interview: R6; Appendix 17: Supplier Expert Interview: S6

⁸⁴ Appendix 11: Retailer Expert Interview: R9

⁸⁵ Appendix 10: Retailer Expert Interview: R8

⁸⁶ Appendix 20: Supplier Expert Interview: S9

end, the **success rate**, which doesn't always have to be the purchase, but simply the completion of a task that a technology is supposed to fulfill.”⁸⁷

Some of the experts also mentioned various metrics from the field of user experience (UX), for example in connection with measuring customer satisfaction with XR technologies and named the **Customer Satisfaction Score (CSAT)** and the **Net Promoter Score (NPS)**: „I think that both NPS and CSAT are two useful ways of measuring customer satisfaction in order to evaluate customer satisfaction. CSAT, where we use a scale to ask in a transaction-oriented way whether the customer was satisfied with the technology, and the NPS score, which is more long-term oriented, where we again use a scale to ask whether the customer would recommend the technology in this case.”⁸⁸

Online surveys (with closed questions) were also identified, especially for technologies used by a large number of customers⁸⁹: “If we are thinking of a survey for an app that is used by many more than 10,000 customers, then an online survey or a CSAT would be much more suitable.”⁹⁰

Summarizing, it can be stated that **key figures**, **shares** and **rates** have been established as quantitative measurement methods or are being discussed in some companies for prospective application. The importance of **metrics** in the context of customer satisfaction measurement concerning user experience have also been elucidated. In addition, **online surveys** (with closed questions) were mentioned as a possible approach. However, a possible **limitation of the objective measurement methods** has also been mentioned, as some experts have emphasized that individual key figures, proportions or rates must always be **considered in the overall context** and also include company circumstances and environmental circumstances in the consideration.⁹¹

⁸⁷ Appendix 20: Supplier Expert Interview: S9

⁸⁸ Appendix 9: Retailer Expert Interview: R7; Appendix 10: Retailer Expert Interview: R8

⁸⁹ Appendix 8: Retailer Expert Interview: R6; Appendix 9: Retailer Expert Interview: R7

⁹⁰ Appendix 9: Retailer Expert Interview: R7

⁹¹ Appendix 18: Supplier Expert Interview: S7; Appendix 8: Retailer Expert Interview: R6; Appendix 9: Retailer Expert Interview: R7; Appendix 10: Retailer Expert Interview: R8

SRQ 4.2: What subjective measurement methods can be used to determine the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction?

In addition to the objective measurable methods, the experts have identified a number of subjective measurement methods. Above all, the **survey** has been mentioned in this context. In this context, the experts distinguished two main points: the **target groups** for the surveys and the **form** the surveys are conducted: With regard to the possible target groups, the **users of digital technologies** were named, the **sales staff or other retail employees** who maintain the digital technologies and **supplier employees**, insofar as they provide the possible technologies for their products.⁹² With regard to the **form** in which the **surveys** are conducted, especially the **personal, face-to-face interview** was emphasized, for the reason that **direct feedback** or **requests for further information** could be asked for, even if this is associated with the **disadvantage** that the **number of participants could be relatively small** and the implementation **relatively expensive**. In addition, **Online surveys** (in this case with open questions) have also been mentioned.⁹³

Furthermore, experts have suggested **usability tests** as a measurement method or the possibility of acquiring test customers for the use of digital technologies who can later express their opinions in a kind of **focus group** round. In particular, the advantage perceived is not only to receive direct **feedback** regarding the impact on customer satisfaction, but also to be able to discuss possible approaches or learn how to **improve satisfaction**.⁹⁴ Within this context, the experts also mentioned **observations** from which conclusions can be drawn about customer satisfaction.⁹⁵

According to the experts, an effective approach for measuring the success of all technologies could also be derived from **consumer intelligence** and **social media monitoring**, especially if it supports semantic analysis. Some companies use

⁹² Appendix 21: Supplier Expert Interview: S10

⁹³ Appendix 8: Retailer Expert Interview: R6; Appendix 21: Supplier Expert Interview: S10

⁹⁴ Appendix 10: Retailer Expert Interview: R8

⁹⁵ Appendix 17: Supplier Expert Interview: S6

software for this purpose that, among other things, analyze posts in forums, social media websites, customer support sites, search engines or review portals. “We often notice such things when analyzing our own websites or, for example, Google reviews, where customers post comments and provide feedback on everything: products, shipping speed, individual employees, any experiences, including those with advice, both analog and digital.”⁹⁶

Summing up, in addition to objective approaches, the experts have also defined numerous subjective approaches for measuring the impact of using digital technologies on customer satisfaction: **various forms of surveys** with different addressees and conducted in different forms. Also, **observations** were mentioned. Other approaches mentioned include **usability tests** and **focus groups**, from which, in addition to feedback, direct potential for improvement was identified as particularly valuable. Of particular importance to the experts are **analysis tools** that perform **consumer intelligence** and **social media monitoring** and thus analyze valuable feedback - including feedback on digital technologies used - on the internet.⁹⁷

⁹⁶ Appendix 11: Retailer Expert Interview: R9

⁹⁷ Appendix 21: Supplier Expert Interview: S10; Appendix 8: Retailer Expert Interview: R6; Appendix 11: Retailer Expert Interview: R9; Appendix 10: Retailer Expert Interview: R8; Appendix 17: Supplier Expert Interview: S6

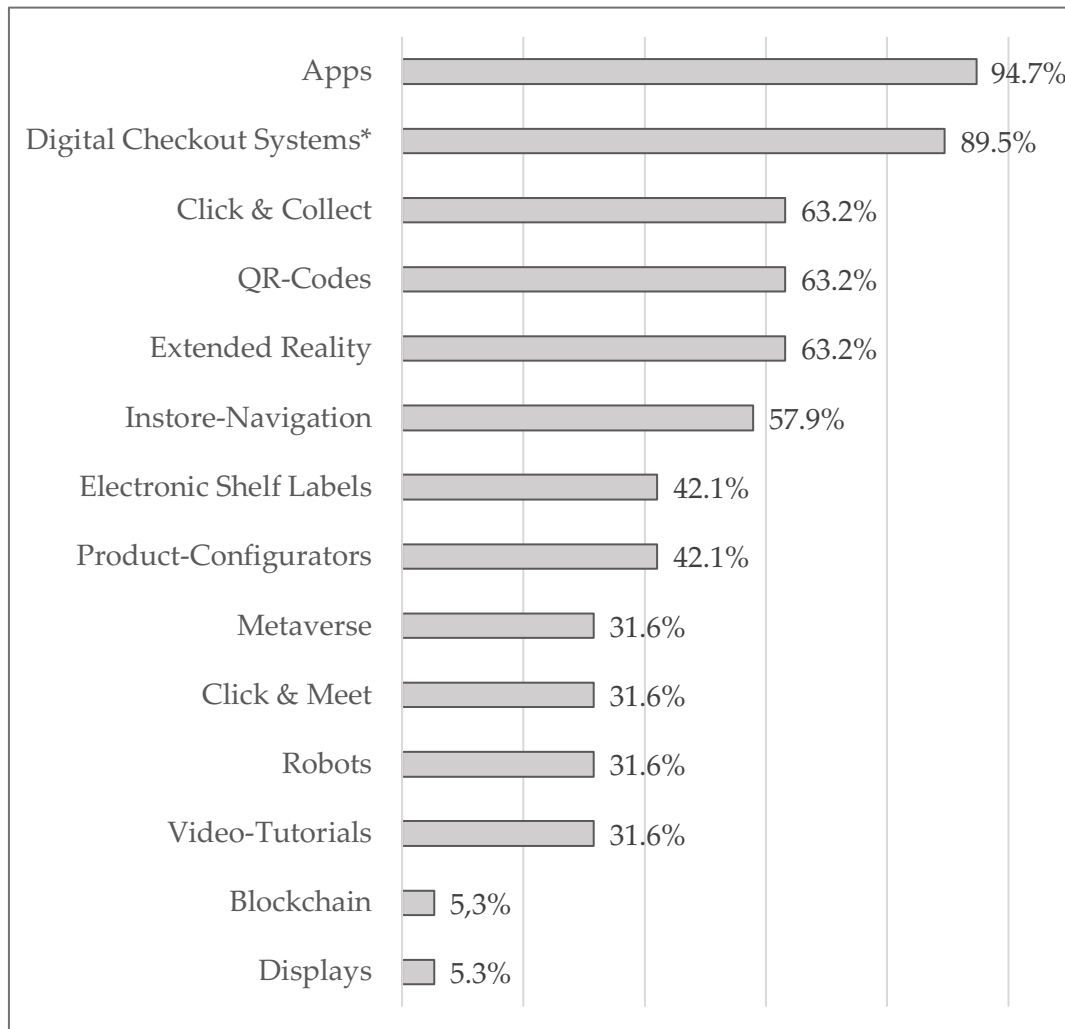
4.12.5 Findings on Digital Technologies that will be used at the Point of Sale in Do-It-Yourself Stores in the Future and their Impact on Customer Satisfaction

Finally, the last subchapter presents the findings regarding the future use of digital technologies at the point of sale in DIY stores and their impact on customer satisfaction. For this purpose, the following research question number five has been defined:

RQ 5: Which digital technologies used at the POS in DIY stores will have become established in the future and what impact will this have on customer satisfaction compared to today?

SRQ 5.1: Which digital technologies will be used in DIY stores in the future?

A key objective of the expert interviews, in addition to formulating action recommendations, was to gather perspectives on the future development of the POS in DIY stores. In this regard, the interviewees stated which digital technologies they expect to be used at the POS in DIY stores in the future. All respondents (n=19) answered, which led to the formulation of twelve subcategories. The following Figure provides an overview of these digital technologies, sorted according to the percentage of mentions:

Figure 22: Digital technologies that will be used in DIY stores in the future.

**Digital Checkout Systems (before: self-service checkout (see footnote from the previous page) [source: own representation]*

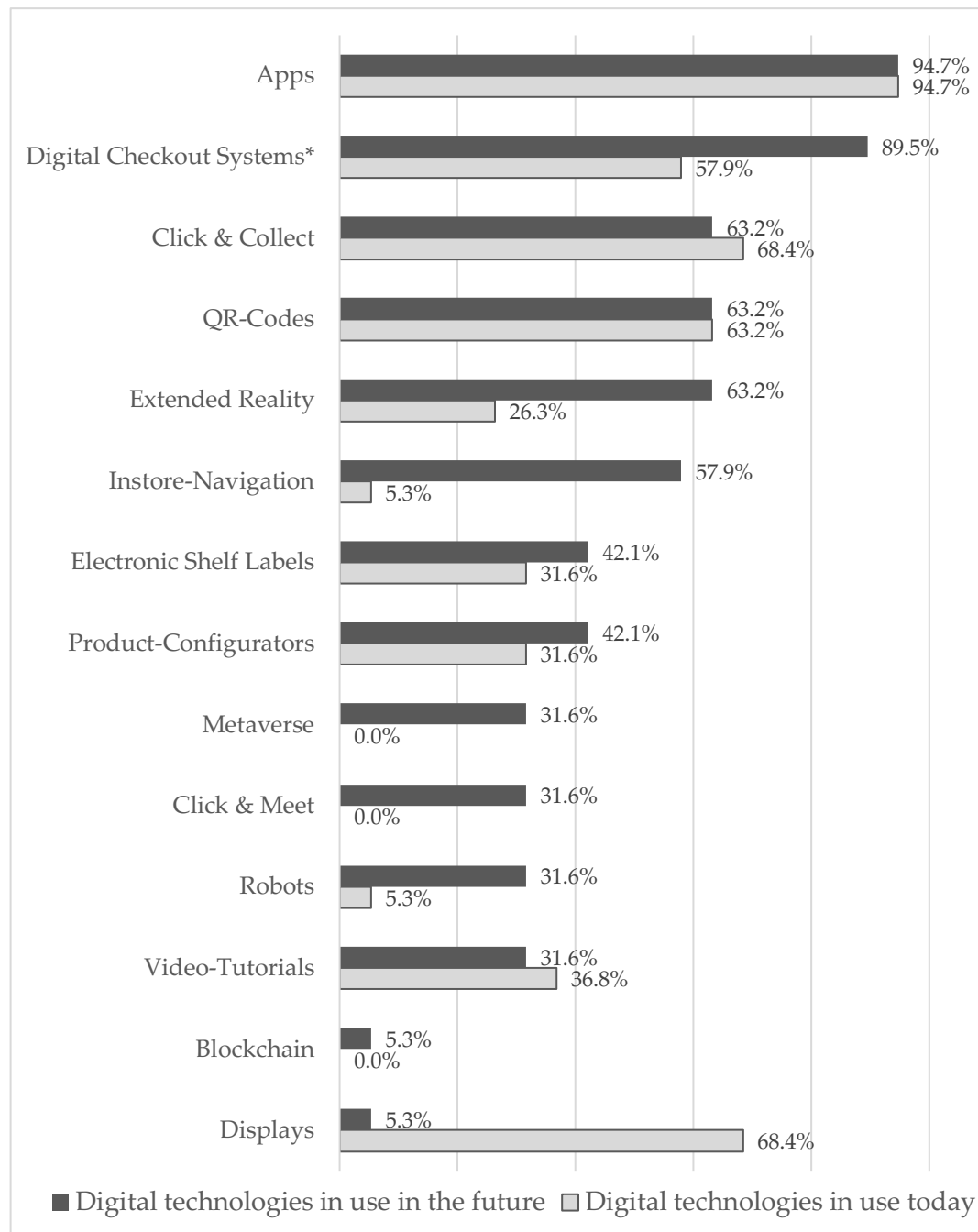
Figure 22 outlines the digital technologies explicitly mentioned by the experts, which they expect to be used in DIY stores in the future. 94.7% of experts consider **apps** to be a digital technology that will continue to be used in the future, albeit in a more advanced form. Digital checkout systems were mentioned by

89.5%.⁹⁸ In the course of the expert interviews, it became clear that the checkout process is seen as problematic. Today, this process leads to great customer dissatisfaction due to long waiting times and excessive complexity and effort. This led the experts to conclude that **digital checkout systems** are necessary and predestined for the future of the DIY brick-and-mortar stores. In particular, the experts consider all the technologies that enable a payless checkout. The experts are also certain that **Click & Collect** (63.2%) will continue to be a significant digital technology in future DIY stores. 63.2% of the experts also named the **QR code** as a digital technology that will remain in the future. Furthermore, 63.2% of experts are convinced that technologies based on **extended reality** will prevail. Another technology that a relatively high number of experts have identified as a future technology in the DIY store is **instore navigation**. 57.9% of the experts assume that digitally controlled navigation will be used in the DIY store of the future. 42.1% of the experts are also certain that the topic of price labelling will be digitized in the form of **electronic shelf labels**. An equal percentage of experts predicts that **product configurators** will be utilized at DIY stores in the future. This is followed by **metaverse**, **click & meet**, **robots** and **video-tutorials** (with 31.6% each). One expert discussed the **displays** (5.3%) in this context.

The following overview shows the digital technologies that were mentioned during SRQ 1.1 (Which factors of a DIY store visit lead to customer satisfaction? – Figure 15) compared to the digital technologies that were mentioned as being used in DIY stores in the future.

⁹⁸ During the analysis of the current use of digital technologies, the experts tended to speak of self-service checkout systems, as the technology utilization only related to the payment process (self-scanning of items and subsequent physical payment in self-service). While determining which digital technologies can be used at the POS in DIY stores in the future, it has become clear that checkout systems will enjoy a further development that comes close to contactless payment technology (as also explained in Chapter 2.7 and in Table 5). For this reason, the terminology of self-service checkouts has been changed to digital checkout systems to and includes any checkout system from self-service checkouts to payless checkout systems.

Figure 23: Comparison of digital technologies that are in use today and that are in use in the future.



*Digital Checkout Systems (before: self-service checkout (see footnote from the previous page) [source: own representation]

Figure 23 illustrates a comparison of digital technologies that are in use today and digital technologies that, according to the experts, will either continue to be used or be newly introduced in the future.

In this context, it is apparent that there are digital technologies that, according to the experts, are in use today and will continue to be used in the future: **apps** (today: 94.7% vs. in the future: 94.7%), **Click & Collect** (today: 68.4% vs. in the future: 63.2%), **QR codes** (today: 68.4% vs. in the future: 63.2%), **electronic shelf labels** or **product configurators** (today: 31.6% vs. in the future: 42.1% each) and **video tutorials** (today: 36.8% vs. in the future: 31.6%).

The figure also illustrates that the experts identified digital technologies that are currently used rarely or even not at all, but are expected to be used significantly more in the future: **digital checkout systems** (today: 57.9% vs. in the future: 89.5%), **extended reality** technologies (today: 26.3% vs. in the future: 63.2%), **instore navigation** (today: 5.3% vs. in the future: 57.9%), **metaverse** and **click & meet** (today: 0.0% vs. in the future: 31.6% each), **blockchain** (today: 0.0% vs. in the future: 5.3% and **robots** (today: 5.3% vs. in the future: 31.6%).

Additionally, according to the experts, there is a technology that is relatively widespread in use today (68.4%), but which will almost no longer be used in the future (5.3%): **one-sided dynamic displays**. The main reason given for this is that dynamic displays that only provide one-sided communication have numerous negative effects on customer satisfaction (see chapter 4.12.3 - RQ 3.2).

SRQ 5.2: Which impact will these digital technologies have on customer satisfaction and how does this differ from today?

The comparison shown in Figure 23 shows significant trends that could lead to various changes in DIY stores: The **app** is undisputedly considered state of the art by almost all experts (both for today and in the future - with 94.7% each). Although the experts consider the use of apps to be indispensable for customer satisfaction (see chapter 4.12.3 - RQ 3.) both today and in the future due to the numerous ways in which they can contribute to customer satisfaction, they perceive further potential in this digital technology: "I think that we are still a long way from the end of developments in apps. There are possibilities such as instore

navigation, the kind of using how-to videos, the presentation of supplements or even the option for customers to manage all their invoices or repair orders with it. I think that each of the major DIY store companies is already quite far along in isolated cases, but the full potential of an app will be demonstrated much more broadly in the future.”⁹⁹ In summary, the experts characterize the app as a digital technology that can fulfill numerous factors that contribute to customer satisfaction or even exceed: **expert advice, product fundability, check-out process, services, shopping experience, product demonstrations, special offers, price labeling and documentation.**

Digital checkout systems in particular, have been brought into focus by the experts. The process as a whole today was repeatedly described as too complex and "simply too long"¹⁰⁰ The checkout process includes the processing of invoices for business customers, receipts for private customers, the handling of discount or customer card systems, for example by physically presenting a card and scanning it, or the registering of loose goods (e.g. from the hardware product category). This is often cumbersome as the articles do not contain EANs or barcodes. This often-complicated processing leads to waiting times, errors or irritation. Additionally, the issue of incorrect pricing due to outdated information also contributes to customer dissatisfaction.¹⁰¹ The experts therefore agree in: "As paying is not much fun, it has to be at least quick."¹⁰² In this context, it was also emphasized that DIY stores have to be benchmarked against amazon in this matter, where the checkout process is "much faster" both online and stationary.¹⁰³ 89.5% of the experts therefore explicitly foresee digital checkout systems technology will becoming more established in the future, which is indicated by the following statements: "What will become much more common is [a checkout system that allows] an article to be paid for as soon as it is removed from the shelf."¹⁰⁴ "[There will be a checkout system] where I no longer have to wait at the checkout, but simply walk out of the store with my articles and they will

⁹⁹ Appendix 21: Supplier Expert Interview: S10

¹⁰⁰ Appendix 4: Retailer Expert Interview: R2

¹⁰¹ Appendix 4: Retailer Expert Interview: R2; Appendix 5: Retailer Expert Interview: R3

¹⁰² Appendix 11: Supplier Expert Interview: S4

¹⁰³ Appendix 4: Retailer Expert Interview: R2

¹⁰⁴ Appendix 3: Retailer Expert Interview: R1

be paid for.”¹⁰⁵ Conversely, this will lead to significant changes while increasing customer satisfaction at the same time by **reducing waiting times** for customers and **enhancing the shopping experience**.

Click & Collect is considered established as a basic factor and would contribute to dissatisfaction if it was not provided, according to the experts: “Click & Collect has proven itself with Corona in 2020 and has since been firmly anchored in the minds of customers, so that this has become the standard, it is no longer possible to imagine it not being there.”¹⁰⁶

QR codes (63.2%) will retain their importance. The interviewed experts see numerous advantages that the QR code offers: they can be used to **provide customers with the information they are looking for directly**, such as access to feedback pages, instructional videos, package inserts or product services: “The advantage of the QR code is its versatility. It provides a direct link to the desired target, enabling the customer to quickly obtain the desired information”.¹⁰⁷ In addition, according to the experts, the possibility of enabling payment transactions using QR codes should be considered: “We should also not forget that the QR code offers the possibility of paying for goods or services directly. This is already happening today. Not in the DIY store, but these possibilities do exist.”¹⁰⁸ In general, the QR code is seen by the experts as an essential link between stationary and online retailing.

Since **extended reality** (XR) technologies are described as an enabler for the **metaverse** (Medrano et al., 2024), these technologies (metaverse, XR, AR, MR and VR) are summarized within this paragraph: Within the future, the use of **extended reality** (63.2%) and the **metaverse** (31.6%), will increase significantly according to the experts’ opinion. These technologies in particular, are described as

¹⁰⁵ Appendix 11: Supplier Expert Interview: S4

¹⁰⁶ Appendix 19: Supplier Expert Interview S8

¹⁰⁷ Appendix 11: Retailer Expert Interview: R9

¹⁰⁸ Appendix 17: Supplier Expert Interview: S6

groundbreaking by the experts, as visualizations for projects (but also individual articles), for example, will gain significant quality. These technologies offer the possibility that the expert advisor (who does not necessarily have to be on site in person) is projected into the same room and provides advice via a live connection. The experts' thoughts in this regard are that in future, virtual reality will be conveyed via glasses or a smartphone, for example for the design of a room (bathroom, home office, etc.), with simultaneous expert advice - possibly even supplemented by expert advice from interior designers - and that this could take place also directly from home in future.¹⁰⁹ One expert explained: "Metaverse and digital technologies offer numerous advantages, especially for high-priced items that require explanation. Visualization makes the possible end results much more understandable for both customers and advisors. This helps to reduce inhibitions and ensures that an expected result can be better explained in advance and that any misunderstandings can be avoided."¹¹⁰ There are also considerations as to whether virtual reality can be combined with a haptic experience, as this is considered as important for worktops, interior doors, cabinets or design items, for example.¹¹¹ The associated advantages include a **more realistic perception of the target scenario** through XR or the metaverse, a **reduction in barriers to purchase due to uncertainty**, an **improvement in the shopping experience**, the associated further **development of documentation** and, above all, more **personalized specialist advice**. These technologies would therefore fulfill numerous factors that lead to customer satisfaction (see Figure 15) and would cause significant changes.

Instore navigation is considered very promising for increasing customer satisfaction in the future and is regarded by many experts as a technology that will be used: "I think that particularly in a DIY stores, where more than 20,000 or 30,000 items are offered for sale, one of the most important supports that we can offer customers is to find the needle in the haystack. Instore navigation is the best solution for this."¹¹² In

¹⁰⁹ Appendix 4: Retailer Expert Interview: R2; Appendix 5: Retailer Expert Interview: R3

¹¹⁰ Appendix 21: Supplier Expert Interview S10

¹¹¹ Appendix 8: Supplier Expert Interview: S1

¹¹² Appendix 17: Supplier Expert Interview: S6

addition to this supplier, a retailer also strengthens this point of view: "Instore navigation is becoming inevitable simply due to the shortage of specialized staff. If customers visit our stores, they need to find the products they are looking for quickly. They can't afford to wait for an employee to guide them to the product they are looking for."¹¹³ Consequently, the **support for finding products** at the point of sale in a fast and efficient manner is an immense advantage, which, according to experts, will contribute to an increase in customer satisfaction.

Electronic Shelf Labels will gain in importance in the future (from 31.6% up to 42.1%). The experts are certain that their use will result in increased customer satisfaction, as it will **eliminate any discussions about price differences** (due to out-of-date data). This topic also offers great potential for reallocating employee capacities **to the benefit of customer expert advice** because price labeling is an extremely time-consuming task due to the large number of items in a DIY store. Eliminating this task significantly increases the time available for staff to provide customer advice.¹¹⁴ The importance and urgency of this topic is made clear by the following statement from a deputy store manager: "[...] the accuracy would always be maintained, and you wouldn't have any discussions with customers due to incorrect prices. In addition, the topic of price labeling takes up so much of employees' time that you should prioritize this issue before investing in any other things."¹¹⁵

With regard to the digital technologies of **product configurators** (both those that are used by customers and those that are only be used by store employees) and **video tutorials**, the following can be stated: Both technologies are considered **established** and will be used even in the future, that gets stated by the expert

¹¹³Appendix 9: Retailer Expert Interview: R7

¹¹⁴ Appendix 8: Supplier Expert Interview: S1; Appendix 10: Supplier Expert Interview: S3; Appendix 5: Retailer Expert Interview: R3

¹¹⁵ Appendix 5: Retailer Expert Interview: R3

statements: “[...] Product configurators are well established and **proven**, [...]”¹¹⁶ and “Video tutorials are indispensable, especially for today's generation.”¹¹⁷

Another new factor that was mentioned is **click & meet** (31.6%), as a supplement to Click & Collect and another **way to receive advice** (for example, provided in the form of an app). According to the experts, about a third of them see this technology as being in use in the future: “Similar to Click & Collect, the customer will receive advice at a fixed time or even in **real time**. For example, via an advisor who can be **connected directly** via an app. If the customer has bought an item from us and has a question about how to put it together, they don't want to have to go back to the store for a question.”¹¹⁸

Six experts also mentioned **robots** as a digital technology that could be used in the DIY store of the future.¹¹⁹ According to the experts, this would mean “that the topic of question and answer would be mapped.”¹²⁰ This could take place in such a way that the robot “accompanies the customer to the shelf and then provides advice. It should then also be able to engage in dialog with the customer, if necessary, it should also be able to [provide] advice on other articles, such as the right plug for a screw.”¹²¹ Accordingly, robots would also satisfy numerous factors that lead to customer satisfaction: **expert advice, product findability, enhancing the shopping experience**, and maybe even more.

In this context, one expert has suggested that **blockchains** could be used in the future in the sector of DIY retailing, due to the advantages in terms of **data security**: “If we continue to develop the topic of QR codes, loyalty programs such as Payback or similar programs could be securely stored via blockchain in the future.

¹¹⁶ Appendix 20: Supplier Expert Interviews: S9

¹¹⁷ Appendix 16: Supplier Expert Interview: S5

¹¹⁸ Appendix 10: Retailer Expert Interview: R8

¹¹⁹ Appendix 11: Supplier Expert Interview: S4; Appendix 10: Supplier Expert Interview: S3

¹²⁰ Appendix 10: Supplier Expert Interview: S3

¹²¹ Appendix 10: Supplier Expert Interview: S3

Especially given the numerous discussions currently taking place on the subject of data security and data protection, the possibility of blockchains, which are considered to be significantly more secure, must be taken into account [...]."¹²²

On the other hand, single-sided **displays** are clearly not considered to be suitable for the future, which is supported by the experts' quotations, among other things: "First of all, I believe that displays that play sound on one side have a negative effect on customer satisfaction."¹²³ And "Video displays. The following applies to these things: Too much information that I don't need. And with a display with sound, it's more distracting than helpful."¹²⁴

Regarding the question of how digital technologies used in the DIY store of the future will differ from those used today, the experts first pointed out the **dynamics of customer expectations**: "In the course of these measurements, we are primarily identifying the dynamics of customer satisfaction. Things that made people enthusiastic yesterday are standard today and may be outdated tomorrow."¹²⁵ In this context, the experts explained that technologies will continue to develop at an ever-faster rate due to rapid technological advances, and that the stationary retail trade will undergo many more changes in its design.

The experts also agree that **digital technologies will become more interactive** and static displays, for example, will no longer be present in stores as they are not considered to generate much added value. "Digital technologies will also be more interactive. If we take a look at the displays that play the same video clip all day long in a shelf unit, they will no longer exist in the future. We are already seeing this. Suppliers that introduced these displays are phasing them out. Both the industry and retailers are no longer interested in these devices. The customer wants added value. Interactive technologies achieve this better than their non-interactive counterparts."¹²⁶

¹²² Appendix 11: Supplier Expert Interview: S6

¹²³ Appendix 12: Supplier Expert Interview: S1

¹²⁴ Appendix 11: Supplier Expert Interview: S6

¹²⁵ Appendix 10: Retailer Expert Interview: R8

¹²⁶ Appendix 9: Retailer Expert Interview: R7

4.12.6 Summary of the Findings

After the previous chapters summarized the findings of the five research questions in detail, this chapter concludes them in a clear and concise manner.

RQ 1 aimed to find out **which factors** of a DIY store visit lead to customer satisfaction and **to what extent they are fulfilled**. The analysis revealed the following main **influencing factors** (supplemented by the most important subcategories), which significantly influence customer satisfaction (the percentage of mentions by the experts in the interviews is given in brackets):

1. Product-related aspects:

- a. Product availability (94.7%)
- b. Product findability (63.2%)
- c. Product diversity (42.1%)
- d. Product quality (15.8%)

2. Price-performance ratio:

- a. Appropriate price-performance ratio (89.5%)

3. Customer service and advice:

- a. Expert advice (68.4%)
- b. Comprehensible and confidential advice (42.1%)

4. Shopping experience and atmosphere:

- a. Smooth and fast checkout process (52.6%)
- b. Shopping experience (15.8%)

5. Additional Services:

- a. Additional services (tool rental, wood cutting, ...) (21.1%)

The following aspects were described in terms of **positive fulfillment of customer satisfaction** in the present: product availability, price-performance ratio, product diversity, product quality and shopping experience. **Potential for improvement** was seen in the following categories: expert advice, product findability, checkout process, comprehensible and confidential advice and services.

The aim of **RQ 2** aimed to **identify digital technologies currently used in DIY stores and the extent to which these technologies influence customer satisfaction.**

Based on the expert interviews, **digital technologies used today in DIY stores are apps, Click & Collect, displays, QR codes, digital checkout systems, video tutorials, product configurators, electronic shelf labels, XR-technologies, instore navigation and robots.** Regarding apps, it should be noted that these can fulfill various functions, such as mobile scanning, viewing digital brochures or managing receipts. The key factors of digital technologies that **influence customer satisfaction** can be summarized as follows:

1. Quality of advice:

- Digital technologies, such as apps, video tutorials, XR-technologies or robots support high-quality advice.

2. Access to information:

- Digital displays provide comprehensive product information, leading to improved purchasing decisions.
- QR codes enable quick access to product data.

3. Efficiency and convenience:

- Updated pricing through electronic shelf labels leads to less frustration from incorrectly displayed sales prices.
- Digital technologies, such as digital checkout systems, robots, Click & Collect, instore navigation or product configurators, lead to faster purchasing processes.

4. Service:

- Digital platforms, such as apps, offer the option of placing Click & Collect orders.

5. Enhancing the shopping experience:

- XR technologies help customers to better visualize products or projects, which facilitates the purchase decision.

The aim of **RQ 3** aimed to **identify product ranges that are particularly suitable for the use of digital technologies** and the **reasons** for this.

Based on the experts, the following **product ranges are particularly suitable for the use of digital technologies** at the POS: **bathroom and sanitary ware, paints and wallpapers, garden, fastening, windows, doors & stairs, floor coverings, living & decoration and timber construction**. It should be noted that 26.3% of the experts stated that the use of digital technologies is suitable for the entire DIY range. The key **characteristics of these product ranges** are as follows:

1. **Articles requiring explanation (52.6%):**
 - Advice is needed on the articles for the purchase decision.
2. **Visualizable articles (47.4%):**
 - Articles can be projected into the real world using XR technology.
3. **Project-relates articles (42.1%):**
 - Often multiple articles that are part of new construction or renovation projects requiring planning.
4. **Configuration articles (26.3%):**
 - Articles that are individually customized at customer's request.
5. **High-priced articles (21.1%):**
 - Relatively expensive articles for which customers require more information/comparison options.
6. **Service articles (15.8%):**
 - Articles that require service in the form of, for example, color mixing systems or wood cutting systems.
7. **Technical articles (15.8%):**
 - Articles that enable more detailed technical advice that can, for example, make comparisons.

The RQ 4 aimed to provide insights into **how the impact of the use of digital technologies at the POS in DIY stores can be measured in terms of customer satisfaction.**

The experts enumerated several possibilities regarding measuring the success of the use of digital technologies at the DIY's POS, which are listed below, separated into objective and subjective, measurement methods:

Objective measurement methods:

1. **Key figures:**
 - turnover, sales, users, clicks, views, shares, usage duration, time to resolution
2. **Rates:**
 - conversion rate, customer retention rate, interaction rate, drop-out rate, exit rate, success rate
3. **Metrics:**
 - Customer Satisfaction Score, Net Promoter Score
4. **Surveys:**
 - online surveys (i.a. target group & form to be selected)

In the context of key figures, it should be noted that these value-based key figures should not only be considered and evaluated in isolation, but should also be put into perspective (e.g. share of turnover of a digital payment checkout compared to a traditional checkout)

Subjective measurement methods:

5. **Observations:**
 - i.a. target group & form to be selected
6. **Usability Tests:**
 - optionally with subsequent feedback session/focus group session
7. **Software Analysis Tools:**
 - Consumer Intelligence, Social Media Monitoring
8. **Surveys:**
 - e.g. online surveys (i.a. target group & form to be selected)

RQ 5 aimed to identify **digital technologies that will be used at the POS in DIY stores in the future** and what **impact these technologies will have on customer satisfaction and how this impact will differ from today**.

Based on the expert interviews, **digital technologies that are in use in the future in DIY stores** are **apps, digital checkout systems, Click & Collect, QR-codes, extended reality, instore navigation, electronic shelf labels, product configurators, metaverse, Click & Meet, robots, video tutorials, blockchain and displays**. The key factors of digital technologies that **influence customer satisfaction** can be summarized as follows:

1. Quality of advice:

- Digital technologies, such as apps, video tutorials, XR-technologies or robots support high-quality advice.

2. Access to information:

- Digital displays provide comprehensive product information, leading to improved purchasing decisions.
- QR codes enable quick access to product data.

3. Efficiency and convenience:

- Updated pricing through electronic shelf labels leads to less frustration from incorrectly displayed sales prices.
- Digital technologies, such as digital checkout systems, robots, Click & Collect, Click & Meet, instore navigation or product configurators, lead to faster purchasing processes.

4. Service:

- Click & Meet offers the possibility of receiving advice at any place.

5. Enhancing the shopping experience:

- Metaverse and XR technologies help customers to better visualize products or projects, which facilitates the purchase decision.

6. Data protection and trust:

- Blockchains increase the data security or that of the sales process.

Regarding the question of **how the impact of digital technologies used at the POS in DIY stores in the future will differ from today**, the following can be stated: **Customer satisfaction will increase with the use of digital technologies in the future**, insofar as the DIY sector implements digital technologies at the POS in a customer-oriented way. As a result, **expectations will be linked to an enhanced shopping experience**. It can also be assumed that **digital technologies used in the future will be designed to be interactive**, and that dynamic technologies and, in particular, static one-sided communicating technologies will increasingly disappear in DIY stores.

V – FUTURE RELEVANCE

V - FUTURE RELEVANCE

After the previous chapter provided an overview of the empirical research conducted for this study, Chapter 5 begins with a discussion and interpretation of its findings. The implications for research and practice are then discussed in Chapter 5.2. The following Chapter 5.3 evaluates whether the objectives of the study were achieved, before the limitations are explained in Chapter 5.4. In Chapter 5.5, the relevance of the results for future directions is discussed and hypotheses are developed that can serve for future research. Finally, Chapter 5 concludes this dissertation with a conclusion and an outlook.

5.1 DISCUSSION AND INTERPRETATION OF THE FINDINGS

Following the summary of the research findings, this chapter will critically reflect on them and place these in the context of the literature. In addition, the findings of both interview groups, retailers and suppliers, are triangulated (perspective triangulation) and, in the course of a further methodological triangulation, the findings of the expert interviews are triangulated with the findings of the systematic literature research (Chapters 2.7 and 3) (Mayring, 2022a; Mayring, 2019; Mayring, 2022; Mayring, 1985; Mayring & Fenzl, 2019; Mayring, 2001).

RQ 1: Which factors of a DIY store visit lead to customer satisfaction and to what extent are they fulfilled?

- *SRQ 1.1: Which factors of a DIY store visit lead to a satisfied customer?*
- *SRQ 1.2: To what extent do DIY stores fulfill these factors today?*

The findings of the first research question confirm established theories on customer satisfaction and its relevance in the context of the DIY store. Both presented theories, the Kano model and the confirmation/disconfirmation paradigm, prove to be **suitable models for explaining the formation of customer satisfaction**. The identified influencing factors can be consistently classified into basic, performance and enthusiasm factors and thus into the Kano model. It is also conceivable to classify the factors into the C/D paradigm, so that the factors could be compared with each other during the comparison process, resulting in positive disconfirmation, confirmation or negative disconfirmation. This underlines the applicability of both models in this context within the DIY sector.

Furthermore, it should be noted that the findings of the study emphasize the **heterogeneity of customer needs** and point out that different customer segments (professional, semi-professional, etc.) place different demands on DIY stores.

In addition, the findings show the **correlation between customer satisfaction and corporate success** by demonstrating the effect of customer satisfaction on the number of customers.

Moreover, during the analysis of the interviews, it was determined that the **opinions of the experts, retailers and suppliers, largely agree**.

In summary, it can be said that the factors identified that lead to customer satisfaction during a visit to a DIY store are in line with current theories and models, however, in this dissertation, **they specifically address the DIY sector** in a way that has not been done before, as previous scientific literature has not dealt with this sector so explicitly (chapter 3). In this way, the findings contribute to a better understanding of the DIY sector and at the same time open up new research perspectives.

RQ 2: Which factors of digital technologies used today at the POS in DIY stores influence customer satisfaction?

- *SRQ 2.1: Which digital technologies are used in DIY stores today?*
- *SRQ 2.2: Which factors of digital technologies used at the POS in DIY stores influence customer satisfaction and in what way?*

The findings of research question **SRQ 2.1** indicate which digital technologies are currently used in DIY stores. Such a detailed overview does not currently exist in the scientific literature with this specific reference to the DIY sector, as it was confirmed in the course of the systematic literature review (Chapter 3). Thus, the findings contribute to a more detailed understanding of the DIY retail sector.

The findings of **SRQ 2.2** prove, in the first instance, that **digital technologies can influence customer satisfaction** at the POS in the DIY store through various factors. This is in line with chapter 2.7, in which, among others, Gmelch & Hofmann (2024) and Leitherer (2024) illustrate that robots can reduce waiting times or offer advice. Likewise, in the above-mentioned chapter, Su et al. (2023), Gatti & Richter (2019) and Nowroth (2024) illustrate that checkout systems can reduce waiting times, which both has a positive effect on customer satisfaction. A triangulation with the findings from chapter 3, in this case with Kim (2020), who states that digital checkout systems can save customers time, also supports this. Thus, the **findings are consistent with the theoretical framework** of the literature reviews.

Equally, a triangulation of the two interest groups of the interviewed experts indicates that their opinions are also consistent. Although not every single expert named the identical factors in response to the open-ended question, there is generally a significant overlap, meaning that **triangulation also reveals a consensus here**.

Additionally, as with **RQ1**, the findings of the study have to take the **heterogeneity of customer needs** into account, since not all identified digital technologies lead to the same level of customer satisfaction for all customers. A customer with an affinity for technology might accept advice from a robot, but another customer might prefer personal, human contact.

RQ 3: For which product ranges are digital technologies suitable in the DIY sector and for what reasons?

- *SRQ 3.1: Which product ranges are suitable for the use of digital technologies at the POS in DIY stores?*
- *SRQ 3.2: What characterizes the articles that are suitable for the use of digital technologies at the POS in DIY stores?*

The findings of research question **RQ 3** can be placed in the context of the scientific literature. For example, Chylinski et al. (2020) point out in their study that bathrooms and kitchens can be projected in real time and in their original size with the help of digital technologies during the sales presentation, so that customers can better imagine themselves in the desired environment. Likewise, Gmelch & Hofmann (2024) and Leitherer (2024) point out characteristics of articles that are suitable for the use of digital technologies by introducing the robot of the SaturnMediaMarkt Retail Group and further elaborating that it can offer advantages for customers when searching for articles or providing expert advice. Accordingly, it should be noted that **the findings of RQ 3 can be classified in the context of the existing literature.**

Furthermore, it should be noted that the **findings of the expert interviews of the two interest groups differ significantly in one point: for retail, configurable articles and product configurators are given a very high priority.** This could be due to the assumption that a higher margin can be expected on customized items and that this special service offered by the DIY store represents an opportunity to differentiate itself from online retailers. The suppliers referred to configurable items only very briefly in this context. However, one reason for this may be, that some of the experts interviewed, may supply product ranges that do not require product configuration.

RQ 4: How can the impact of the use of digital technologies at the POS in DIY stores be measured in terms of customer satisfaction?

- *SRQ 4.1: What objective measurement methods can be used to determine the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction?*
- *SRQ 4.2: What subjective measurement methods can be used to determine the impact of the use of digital technologies at the POS in DIY stores on customer satisfaction?*

The findings of **RQ 4** indicate various objective and subjective measurement methods that can be classified in the current state of research. The **key figures can be categorized in existing models**, such as the measurement customer satisfaction model by Beutin (2007), which also divides measurement approaches into objective and subjective approaches (Chapter 2.6). This also applies to the identified metrics: The findings identify metrics, that are widely used, such as the Customer Satisfaction Score, which is described by Majka (2024) as follows: “the Customer Satisfaction Score (CSAT) emerges as a beacon of insight, guiding companies through the intricacies of customer experience.”, or the Net Promoter Score, which is used in the hotel industry, among others, to measure customer satisfaction (Baquero, 2022). The present findings on how the use of digital technologies at the POS in DIY stores affects customer satisfaction **can thus be placed in the broader context of the literature by reflecting on central theories and concepts discussed in the scientific literature.**

The added value for research arises from the **proposals of the experts of how the identified measurement methods can be applied directly into the DIY sector** to determine the impact of the use of digital technologies at the POS on customer satisfaction. This offers a suitable opportunity to expand existing approaches: “The theoretical principles available for measuring customer satisfaction are not new. For us, it must be about, how we can explicitly measure [...] the success of digital technologies at the POS in our specific sector. For example, we are intensively evaluating the use of video tutorials and using this to learn, [...], for which product categories these videos are often clicked to determine which products are relevant for customers regarding video tutorials.

Beyond that, semantic analysis can then evaluate what the comments on these videos provide: which video tutorials are explicitly requested for certain products or product groups.”¹²⁷ In such DIY-specific considerations, the findings of the research question contribute to a better understanding of the DIY sector and at the same time, they offer new perspectives for the stationary retail trade, that has to face the challenges of the digital transformation.

RQ 5: Which digital technologies used at the POS in DIY stores will have become established in the future and what impact will this have on customer satisfaction compared to today?

- *SRQ 5.1: Which digital technologies will be used at the POS in DIY stores in the future?*
- *SRQ 5.2: Which impact will these digital technologies have on customer satisfaction and how does this differ from today?*

RQ 5 points out that **customers' expectations and perceptions of service quality tend to be dynamic** and that, in the case of this study, digital technologies that are used today and achieve extraordinary customer satisfaction today, could be seen as a basic requirement in the future. This can be classified, among other things, in the context of the Dynamic Process Model of Service Quality by Boulding et al. (1993). A further confirmation of this can also be found in the expert interviews: “In the course of these measurements, we are primarily identifying the dynamics of customer satisfaction. Things that made people enthusiastic yesterday are standard today and may be outdated tomorrow.”¹²⁸ Thus, these results can be described as congruent.

Furthermore, the fact that the number of different digital technologies that will be used in DIY in the future indicates that the DIY store is an industry that is driven by these implied technological advances that urge the DIY store to develop

¹²⁷ Appendix A 11: Retailer Expert Interview: R9

¹²⁸ Appendix A8: Retailer Expert Interview: R8

digitalization strategies to remain competitive. These **findings from the expert interviews can be categorized in the context of the digital transformation of the retail industry**, in that they correspond to the concepts of omnichannel retailing or that of seamless customer experience (Silva et al., 2024; Gereá et al., 2021), which pursue the goal of seamlessly linking different shopping channels - online and offline. This is also **accompanied by case studies from the experts interviewed**, who report that efforts are being made to combine the strengths of brick-and-mortar DIY stores with the advantages of digital technologies by integrating digital technologies such as Click & Collect, Click & Meet, extended reality, product configurators or apps.¹²⁹

The results of RQ5 also confirm established theories on customer satisfaction and its relevance in the context of the DIY market. In this way, the 14 identified digital technologies can be integrated into the Kano model to categorize or prioritize them according to their importance for customer satisfaction (Figure 24). This can help retailers, for example, to prioritize investments in technologies or to achieve a unique selling point in the competitive environment by focusing on enthusiasm factors. Similarly, the dynamics of the customer satisfaction construct can be used to anticipate future performance and basic factors based on the enthusiasm factors, as these usually develop in that direction (Knop, 2007; Ebel, 2008).

However, the findings of RQ 5 also clearly indicate the **limits of using digital technologies in a brick-and-mortar DIY store**: integrating digital technologies at the POS is often much more difficult in practice than expected. Often, trivial things such as a lack of power connections or the **absence of internet access at the location where the technology is to be set up** can cause problems. In addition, in the course of the introduction of digital technologies, attention has been drawn to the often-**unresolved data protection aspects**. The introduction of digital technologies simultaneously leads to **higher demands on a company's data protection and IT security**. In practice, this often presents companies with challenges: "One point we

¹²⁹ Appendix 3: Retailer Expert Interview: R1; Appendix 6: Retailer Expert Interview: R4; Appendix 12: Supplier Expert Interview: S1; Appendix 19: Supplier Expert Interview: S8; Appendix A8: Retailer Expert Interview: R6

have to remember in this context is that all the technologies we are talking about add a great deal of value in theory. We should not forget that the reality is often different: not every store can provide electricity or internet access in the desired locations for the integration of a digital technology [...] and we may not be able to introduce technologies that, for example, film customers and store data at all in view of data protection laws. [...] Quite apart from the financial investments behind it, where we don't know how long it will take for a return.”¹³⁰

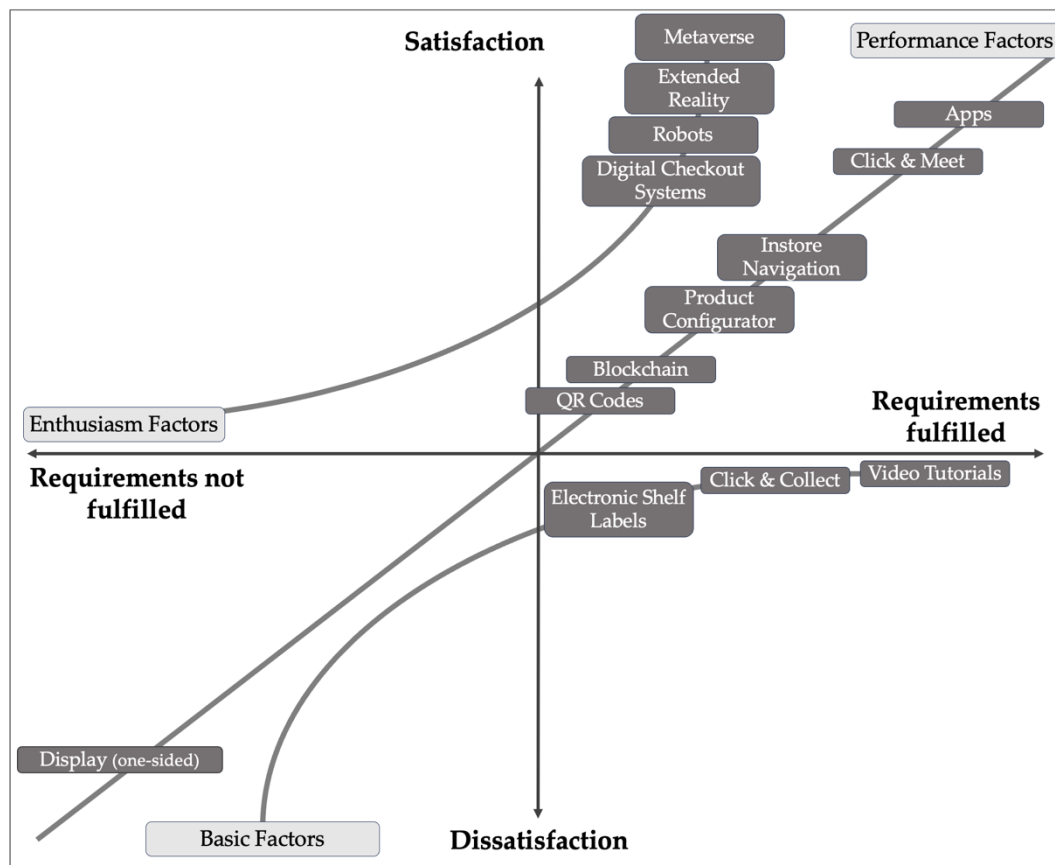
Equally, **trained staff is indispensable**. A shortage of skilled employees and the situation that **employee training is difficult to implement in practice**, since this implies that employees from several locations are best brought together in a central location without staff being missing in the field at the same time, can cause problems. This is accompanied by the risk that **staff will become more dissatisfied due to the use of digital technologies**, since technology acceptance is not opposed, which would also have a negative effect on customer satisfaction: “It is important to educate employees at the point of sale. If the customer is more knowledgeable than the employee at the point of sale, then we have a problem in our company. If there is an imbalance between customer knowledge and employee knowledge, to the detriment of our company, then we have a problem. That's why we should make sure that digital technologies not only lead to customer satisfaction, but also to employee satisfaction, and give them the opportunity to further educate and develop themselves through these technologies.”¹³¹

One striking aspect from the point of view of triangulation in connection with RQ 5 is that the examination of the **metaverse in retail seems to be significantly more extensive than in industry** in terms of the possibilities for future implementation. The metaverse has been discussed much more intensively by experts from the retail sector. This may be due to the immediate challenge and pressure to maintain competitiveness in retail, as retailers have to deal intensively with innovative technologies in order to survive in the face of intense competition with other retail companies.

¹³⁰ Appendix 11: Retailer Expert Interview R9

¹³¹ Appendix 3: Retailer Expert Interview: R1

Figure 24: Classification of the 14 identified digital technologies in the Kano model to differentiate the different satisfaction levels of quality perception and as a basis for a decision for action in practice.



[source: own elaboration based on (Berger, et al., 1993, p. 4) (Nerdinger, Neumann, & Curth, 2015, p. 127)]

Concluding this chapter, the following figure provides an overview of the digital technologies that will be used in the future in the DIY stores, according to the experts. The left-hand column lists the factors that the experts identified as contributing to customer satisfaction. The ticks indicate which of the customer needs can be satisfied with the use of the respective digital technologies. An asterisk marks instances where, according to the experts, these factors can lead to extraordinary satisfaction using these digital technologies. Conversely, a cross indicates situations where digital technologies have a negative impact on customer satisfaction, leading to dissatisfaction. It is crucial to note that this overview assumes the digital technologies function flawlessly; any deviation from this could compromise its reliability as a foundation.

Figure 25: Overview of the 14 digital technologies identified as suitable for use at the POS in DIY and their impact on the identified customer satisfaction factors.

	Apps	Digital Checkout Systems	Click & Collect	QR-Codes	Extended Reality	Instore Navigation	Electronic Shelf Labels	Product configurator	Metaverse	Click & Meet	Robots	Video Tutorials	Blockchain	Displays (one-sided)
Product availability	✓		✓			✓					✓			
Price-performance ratio														
Expert Advice	✓			✓	✓			✓	☆	✓	☆	✓		✓
Product findability	✓		✓		✓	✓			✓		✓			
Checkout Process	(✓)	☆	✓										✓	
Product diversity								✓						
Confidence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Services	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shopping Experience	✓	✓	✓		☆			✓	☆	✓	☆		✓	
Product quality														
Kindness of <u>employess</u>					✓						✓			X
Product demonstrations	✓			✓	✓			✓	✓	✓		✓		
Price Labeling	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	
Store appearance		✓			✓		✓	✓	✓		✓			X
Documentation	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓	

[source: own elaboration]

5.2 IMPLICATIONS FOR RESEARCH AND PRACTICE

The findings of the study provide significant implications for research and practice. These are summarized in the following two subsections.

5.2.1 Implications for Research

The present study significantly contributes to scientific research by conducting an **explicit and comprehensive investigation of the DIY store sector**, a field that has hitherto seldom been the focus of existing research. In addition to a **well-structured and clear description of the DIY sector** (Chapter 2), it also provides a **systematic literature review** in which the current state of research on the relationship between digital technologies, the DIY market and customer satisfaction is presented (Chapter 3). Moreover, the study provides a highly **comprehensive inventory of German- and English-language literature** in the context of the DIY market in the form of its bibliographic references.

Furthermore, the study was able to provide important conceptual contributions to DIY market research by **systematically integrating this area of research into related research fields**, such as customer satisfaction, digital technologies or concepts such as omnichannel retailing or seamless customer experience (Silva et al., 2024; Gereaa et al., 2021).

In this context, the findings of the study can prove the **applicability of established customer satisfaction models**, the **Kano model** and the **confirmation/disconfirmation paradigm**, in the context of the DIY sector. This leads to an extended scope and confirms their relevance in specific retail sectors.

The research findings also suggest that **scientific constructs such as the customer journey** (Barbosa et al., 2022; Rana et al., 2022) **or touchpoints** (Bolton et al., 2022; Santos & Gonçalves, 2021) **will become more important**, as customers expect a seamless shopping experience.

5.2.2 Implications for Practice

The findings of this dissertation clearly show that digitalization is fundamentally changing the brick-and-mortar retail industry, leading to considerable challenges for retailers. At the same time, however, tremendous opportunities are arising for retailers to innovate their business models to remain competitive or even gain a competitive advantage.

In this context, the study provides numerous practical implications: Firstly, it can be assumed that practitioners working in the DIY sector will see great added value in a structured study on DIY. Furthermore, success-critical findings for the DIY sector have been discovered. The **identification of 16 factors that contribute to customer satisfaction during a DIY store visit**, and the elaboration as to which of these factors the DIY store fulfills and where there is need of improvement, provides a valuable basis for the future that goes beyond the scope of this dissertation and its focus on digital technologies.

The presentation of **digital technologies that are used in DIY today**, their **classification** into static, dynamic and interactive technologies, with a simultaneous description of the advantages and disadvantages of these classes and an associated overview of **factors of these technologies that influence customer satisfaction** will enable practitioners to prepare the design of the POS for the future in terms of a successful alignment.

The findings identify **nine specific product ranges that are particularly suitable for digital technology integration**, offering real benefits for both retail and industry sectors. Based on these findings, strategies and enhancements can be implemented at product range level optimizing the use of digital technologies in these areas, which will lead to an increase in customer satisfaction. This in turn leads to an increase in sales and profits, creating a unique selling point and thus a competitive advantage.

In addition, the dissertation provides a **structured overview of customer satisfaction measurement methods with DIY-specific recommendations** for use, enabling DIY practitioners to directly and specifically evaluate the success of the digital technologies they use.

In addition, it is of great importance for practitioners to be provided with an **overview of 14 digital technologies that are to be used in DIY stores in the future** (integrated into the Kano Model), as well as **their impact on customer satisfaction**, coupled with a **critical examination** of these technologies.

Furthermore, the research findings also contribute to **specific recommendations for action in practice**:

DIY store practitioners should generally **concentrate on the core factors identified** in the study that **lead to an increase in customer satisfaction**, in particular product findability, an efficient checkout process, a fair price-performance ratio of their products and expert advice - not only in terms of digital technologies, as these factors appear relevant in general.

DIY store retailers should invest in the use of digital technologies, at the POS as these have been **proven to lead to customer satisfaction**. Concretely, in this context, it can be recommended that DIY stores should rely on technologies such as apps, video tutorials, XR technologies or robots, as these improve the key factor quality of advice, or on instore navigation, as this positively influences the key factor of product findability, and these two factors appear to be particularly relevant for increasing customer satisfaction.

Retailers **should also develop a solution for a seamless customer experience** and use digital technologies to further promote the connection between online and offline, as the customer demands.

In general, it is recommended that **retailers develop a holistic digitalization strategy** in order to **remain competitive** in the medium and long term in a dynamic market where the use of digital technologies is becoming increasingly important. This also implies that, besides digital technologies, **investments in employees in the form of employee training** should also be considered, since **personal advice has proven to be a decisive factor** for reaching customer satisfaction and, at the same time, DIY store employees should be able to operate digital technologies in the future, in addition to the complex range of products they sell.

Furthermore, the **heterogeneity of customers in practice** indicates that it must be taken into account: Retailers should **personalize their offers** and services more in order to meet these needs. One possible solution, as an example, would be

to integrate a digital customer card into the app that can provide personalized offers and personalized recommendations. However, retailers should also consider implementing a professional **CRM system**. At the same time, the **range of digital technologies available to different customer segments should be carefully considered** in order to be able to offer services to both customers with and without a high level of digital affinity.

In summary, this study provides findings that can be regarded as a well-founded basis for the implementation of digital technologies at future POS in DIY stores. Implementing the recommendations will enable brick-and-mortar retailers to take advantage of the opportunities offered by digitalization, thus contributing to the generation of competitive advantages and the optimization of results by maximizing sales and profits. However, the recommendations should always be adapted to the individual circumstances of the company.

5.3 EVALUATION OF THE OBJECTIVES OF THE STUDY

The present study and the associated research question “What insights can be gained into digital technologies that can be used at the point of sale in Do-It-Yourself stores, and how do they impact customer satisfaction?” is intended to fill the previously identified research gap and highlight the derived research objectives:

- Which factors of a DIY store visit lead to customer satisfaction and to what extent are they fulfilled?
- Which factors of digital technologies used today at the POS in DIY stores influence customer satisfaction?
- For which product ranges are digital technologies suitable in the DIY sector and for what reasons?
- How can the impact of the use of digital technologies at the POS in DIY stores be measured in terms of customer satisfaction?
- Which digital technologies used at the POS in DIY stores will have become established in the future and what impact will this have on customer satisfaction compared to today?

To address these questions and the research objectives derived from them, the following examinations were carried out and the following objectives achieved:

- Review of scientific literature and the latest findings in the field of Do-It-Yourself with the aim of providing a structured overview of the DIY sector in terms of product ranges, market data, drivers and trends.
- Review of scientific literature and the latest scientific findings in the field of digitalization and digital technologies and the point of sale and subsequently characterizing digital technologies at the point of sale in brick-and-mortar stores.
- Review of the scientific literature and the latest scientific findings in the field of customer satisfaction.
- Development of an overview of practical examples of using digital technologies at the point of sale in brick-and-mortar stores and their impact on customer satisfaction.
- Presentation of a systematic literature review, which provides the state of the art regarding the use of digital technologies at the point of sale in Do-It-Yourself brick-and-mortar stores in terms of customer satisfaction
- Development of a semi-structured interview guide as a foundation for conducting expert interviews. Structured knowledge extraction from the expert interviews using a qualitative content analysis according to Mayring. Derivation of the most important findings.
- Perspective and methodological triangulation and critical discussion and interpretation of the findings from the expert interviews and development of implications for theory and practice.

The present dissertation successfully achieved its predefined research objectives. The study provides insights of great importance in the context of the DIY store sector, digital technologies and customer satisfaction. The study addressed five central research questions, leading to results that provide a significant contribution to both research and practice:

RQ 1: Which factors of a DIY store visit lead to customer satisfaction and to what extent are they fulfilled?

The study identified 16 success factors that contribute to customer satisfaction when visiting a brick-and-mortar DIY store. In addition, the current degree to which these factors are fulfilled by DIY stores was presented and it was provided which of these factors are in need of improvement. In addition, a comparative analysis of these results was carried out.

RQ 2: Which factors of digital technologies used today at the POS in DIY stores influence customer satisfaction?

Eleven digital technologies currently implemented in the DIY store were identified, which could be categorized as static, dynamic or interactive. Furthermore, various factors of these technologies were identified that influence customer satisfaction. These key factors were highlighted in a comprehensive, concise overview.

RQ 3: For which product ranges are digital technologies suitable in the DIY sector and for what reasons?

The research on this research question resulted in the identification of nine product ranges that proved suitable for the use of digital technologies at the point of sale in DIY stores. Subsequently, these product ranges were subjected to a detailed characterization.

RQ 4: How can the impact of the use of digital technologies at the POS in DIY stores be measured in terms of customer satisfaction?

The findings provided a structured overview of measurement methods that can be used to evaluate the influence of digital technologies at the point of sale on customer satisfaction in a DIY store. In addition, specific recommendations for the practical implementation of these measurement methods in a DIY store were developed.

RQ 5: Which digital technologies used at the POS in DIY stores will have become established in the future and what impact will this have on customer satisfaction compared to today?

The findings identified 14 digital technologies that are expected to be used in DIY stores in the future and integrated them into the Kano model. The influence of these technologies on customer satisfaction was analyzed and presented in a structured overview in comparison to the current situation.

In summary, the research questions of this thesis could be answered comprehensively and thus contribute significantly to filling the research gap. By answering these questions and providing the results, the present dissertation contributes significantly to academic research in the field of the DIY store industry by examining the link between digital technologies, their application at the POS and the construct of customer satisfaction. Thus, the work offers substantial insights for both academic research and practical application.

5.4 LIMITATIONS

The findings of the dissertation that were presented, discussed and interpreted should generally be considered in the context of potential limitations.

First, it should be noted that the author of the study was given access to the field under investigation via expert interviews. The experts could be divided into two groups: retailers and suppliers. This contributes to a triangulation of the findings and provides an up-to-date contribution from a methodological perspective. Nevertheless, it should be noted that the findings of this study are based on the information provided by nineteen experts. **This number of experts means that the scope of the study is limited**, even though they were selected based on rigorous criteria. In this context, it should also be mentioned that this study is a cross-sectional study, since one interview was conducted with one interview partner at a time, which makes it difficult to derive causal relationships. From the perspective of the dynamic development of the construct of customer satisfaction and that of digital technologies, **a longitudinal study would be appropriate**. It should also be noted that the decision to conduct a **manual content analysis** according to Mayring was consciously chosen in order to ensure the depth of interpretation, validity, context and sensitivity. Nevertheless, the amount and depth of the qualitative data obtained can complicate the evaluation and categorization.

Another limitation of the study lies in the fact that the research approach is qualitative. **A quantitative verification of the findings is not given.**

This results also in a limitation due to a **lack of perspectives**, since the study surveyed experts from retail and industry. However, experts or **consultants from the IT sector were not surveyed**, although they could have provided a complementary and essential expansion of knowledge. Also, no customer opinions were included in the study, so the **customers' perspective is not given** in this thesis either. Another aspect of the limitation relates to the selection of the sample: due to the use of a non-probabilistic selection method for the experts, **the thesis suffers from a selection bias** and complete representativeness cannot be guaranteed.

In addition, research question number 5, in which the future situation of DIY stores was discussed, addressed digital technologies that have not yet been tried

and tested in DIY stores. Although the experts concede that the **digital technologies** declared as **suitable for use** at the POS in DIY **in the future**, it is **difficult to verify** this from the current perspective. In general, this thesis is limited by the fact that digital **technologies are developing very quickly** and some of the findings of this study could quickly become obsolete.

Throughout the study, the unique position of the DIY market within the retail sector was frequently emphasized. Consequently, this suggests that the **findings cannot be directly applied to other retail sectors without careful consideration**.

These limitations illustrate that although this study was conducted with the diligence and accuracy to be expected in research and can thus provide valuable insights for an under-researched field, it must always be critically reflected upon and considered in the context of the specific research situation.

5.5 FUTURE DIRECTIONS

The findings of this dissertation indicate, in addition to the aforementioned implications for research and practice, equally valuable approaches for research.

In the context of qualitative research, an **extension** of this research project could include **experts from digitalization consulting companies** in addition to experts from retail and industry. It can be assumed that these experts would provide further in-depth knowledge about the potential offered by digital technologies.

In addition, future **longitudinal studies** could help to determine the causal relationships between the success factors and the construct of customer satisfaction more precisely.

In the context of quantitative research, it should be noted that the findings of this study are based on interviews with 19 experts from the DIY sector. It is recommended that these findings be **verified by quantitative studies**, e.g. by a survey. In this context, it seems particularly useful to include customers in the sample, as they were not part of the expert interviews and so, they could offer a new perspective.

Furthermore, future research should focus intensively and specifically on **measuring customer satisfaction**. Due to the fact that customer satisfaction is a dynamic construct, and digital technologies will continue to develop at a rapid pace, future quantitative studies should be conducted that precisely measure the development of customer satisfaction, thus enabling scientific research and practice to make decisions on a well-founded basis and solid facts.

It is also important to consider the perspective of customers and employees: Future research should also consider **customer heterogeneity** in terms of **how satisfaction drivers differ across various customer segments**. Additionally, future research into the extent to **how and which digital technologies impact the role and skills of employees in brick-and-mortar retail** could be of particular importance for human resources management.

At the same time, it is recommended that existing trade theories be expanded and updated to include digital aspects. Moreover, the heterogeneity of customer needs

suggests that **theoretical models of customer satisfaction should differentiate more strongly between different customer segments.**

In addition, the findings of the study provide important insights into the **dynamics of customer satisfaction.** Especially in an area that is experiencing rapid change due to digital transformation, this aspect should lead to a **further development of existing theoretical models that take these dynamics into account to a greater extent.** In this concrete context, the Kano model, the confirmation/disconfirmation paradigm or the equity theory of Adams (1963) could be suitable.

In the context of digital technologies and their dynamic and rapid development, it is recommended that a more detailed study to **examine the role of digital touchpoints in brick-and-mortar retail** and their impact on customer satisfaction is undertaken. Furthermore, it is generally obvious since this research focuses on digital technologies that are **rapidly evolving due to shorter technology lifecycles,** that there exists a significant need for further research in this area. In this context, it should also be examined **how consumer behavior is changing as a result of digitalization** and the application of digital technologies.

Future research is also needed on more global issues: The aspect of growing awareness of sustainability should be investigated in future studies to find out **how aspects of sustainability influence customer satisfaction** in the DIY sector or in retail in general. Likewise, future research should also address data protection or ethical issues, and the fact, that digital technologies collect data with **effects on data protection and the ethical compatibility of such stored information.**

Ultimately, this study paves the way for extensive future research. It invites profound exploration of specific business models, strategies, and the identified factors that drive customer satisfaction in the DIY market. Such research could enable the achievement of further competitive advantages at the POS in the future for retail and thus also contribute to increasing sales and maximizing profits. In conclusion, the following hypotheses can be suggested for future research:

- H1:** Product findability, appropriate price-performance ratio, an efficient checkout process and expert advice are the factors that have the most significant influence on customer satisfaction during a visit to a DIY store.
- H2:** The factors of expert advice, product findability and the checkout process have the greatest need for improvement in the stationary DIY.
- H3:** Advice-intensive product ranges such as bathroom & sanitary ware, or paints & wallpapers are particularly suitable for the use of digital technologies at the point of sale in DIY stores.
- H4:** The use of digital technologies at the POS results in higher customer satisfaction in the advice- and sales-process for articles that require explanation or that can be visualized.
- H5:** To achieve an enhancement of the shopping experience for the benefit of customer satisfaction, the digital technologies of robots, extended reality and a digital checkout process are particularly suitable.
- H6:** The combination of objective and subjective measurement methods is best suited for measuring the influence of the use of digital technologies at the point of sale on customer satisfaction.
- H7:** The systematic measurement and analysis of objective and subjective key figures relating to the use of digital technologies at the POS and their influence on customer satisfaction leads to a measurable increase in sales in stationary retail.

5.6 CONCLUSION AND OUTLOOK

The present dissertation examined the effects of digital technologies at the point of sale in brick-and-mortar hardware stores on customer satisfaction. A comprehensive literature analysis, followed by a systematic literature review that underlined the significant need for research in this field, and an exhaustive qualitative study using expert interviews provided a significant contribution to academic research and practical application.

The key findings are:

Key success factors for a satisfying customer experience in a DIY store are product availability, product findability, an efficient checkout process, qualified advice and a competitive price-performance ratio.

The use of digital technologies such as robots, XR technologies, digital checkout systems, video tutorials or apps makes a significant contribution to these key factors, as they can successfully influence customer satisfaction.

Product ranges requiring explanation, visualizable product ranges and configurable articles are particularly suitable for the use of digital technologies, as these help to provide customers with professional advice or to create a better understanding through visualization, thus reducing possible inhibitions.

The introduction of a dual measurement controlling system, consisting of subjective and objective performance indicators, is of critical importance for operationalizing and validating success and enabling continuous improvement.

The establishment of digital technologies at the POS, based on a holistic digitalization strategy characterized by seamless omnichannel services and individualized marketing, offers considerable potential for increasing customer satisfaction.

Challenges identified in this digital transformation include high investment costs, complex technological implementation processes, the consideration of data protection and ethical concerns, employee development, but also customer-specific challenges, such as the heterogeneity of the customers.

The dissertation's findings emphasize the importance of a holistic strategy implementation that considers customer needs and combines the strengths of brick-and-mortar retail with the opportunities offered by the use of digital technologies at the POS. It also becomes clear that, due to rapid technological development, such a strategy is an ongoing process that needs to be continuously adapted and validated by measurable indicators.

In conclusion, it can be said that digitalization in the brick-and-mortar DIY stores entails challenges and opportunities. However, retailers that address this issue and develop a digital strategy will be able to exploit new growth opportunities by expanding their competitive position. Successfully addressing continuously changing customer needs and rapid technological development will be essential to offering customers a shopping experience that generates customer satisfaction and helps companies achieve measurable success.

VI – BIBLIOGRAPHICAL REFERENCES

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- Adams, J. S. (1965). Inequity In Social Exchange. In L. Berkowitz (ed.), , Vol. 2 (pp. 267 - 299) . Academic Press .
- Albert, M. (2020). *Projekterfolg im Maschinenbau Ein Beitrag zur ganzheitlichen Bewertung von Produktentwicklungsprojekten*. Kassel: Kassel University Press.
- ALDI Nord. (2023). *ALDI Nord*. Retrieved August 2023, from <https://www.aldi-nord.de/unternehmen/ueber-aldi-nord/110-jahre-kaufmannstradition.html>
- Allen, M. (2017). *The SAGE Encyclopedia of Communication Research Methods* (Vol. 1). Thousand Oaks: SAGE Publication.
- Altobelli, C. F. (2017). *Marktforschung Methoden - Anwendungen - Praxisbeispiele* (3. ed.). Konstanz und München: UVK Verlagsgesellschaft.
- Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal*, 22(6-7), 493-520.
- Anderson, R. E. (1973). Consumer Dissatisfaction: The Effect of Disconfirmed Expectancy on Perceived Product Performance. *Journal of Marketing Research*, 10(1), 38-44.
- Atkinson, P. (2006). Do It Yourself: Democracy and Design. *Journal of Design History*, 19(1), 1-10.
- Auge-Dickhut, S., Koye, B., & Liebetrau, A. (2016). *Customer Value Generation in Banking The Zurich Model of Customer-Centricity*. Cham: Springer International Publishin.
- Backhaus, K., & Bauer, M. (2003). Zufriedenheit in industriellen Geschäftsbeziehungen. In M. Rese, A. Söllner, & B. Utzig, *Relationship Marketing Standortbestimmung und Perspektiven* (pp. 105-140). Berlin / Heidelberg: Springer Verlag.
- Bakken, D., & Frazier, C. (2006). Conjoint Analysis: Understanding Consumer Decision Making. In R. Grover, & M. Vriens, *The Handbook of Marketing Research* (pp. 288-311). Thousand Oaks: SAGE Publications, Inc.

- Baquero, A. (2022).. Net Promoter Score (NPS) and Customer Satisfaction: Relationship and Efficient Management. *Sustainability*, 14(4), 2011. <https://doi.org/10.3390/su14042011>
- B Barbosa, B., Saura, J.R. & Bennett, D. How do entrepreneurs perform digital marketing across the customer journey? A review and discussion of the main uses. *J Technol Transf* 49, 69–103 (2024). <https://doi.org/10.1007/s10961-022-09978-2>
- BAUHAUS. (2023). *BAUHAUS*. Retrieved September 2023, from <https://www.bauhaus.info/unternehmen/international>
- BAUHAUS. (2023a). *BAUHAUS*. Retrieved December 2023, from <https://www.bauhaus.info/befestigungstechnik/c/10000002>
- BAUHAUS. (2023b). *BAUHAUS*. Retrieved December 2023, from BAUHAUS: <https://www.bauhaus.info/service/veranstaltungen/womens-week>
- BAUHAUS. (2023c). *BAUHAUS*. Retrieved December 2023, from BAUHAUS: <https://www.bauhaus.info/garantie>
- BAUHAUS E-Business Gesellschaft für Bau- und Hausbedarf mbH & Co. KG. (2023). *BAUHAUS*. Retrieved December 2023, from BAUHAUS: <https://www.bauhaus.info/unternehmen/nachhaltigkeit>
- BaumarktManager. (2014). *BaumarktManager*. Retrieved December 2023, from [baumarktmanager.de](https://www.baumarktmanager.de): <https://www.baumarktmanager.de/erfolgreiche-herstellerlogistik-19092014>
- BaumarktManager. (2015). *BaumarktManager*. Retrieved September 2023, from <https://www.baumarktmanager.de/eisenwaren--keimzelle-des-baumarkts-06032015>
- BaumarktManager. (2017). *BaumarktManager*. Retrieved July 2022, from <https://www.baumarktmanager.de/die-anfaenge-der-baumarktszene-25092017>
- BaumarktManager. (2019). *BaumarktManager*. Retrieved June 2023, from <https://www.baumarktmanager.de/hagebaumaerkte-feiern-40-geburtstag-30012019#:~:text=Am%2016.%20Februar%201979%20öffnete,der%20erste%20Hagebaumarkt%20seine%20Pforten.>

- BaumarktManager. (2021). *BaumarktManager*. Retrieved December 2023, from BaumarktManager: <https://www.baumarktmanager.de/kaercher-verwendet-mehr-recyclen-kunststoff-in-der-produktion-12082021>
- BaumarktManager. (2022). *BaumarktManager*. Retrieved December 2023, from baumarktmanager.de: <https://www.baumarktmanager.de/baumarktbranche-legt-normalen-start-hin-06052022>
- BaumarktManager. (2023). *BaumarktManager*. Retrieved December 2023, from BaumarktManager: <https://www.baumarktmanager.de/hagebau-unterstuetzt-kampagne-bau-stau-aufloesen-02102023>
- Baur, N., & Fromm, S. (2011). Die Rolle von SPSS im Forschungsprozess. In L. Akremi, N. Baur, & S. Fromm, *Datenanalyse mit SPSS für Fortgeschrittene 1 Datenaufbereitung und uni- und bivariate Statistik* (3. ed.). Wiesbaden: VS Verlag für Sozialwissenschaften.
- BayWa Bau- & Gartenmärkte GmbH & Co. KG. (2023). *BayWa Baumarkt*. Retrieved December 2023, from BayWa Baumarkt: <https://www.baywa-baumarkt.de/service/farbmischservice/>
- Ben-Gan, I., Kollar, L., Sarka, D., & Kass, S. (2009). *Inside Microsoft SQL Server 2008 T-SQL Querying*. Microsoft Press.
- Bercher, P., Behnke, G., Kraus, M., Schiller, M., Manstetten, D., Dambier, M., . . . Biundo, S. (2021). Do It Yourself, but Not Alone: Companion-Technology for Home Improvement—Bringing a Planning-Based Interactive DIY Assistant to Life. *Künstl Intell* 35, pp. 367–375.
- Berg, N., & Knights, M. (2022). *Das Amazon-Modell Wie der unerbittlichste Einzelhändler der Welt den Handel weiter revolutionieren wird*. Kulmbach: Börsenmedien AG.
- Berger, C., Blauth, R., Boger, D., Bolster, C., Burchill, G., DuMouchel, W., . . . Walden, D. (1993). Kano's methods for understanding customer-defined quality. *Center of Quality Management Journal*, 2(4), 3-36.
- Bergin, T. (2018). *An Introduction to Data Analysis Quantitative, Qualitative and Mixed Methods*. Londong: SAGE Publications.

- Beutin, N. (2006). Verfahren zur Messung von Kundenzufriedenheit im Überblick, In. Homburg, C. (ed.): Kundenzufriedenheit – Konzepte – Methoden – Erfahrungen, (pp. 121-170), Wiesbaden.
- BHB - Handelsverband Heimwerken, Bauen und Garten e.V. (2016). *BHB - Handelsverband Heimwerken, Bauen und Garten e.V.* Retrieved January 2023, from <https://www.bhb.org/verband/zahlen-fakten/branchendefinitionen/>
- BHB - Handelsverband Heimwerken, Bauen und Garten e.V. (2023). *Pressemitteilung Nr. 01/2023 – Köln, 23. März 2023 - Baumarktbranche bleibt trotz Multikrise 2022 auf stabilem Kurs – Handel hält Inflation auf maßvollem Niveau.* Köln.
- BHB - Handelsverband Heimwerken, Bauen und Garten e.V. (2024). *BHB - Handelsverband Heimwerken, Bauen und Garten e.V.* Retrieved January 2025, from <https://www.bhb.org/verband/zahlen-fakten/diy-branchenzahlen/>
- Blasig, R. (2021). *Altes Einbeck Porträt einer Kleinstadt im demografischen Wandel.* Hamburg: tredition.
- Blatter, J., Langer, P. C., & Wagemann, C. (2018). *Qualitative Methoden in der Politikwissenschaft Eine Einführung.* Wiesbaden: Springer Fachmedien.
- Boedeker, S. (2011). *Arbeit in interkulturellen Teams Erfolgsfaktoren mexikanisch-deutscher Konstellationen.* Wiesbaden: Springer Verlag.
- Bogner, A., Littig, B., & Menz, W. (2014). *Interviews mit Experten - Eine praxisorientierte Einführung.* Wiesbaden: Springer Fachmedien.
- Böhl, L. (2021). *Stuttgarter Zeitung.* Retrieved December 2023, from Stuttgarter Zeitung: <https://www.stuttgarter-zeitung.de/inhalt.wasserfilter-entsorgen-mh5d.11f0c297-601f-46dd-ba5b-883be6f2fe6f.html>
- Bolton, R.N., Gustafsson, A., Tarasi, C.O. et al. Designing satisfying service encounters: website versus store touchpoints. *J. of the Acad. Mark. Sci.* 50, 85–107 (2022). <https://doi.org/10.1007/s11747-021-00808-9>
- Borth, B.-O. (2004). Beschwerdezufriedenheit und Kundenloyalität im Dienstleistungsbereich Kausalanalysen unter Berücksichtigung moderierender Effekte. In R. Hünerberg, & A. Töpfer, *Forum Marketing.* Wiesbaden: Deutscher Universitätsverlag / GWV Fachverlage GmbH.

- Boslau, M. (2009). *Kundenzufriedenheit mit Selbstbedienungskassen im Handel*. Wiesbaden: Gabler | GWV Fachverlage.
- Boulding W., Kalra, A., Staelin, R. & Zeithaml, V. (1993). A Dynamic Process Model of Service Quality: From Expectations to Behavioral Intentions. *Journal of marketing research*. 30. 7-27. 10.2307/3172510.
- Brady, M., McDavid, J., Huse, I., & Hawthorn, L. (2013). Applying Qualitative Evaluation MEthods. In J. C. McDavid, I. Huse, & L. Hawthorn, *Program Evaluation and Performance Measurement An Introduction to Practice* (pp. 187-224). California: SAGE Publications.
- Branchendienst der Sparkassen-Finanzgruppe. (2021). *Branchenreport Einzelhandel mit Metallwaren, Bau- und Heimwerkerbedarf 2021*. Deutscher Sparkassenverlag.
- Breitenfelder, U., & Zeglovits, E. (n.d.). Der Einsatz qualitativer Methoden im Forschungsdesign für wahlwerbende Organisationen. In R. Buber, & H. Holzmüller, *Qualitative Marktforschung Konzepte - Methoden - Analysen* (2. ed., pp. 1101-1120). Wiesbaden: Gabler Verlag.
- Breuer, F., Muckel, P., Allmers, A., & Dieris, B. (2017). *Reflexive Grounded Theory Eine Einführung für die Forschungspraxis*. Wiesbaden: Springer Verlag.
- Bruhn, M. (2014). Zufriedenheits- und Kundenbindungsmanagement. DOI: 0.1007/978-3-8349-6618-6_14.
- Bruhn M. (2006). Qualitätsmanagement für Dienstleistungen: Grundlagen Konzepte Methoden. DOI: 0.1007/978-3-8349-6618-6_14
- Brüsemeister, T. (2008). *Qualitative Forschung - Ein Überblick* (2. ed.). Wiesbaden: Verlag für Sozialwissenschaften.
- Brysch, A.A (2022). Augmented Reality and Virtual Reality im Tourismus. In A. Schulz, U. Weithöner, R. Goecke, E. Kurz, *Digitaler Tourismus Informationsmanagement im Tourismus* (pp. 238-250). Berlin: Walter de Gruyter GmbH
- Bundesministerium für Wirtschaft und Klimaschutz. (2023a). *Bundesministerium für Wirtschaft und Klimaschutz*. Retrieved December 2023, from Bundesministerium für Wirtschaft und Klimaschutz:

- <https://www.de.digital/DIGITAL/Navigation/DE/Lagebild/Technologie-und-Trendradar/technologie-und-trendradar.html>
- Büttner, O. B. (2009). *Kognitive Prozesse am Point of Sale Zur Qualität von Datenerhebungsmethoden der Konsumentenforschung*. Wiesbaden: Gabler I GEV Fachverlage GmbH.
- BWI-Bau (2013). *Ökonomie des Baumarktes – Grundlagen und Handlungsoptionen: Zwischen Leistungsversprecher und Produktanbieter*. Wiesbaden: Springer Fachmedien.
- Carl, F. (2016). *Gymnasium ohne Sitzenbleiben Wie Lehrpersonen mit leistungsschwachen Schülerinnen und Schülern umgehen*. Wiesbaden: Springer Verlag.
- Çetin, Z. (2014). Interaktion, Intervention, Interpretation: intersektionale Forschung zu binationalen, schwulen Partnerschaften. In H. v. Unger, P. Narimani, & R. M'Bayo, *Forschungsethik in der qualitativen Forschung Reflexivität, Perspektiven, Positionen* (pp. 191-208). Wiesbaden: Springer Fachmedien.
- Churchill, G. A., & Surprenant, C. (1982). An Investigation into the Determinants of Customer Satisfaction. *Journal of Marketing Research*, 19(4), 491-504.
- Chylinski, M., Heller, J., Hilken, T., Keeling, D. I., Mahr, D., & de Ruyter, K. (2020). Augmented reality marketing: A technology-enabled approach to situated customer experience. *Australasian Marketing Journal*, 28(4), 374-384.
- Ciarli, T., Kenney, M., Massini, S., & Piscitello, L. (2021). Digital technologies, innovation, and skills: Emerging trajectories and challenges. *Research Policy*.
- Clausius, E. (2015). *Paradigmenwechsel in der Wirtschaft - von der rationalen zur emotionalen Intelligenz -*. Norderstedt: Books on Demand.
- Cloos, P., & Köngeter, S. (2009). "...uns war mal langweilig, da ham wir das JUZ entdeckt." Empirische Befunde zum Zugang von Jugendlichen zur Jugendarbeit. In W. Lindner, *Kinder- und Jugendarbeit wirkt Aktuelle und ausgewählte Evaluationsergebnisse der Kinder- und Jugendarbeit* (pp. 81-94). Wiesbaden: Verlag für Sozialwissenschaften.
- Dähne Verlag. (2023). *Statistik Baumarkt + Garten 2023. diy Fachmagazin*.

- Dallwitz-Wegner, D. (2016). *Unternehmen positiv gestalten Einstellungs- und Verhaltensänderung als Schlüssel zum Unternehmenserfolg*. Wiesbaden: Springer Fachmedien.
- Day, R. L. (1984). Modeling Choices Among Alternative Responses to Dissatisfaction. *Advances in Consumer Research*, 11, 496-499.
- De Silva, N., & Asmone, A. S. (2023). Embedding Facilities Management Knowledge into Project Management in Developing Countries. In G. Ofori, *Building A Body Of Knowledge In Project Management In Developing Countries* (Vol. 3, pp. 477-513). Hackensack / London: World Scientific Publishing Co. Pte. Ltd.
- DeepL Translate, DeepL SE: <https://www.deepl.com/de/translator>. Translation of text passages.
- Deutsche Presse-Agentur. (2023). *Zeit Online*. Retrieved August 2023, from <https://www.zeit.de/news/2023-08/21/baummarktbranche-verzeichnet-sinkenden-umsatz>
- Deutsche Vereinigung für Politikwissenschaft (DVPW) e.V. (2017). *Deutsche Vereinigung für Politikwissenschaft*. Retrieved December 2023, from <https://www.dvpw.de/wir/profil/ethik-kodex/>
- Dhivyadeepa, E. (2015). *Sampling Techniques in Educational Research*. Lulu.
- Dilthey, W. (1923). *Ideen über eine beschreibende und zergliedernde Psychologie* (Vol. (Gesammelte Schriften Bd. 5)). Leipzig: Teubner.
- Dilthey, W. (1977). *Gesammelte Schriften*. Stuttgart: Teubner Verlagsgesellschaft.
- DIY & Hardware Store - Worldwide. (n.d.). Retrieved January 13, 2025, from <https://www.statista.com/outlook/cmo/diy-hardware-store/worldwide> as seen in: Statista. (2023). *DIY & Hardware Store – market data analysis & forecast*. Statista GmbH & Statista. (2023a). *Umsatz mit DIY- und Heimwerkerbedarf weltweit in den Jahren 2018 bis 2023 mit einer Prognose bis 2028 (in Milliarden Euro)*. Statista GmbH.
- diy online. (2018). *diy online*. Retrieved December 2023, from <https://www.diyonline.de/d/diy/2018/1-2018/megatrend-individualisierung.html>

- diy online. (2022). *diyonline*. Retrieved December 2023, from diyonline: <https://www.diyonline.de/d/news/2022/08/23/obi-uebersetzt-video-tutorials-in-acht-sprachen.html>
- diy online. (2022a). *diyonline*. Retrieved September 2023, from <https://www.diyonline.de/d/news/2022/09/05/globus-eroeffnet-nach-umbau-seinen-groessten-hessischen-markt.html>
- diy online. (2024). *diyonline*. Retrieved January 2025, from <https://www.diyonline.de/d/news/2024/05/07-1/top-6-baumaerkte-verloren-2023-um-2-3-prozent.html>
- Domke, B. (2024). *Lidl-App inzwischen fast so erfolgreich wie Amazon*. Retrieved December 2024 from Harvard Business Manager: <https://www.manager-magazin.de/hbm/lidl-app-inzwischen-fast-so-erfolgreich-wie-amazon-a-5c85cfea-3e99-4995-a5c2-60d872fc4c7e>
- Döring, N., & Bortz, J. (2016). *Forschungsmethoden und Evaluation in den Sozial- und Humanwissenschaften* (5. ed.). Heidelberg: Springer Verlag.
- Dresing, T., & Pehl, T. (2015). *Praxisbuch Interview, Transkription & Analyse. Anleitungen und Regelsysteme für qualitativ Forschende* (6. ed.). Marburg.
- Dresing, T., & Pehl, T. (2020). Transkription - Implikationen, Auswahlkriterien und Systeme für psychologische Studien. In G. Mey, & K. Mruck, *Handbuch Qualitative Forschung in der Psychologie - Band 2: Designs und Verfahren* (pp. 835-854). Wiesbaden: Springer Fachmedien.
- Dröge, Kai (2020). *Qualitative Interviews am Telefon oder online durchführen*. QUASUS. Qualitatives Methodenportal zur Qualitativen Sozial-, Unterrichts- und Schulforschung. URL <https://www.ph-freiburg.de/quasus/was-muss-ich-wissen/daten-erheben/interviews/qualitative-interviews-online-oder-am-telefon-durchfuehren.html>
- Ebel, N. (2008). *ITIL V3 Basis-Zertifizierung*. München: Addison Wesley Verlag.
- Egan, J. (2020). *Marketing Communications* (3. ed.). Thousand Oaks: SAGE Publications Ltd.
- EHI Retail Institute. (2023). *EHI Retail Institute*. Retrieved December 2023, from EHI Retail Institute: <https://www.handelsdaten.de/internationaler->

handel/ceconomy-ag-durchschnitt-verkaufsflaeche-fachmaerkte-media-
markt-
saturn#:~:text=Die%20durchschnittliche%20Verkaufsfläche%20der%20vo
m,Prozent%20im%20Vergleich%20zum%20Vorjahr.

- Einramhof-Florian, H. (2017). *Die Arbeitszufriedenheit der Generation Y Lösungsansätze für erhöhte Mitarbeiterbindung und gesteigerten Unternehmenserfolg*. Wiesbaden: Springer Fachmedien.
- Engeser, F. (2024): *Wenn das "Hologramm" die Designerlampe verkauft*. Retrieved December 2024, from BR: <https://www.br.de/nachrichten/wirtschaft/beratung-durch-ein-hologramm-im-einzelhandel,U5VKEzc>
- Faullant, R. (2007). *Psychologische Determinanten der Kundenzufriedenheit*. Wiesbaden: Deutscher Universitäts-Verlag | GWV Fachverlage GmbH.
- Ferchland, M. (2014). *Wenn Kinder ausziehen: Die Perspektive der Eltern von Kindern mit geistiger Behinderung*. Hamburg: Diplomica Verlag.
- Ferri, R. B. (2010). *Wege zur Innenwelt des mathematischen Modellierens Kognitive Analysen zu Modellierungsprozessen im Mathematikunterricht*. Wiesbaden: Vieweg Teubner Verlag | Springer Verlag.
- Fichter, C. (2018). Kunden. In C. Fichter, *Wirtschaftspsychologie für Bachelor* (pp. 59-70). Berlin: Springer Verlag GmbH Deutschland, ein Teil von Springer Nature.
- Fischer, K.; Fox, C., Kurz, W., Zink, K. J. (2015). *Innovationen in der Bauwirtschaft – von der Idee bis zum Markt*. Stuttgart: Fraunhofer IRB Verlag.
- Fischer, P. (2007). *Berufserfahrung älterer Führungskräfte als Ressource*. Wiesbaden: Deutscher Universitätsverlag.
- Flick, U. (2009). *An Introduction to Qualitative Research* (4. ed.). London: SAGE Publications Ltd.
- Flick, U. (2020). *Introducing Research Methodology Thinking Your Way Through Your Research Project*. London: SAGE Publications.
- Flick, U. (2022). *Doing Interview Research The Essential How To Guide*. London: SAGE Publications.

- Fontaine, P., & Backhouse, R. (2010). *The History of the Social Sciences Since 1945*. Cambridge: Cambridge University Press.
- Fuchs, A. (2010). *Kundenbindungsmanagement im Einzelhandel Eine kausalanalytische Untersuchung am Beispiel des Textilfacheinzelhandels*. Wiesbaden: Gabler I GWV Fachverlage GmbH.
- Fürst, S., Jecker, C., & Schönhagen, P. (2016). Die qualitative Inhaltsanalyse in der Kommunikationswissenschaft. In S. Averbek-Lietz, & M. Meyen, *Handbuch nicht standardisierte Methoden in der Kommunikationswissenschaft* (pp. 209-225). Wiesbaden: Springer Verlag.
- Gage, N. L. (1989). The Paradigm Wars and Their Aftermath: A "Historical" Sketch of Research on Teaching since 1989. *American Educational Research Association*, 18(7), 4-10.
- Gatti, E., & Richter, C. (2019). *Digitales China Basiswissen und Inspirationen für Ihren Geschäftserfolg im Reich der Mitte*. Wiesbaden: Springer Gabler.
- Gantert, K., Lauber-Reymann, M. (2022). *Informationsressourcen Ein Handbuch für Bibliothekare und Informationsspezialisten*. Berlin: Walter de Gruyter Verlag.
- Gartner. (2023). *Gartner*. Retrieved December 2023, from Gartner: <https://www.gartner.com/en/information-technology/glossary/digitalization>
- Gelber, S. M. (1997). Do-It-Yourself: Constructing, Repairing and Maintaining Domestic Masculinity. *American Quarterly*, 49(1), 66-112.
- Gelbrich, K., Wünschmann, S., & Müller, S. (2018). *Erfolgsfaktoren des Marketing* (2. ed.). München: Vahlen Verlag.
- gemaba - Gesellschaft für Markt- und Betriebsanalyse mbH. (2023). *Baumarkt-Strukturdaten 2023*. Lev-Hitdorf.
- Gerea, C., Gonzalez-Lopez, F., & Herskovic, V. (2021). Omnichannel Customer Experience and Management: An Integrative Review and Research Agenda. *Sustainability*, 13(5), 2824. <https://doi.org/10.3390/su13052824>
- German Federal Ministry for Economic Affairs and Climate Action. (2024). *German Federal Ministry for Economic Affairs and Climate Action*. Retrieved December 2024, from German Federal Ministry for Economic Affairs and Climate Action:

- <https://www.bmwk.de/Redaktion/DE/Downloads/A/anwendungen-von-kuenstlicher-intelligenz-einzelhandel.html>
- GfK SE. (2017). GfK. Retrieved December 2023, from GfK: <https://www.gfk.com/insights/infographic-smart-home-and-the-millennial-divide>
- Giuri, M. (2021). *Instore-Navigation per Handy-Kamera: Marks & Spencer testet Augmented Reality*. Retrieved December 2024, from Lebensmittel Zeitung: <https://www.lebensmittelzeitung.net/tech-logistik/nachrichten/instore-navigation-per-handy-kamera-marks-spencer-testet-augmented-reality-162858#:~:text=Der%20britische%20Händler%20Marks%20%26%20Spencer,App%2Dbasierte%20AR%2DLösung>.
- Gladbach, S. (2015). *Der Abbruch akademischer Gründungsvorhaben Eine explorativ-empirische Untersuchung*. Lohmar: Josef EUL Verlag.
- Glaser, B. G., & Strauss, A. (1967). *The discovery of grounded theory: strategies for qualitative research*.
- Glaser, B. G., & Strauss, A. (1979). Die Entdeckung gegenstandsbezogener Theorie: Eine Grundstrategie qualitativer Sozialforschung. In C. Hopf, & E. Weingarten, *Qualitative Sozialforschung* (pp. 91-111). Stuttgart: Klett-Cotta.
- Glaser, B., & Strauss, A. (2017). *Discovery of grounded theory: Strategies for qualitative research*. New Brunswick & London: Aldine Transaction - A Division of Transaction Publishers.
- Gläser, J., & Laudel, G. (2010). *Experteninterviews und qualitative Inhaltsanalyse* (4. ed.). Wiesbaden: Springer Fachmedien.
- Gläser-Zikuda, M., Stephan, M., & Hofmann, F. (2022). Qualitative Auswertungsverfahren. In H. Reinders, D. Bergs-Winkels, A. Prochnow, & I. Post, *Empirische Bildungsforschung Eine elementare Einführung* (pp. 237-251). Wiesbaden: Springer Verlag.
- Globus Fachmärkte GmbH & Co. KG. (2023). *Globus Fachmärkte GmbH & Co. KG*. Retrieved December 2023, from Globus Baumarkt: <https://www.globus-baumarkt.de/info/service/garantien/>
- Gmelch, O., & Hofmann, J. (2024). Ausgewählte technologische Grundlagen von Frontend-Services. In L. Fend, & J. Hofmann, *Digitalisierung in Industrie-*

- Handels- und Dienstleistungsunternehmen Konzepte – Lösungen – Beispiele* (pp. 3-76). Wiesbaden: Gabler.
- Goldstein, C. M. (1998). *Do it Yourself: Home Improvement in 20th-century America*. New York: Princeton Architectural Press.
- Gröppel-Klein, A. (2006). Point-of-Sale-Marketing. In J. Zentes, *Handbuch Handel* (pp. 671-692). Wiesbaden: Gabler.
- Gröschel, M., & Leuchter, S. (2020). Mobile Business und Mobile IT. In M. Lang, & M. Müller, *Von Augmented Reality bis KI - Die wichtigsten IT-Themen, die Sie für Ihr Unternehmen kennen müssen* (pp. 1-26). München: Carl Hanser Verlag GmbH Co KG.
- Gränitz, D. (2016). *Erfolgsfaktoren Financial Planning-basierter Beratungs- und Geschäftsmodelle Eine Fallstudien-basierte Analyse der Angebote im deutschen Markt*. Norderstedt: BoD - Books on Demand.
- Gray, D. E. (2004). *Doing Research in the Real World*. London: SAGE Publications.
- Griese, K.-M. (2002). *Der Einfluss von Emotionen auf die Kundenzufriedenheit Ansätze für ein erfolgreiches Consumer Relationship Marketing mit 18- bis 25-jährigen Bankkunden*. Wiesbaden: Deutscher Universitätsverlag.
- Grund, M. (1998). *Interaktionsbeziehungen im Dienstleistungsmarketing Zusammenhänge zwischen Zufriedenheit und Bindung von Kunden und Mitarbeitern*. Wiesbaden: Springer Fachmedien.
- Güldner, D. (2023). SWR. Retrieved August 2023, from SWR: <https://www.swrfernsehen.de/marktcheck/checkt-und-deckt-auf/uebersicht-marktcheck-checkt-obi-100.html>
- Günther, T., Nagel, D., Fuhrmann, S., & Graßmann, M. (2019). Automatisierte Inhaltsanalyse. 48(12), 1348-1354.
- Gustafsson, A., Johnson, M., & Roos, I. (2005). The effects of customer satisfaction, relationship commitment dimensions, and triggers on customer retention. *Journal of Marketing*, 69(4), 210-218.
- Häberle, S. G. (2008). *Das neue Lexikon der Betriebswirtschaftslehre Kompendium und Nachschlagewerk - mit 200 Schwerpunktthemen, 6.000 Stichwörtern, 2.000 Literaturhinweisen sowie 1.300 Internetadressen*. München / Wien: Oldenbourg Verlag.

- Hagberg, J., Sundström, M., & Egels-Zandén, N. (2016). The digitalization of retailing: an exploratory framework. *International Journal of Retail & Distribution Management*, 1-16.
- Hahn, S. (2018). *Female Founders in der Games- und Medienbranche Experteninterviews und Erfolgsgeschichten: Gründerinnen berichten über ihren Weg*. Berlin: Springer Verlag.
- Hakim, S., Laelawati, L. N., & Mardiana, R. (2023). The Role of Digital Skills and Technological Innovation in Improving the Performance of Small and MEdium Industries: Systematic Literature Review. In S. Saha, D. N. Rahmatika, Y. Li, K. S. Kyaw, D. Indriasih, A. Zainudin, . . . Y. Arfiani, *Proceedings of the International Conference on Global Innovation and Trends in Economics and Business (ICOBIS 2022)* (pp. 74-104). Dordrecht: Atlantis Press International - part of Springer Nature.
- Hanson, A. (2019). The Next Level of Do-It-Yourself: New advances in technology deliver higher quality with the labor savings of self-service. *Convenience Store News*, 52-54.
- Hatton-Jones, S., & Teah, M. (2015). Case analysis of the do-it-yourself industry. *Asia Pacific Journal of Marketing and Logistics*, 826-838.
- Hedderich, I., & Hecker, A. (2009). *Belastung und Bewältigung in integrativen Schulen eine empirisch-qualitative Pilotstudie bei LehrerInnen für Förderpädagogik*. Bad Heilbrunn: Verlag Julius Klinkhardt.
- Hehle, F. (2011). *Die Anwendung des Convenience-Konzepts auf den Betriebstyp Vending*. Frankfurt am Main: Peter Lang GmbH.
- Heinemann, G. (2024). *Der neue Online-Handel Geschäftsmodelle, Geschäftssysteme und Benchmarks im E-Commerce* (15. ed.). Wiesbaden: Springer Gabler.
- Heinemann, M. A. (2019). *Do it yourself! An analysis of the business opportunity of self-service technologies in the German retail industry*.
- Heiser, P. (2018). *Meilensteine der qualitativen Sozialforschung Eine Einführung entlang klassischer Studien*. Wiesbaden: Springer Fachmedien.
- HELLWEG Die Profi-Bau- & Gartenmärkte GmbH & Co. KG. (2023). *hellweg*. Retrieved December 2023, from hellweg: <https://www.hellweg.de/unternehmen/nachhaltige-produkte/>

- HELLWEG Die Profi-Bau- & Gartenmärkte GmbH & Co. KG. (2023a). *HELLWEG Die Profi-Bau- & Gartenmärkte GmbH & Co. KG*. Retrieved December 2023, from HELLWEG Die Profi-Bau- & Gartenmärkte GmbH & Co. KG: <https://www.hellweg.de/Service/Tiefpreisgarantie/>
- Hempel, D. J., & Rosenberg, L. (1976). Consumer Satisfaction: a Neglected Link? *Advances in Consumer Research*, 3, 261-262.
- Hensen, P. (2019). *Qualitätsmanagement im Gesundheitswesen Grundlagen für Studium und Praxis* (2. ed.). Wiesbaden: Springer Fachmedien.
- Herkenhoff, J. (2020). *Inklusiver Mathematikunterricht Entwicklung eines Instruments zur Planung von Mathematikunterricht in einem inklusiven Setting*. Wiesbaden: Springer Verlag.
- Hildermeier, J. (2016). *How Ideas Change Markets Social and Semantic Construction(s) of Automobility in 21st Century Europe*. Wien: LIT Verlag.
- Hill, N., & Alexander, J. (1996). *Handbook of Customer Satisfaction and Loyalty Measurement*. Burlington: Gower Publishing Company.
- Hinterhuber, H. H., Handlbauer, G., & Matzler, K. (2003). *Kundenzufriedenheit durch Kernkompetenzen Eigene Potenziale erkennen, entwickeln, umsetzen* (2. ed.). München / Wien: Gabler Verlag.
- Hitzler, R. (1986). Die Attitüde der künstlichen Dummheit. Zum Verhältnis von Soziologie und Alltag. *SOWI - Sozialwissenschaftliche Informationen*, pp. 53-59.
- Hitzler, R. (1991). Dummheit als Methode: eine dramatologische Textinterpretation. In D. Garz, & K. Kraimer, *Qualitativ-empirische Sozialforschung : Konzepte, Methoden, Analysen* (pp. 295-318). Opladen: Weststadt Verlag.
- Hitzler, R. (1991). Dummheit als Methode: eine dramatologische Textinterpretation. In D. Garz, & K. Kraimer, *Qualitativ-empirische Sozialforschung : Konzepte, Methoden, Analysen* (pp. 295-318). Opladen: Westdt. Verl.
- Hochmayr, M. (2021). *Auswirkungen digitaler Technologien auf das Kundenbeziehungsmanagement in Industriegütermärkten - Eine empirische Analyse auf Basis eines Szenario-Ansatzes*. Linz.

- Holmes, K., Greenhill, A., & McLean, R. (2014). Creating communities: the use of technology in craft and DIY communities of practice. *Journal of Systems and Information Technology*, 277-295.
- Homburg, C., & Koschate, N. (2007). Kundenzufriedenheit und Kundenbindung. In S. Albers, & A. Herrmann, *Handbuch Produktmanagement - Strategieentwicklung - Produktplanung - Organisation - Kontrolle* (3. ed., pp. 844-867). Wiesbaden: Betriebswirtschaftlicher Verlag Dr. Th. Gabler | GWV Fachverlage GmbH.
- Homburg, C., Giering, A., & Hentschel, F. (1998). Der Zusammenhang zwischen Kundenzufriedenheit und Kundenbindung. (U. M. nst. für Marktorientierte Unternehmensführung, Ed.) *Wissenschaftliche Arbeitspapiere / Institut für Marktorientierte Unternehmensführung*, W018, pp. 1-33.
- Hopf, C. (1982). Norm und Interpretation. Einige methodische und theoretische Probleme der Erhebung und Analyse subjektiver Interpretationen in qualitativen Untersuchungen. *Zeitschrift für Soziologie*, 307-329.
- HORNBACH Baumarkt AG. (2023). *Hornbach*. Retrieved December 2023, from Hornbach: <https://www.hornbach.de/nachhaltigkeit/>
- HORNBACH Baumarkt AG. (2023a). *HORNBACH*. Retrieved December 2023, from HORNBACH: <https://www.hornbach.de/aktuelles/women-work/>
- HORNBACH Baumarkt AG. (2023b). *Hornbach*. Retrieved December 2023, from HORNBACH: <https://www.hornbach.de/projekte/alle-videos-fuer-dein-projekt/>
- HORNBACH Baumarkt AG. (2023c). *HORNBACH*. Retrieved December 2023, from HORNBACH: <https://www.hornbach.de>
- HORNBACH Baumarkt AG. (2023d). *HORNBACH Baumarkt AG*. Retrieved December 2023, from HORNBACH: <https://www.hornbach.de/services/die-hornbach-dauertiefpreise/>
- Howard, J. A., & Sheth, J. N. (1969). *The theory of buyer behavior*. John Wiley & Sons.
- Hurst, A., & Tobias, J. (2011). Empowering individuals with do-it-yourself assistive technology., (pp. 11-18).

- IFH Institut für Handelsforschung GmbH. (2016). *Mittelstand 4.0 - Agentur Handel - Implementierung digitaler Technologien am Point of Sale - Ein Leitfaden für kleine und mittlere Unternehmen - Mittelstand Digital*. Köln.
- IFH Köln. (2024). IFH Köln. Retrieved December 2024, from IFH Köln: <https://www.ifhkoeln.de/das-geschaeftsmodell-baumarkt-wird-angegriffen-von-allen-seiten/>
- Immobilienmanager. (2023). *Immobilienmanager*. Retrieved December 2023, from Immobilienmanager: <https://www.immobiliengmanager.de/demografischer-wandel-beeinflusst-wohnungsmaerkte-21072023>
- Jäger, U., & Reinecke, S. (2009). Expertengespräch. In Baumgarth, E. Carsten, & E. H. Martin, *Empirische Mastertechniken Eine anwendungsorientierte Einführung für die Marketing- und Managementforschung* (pp. 29-76). Wiesbaden: Gabler Verlag.
- Jahn, M. (2017). Einzelhandel in Läden – Ein Auslaufmodell? Chancen und Risiken in einer strukturellen Umbruchphase. In R. Gläß, & B. Leukert, *Handel 4.0 Die Digitalisierung des Handels – Strategien, Technologien, Transformation* (pp. 25-50). Berlin / Heidelberg: Springer-Verlag.
- Jaspert, J. (2010). *Regionalismus im südlichen Afrika Die Handels- und Sicherheitspolitik der SADC*. Wiesbaden: Verlag für Sozialwissenschaften.
- Jasti, N. V., & Kodali, R. (2014). A literature review of empirical research methodology in lean manufacturing. *International Journal of Operations & Production Management*, 34(8), 1080-1122.
- Jick, T. D. (1979). Mixing Qualitative and Quantitative Methods: Triangulation in Action. *Administrative Science Quarterly*, 24(4), 602-611.
- Johnson, M. D. (2001). *Kundenorientierung und Markthandlung*. München / Wien: Oldenbourg Wissenschaftsverlag.
- Johnston, K., Kervin, L., & Wyeth, P. (2022). *Defining digital technology*. Retrieved from Australian Research Council - Centre of Excellence for the Digital Child: <https://www.digitalchild.org.au/blog/defining-digital-technology/>
- Jürgens, B. (2023). *"Was sich verbessert hat, ist die Kommunikation."* *Säkulares Management in einem Bischöflichen Generalvikariat*. Würzburg: Echter Verlag.

- Kargl, F., Erb, B., & Bösch, C. (2023). Defininig Privacy. In C. Montag, & H. Baumeister, *Digital Phenotyping and Mobile Sensing New Developments in Psychoinformatics* (2. ed., pp. 461-464). Cham: Springer Nature Switzerland.
- Kelle, U. (2008). *Die Integration qualitativer und quantitativer Methoden in der empirischen Sozialforschung Theoretische Grundlagen und methodologische Konzepte* (2. ed.). Wiesbaden: GWV Fachverlage GmbH.
- Kelle, U., & Kluge, S. (2010). *Vom Einzelfall zum Typus Fallvergleich und Fallkontrastierung in der qualitativen Sozialforschung*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Kempkens, S., & Kopatzki, J. (2021). *Zeit*. Retrieved December 2023, from Zeit: <https://www.zeit.de/2021/20/baumarkt-corona-lockdown-diy-heimwerker-projekte-werkzeuge#comments>
- Kergel, D. (2016). Glücklich forschend lernen. In D. Kergel, & B. Heidkamp, *Forschendes Lernen 2.0 Partizipatives Lernen zwischen Globalisierung und medialem Wandel* (pp. 179-212). Wiesbaden: Springer.
- Kerzner, H., Zeitoun, A., & Vargas , R. (2022). *Project Management Next Generation The Pillars for Organizational Excellence*. New Jersey: John Wiley & Sons.
- Kim, B. (2020). *Moving Forward with Digital Disruption: What Big Data, IoT, Synthetic Biology, AI, Blockchain, and Platform Businesses Mean to Libraries* (Vol. 56). Library Technology Report.
- Kirchmair, R. (2022). *lernen, Qualitative Forschungsmethoden Anwendungsorientiert: vom Insider aus der Marktforschung*. Berlin: Springer Verlag.
- Klemme, B., & Siegmann, G. (2015). Vom Anfänger zum Experten - Entwicklung von Clinical-Reasoning-Fähigkeiten. In B. Klemme, & G. Siegmann, *Clinical Reasoning - Therapeutische Denkprozesse lernen* (2. ed., pp. 75-79). Stuttgart: Thieme Verlag.
- Knobel, M., & Lankshear, C. (2010). *DIY Media - Creating, Sharing and Learning with New Technologies*. New York: Peter Lang.
- Knop, R. (2007). *Erfolgsfaktoren strategischer Netzwerke kleiner und mittlerer Unternehmen*. Wiesbaden: Gabler / GWV Fachverlage.
- Knoppe, M. (2018). Kundenerlebnis und digitale Innovationen als Treiber erfolgreicher Geschäftsmodelle. In M. Knoppe, & M. Wild, *Digitalisierung*

- im Handel Geschäftsmodelle, Trends und Best Practice* (pp. 1-28). Berlin: Springer-Verlag GmbH Deutschland, ein Teil von Springer Nature.
- Köchert, J., Ta, T., & Wojtal, P. (2016). *Geschlechtsspezifische Prävention des Diabetes Typ-2 Chancen einer Individualisierten Medizin*. Wiesbaden: Springer Verlag.
- Kolf, F. (2022, July 5). *Schnelle Lieferung aus dem Baumarkt – So will Obi sein Geschäft modernisieren*. Retrieved December 2023, from Handelsblatt: <https://www.handelsblatt.com/unternehmen/handel-konsumgueter/einzelhandel-schnelle-lieferung-aus-dem-baumarkt-so-will-obi-sein-geschaeft-modernisieren/28466432.html>
- Kolf, F., & Scheppe, M. (2023). *Handelsblatt*. Retrieved December 2023, from Handelsblatt: <https://www.handelsblatt.com/unternehmen/handel-konsumgueter/serie-gruener-umbruch-die-hohen-energiekosten-machenden-klimaschutz-fuer-den-handel-zur-ueberlebensfrage/28861918.html>
- Kotler P., Kartajaya, H., Setiawan, I. (2024). *Marketing 6.0 Die Zukunft ist immersiv*. Frankfurt am Main: Campus Verlag GmbH
- Kotthaus, J. (2020). *FAQ Methoden der empirischen Sozialforschung für die Soziale Arbeit und andere Sozialberufe*. Leverkusen-Opladen: Barbara Budrich GmbH.
- Krause, F. (2023). *Blockchainwelt*. Retrieved December 2024, from Blockchainwelt: <https://blockchainwelt.de/breitling-setzt-auf-blockchain-zertifikate-im-luxusuhrenhandel/>
- Kreutzer, R. T. (2012). *Praxisorientiertes Online-Marketing Konzepte – Instrumente – Checklisten*. Wiesbaden: Gabler Verlag | Springer Fachmedien.
- Krüger, W. (2011). Organisation. In F. X. Bea, & M. Schweitzer, *Allgemeine Betriebswirtschaftslehre 2 Bd. 2: Führung* (pp. 178-269). Konstanz: UVK Verlagsgesellschaft mbH.
- Kuckartz, U. (2018). *Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung* (4. ed.). Weinheim: Beltz Juventa.
- Kuckartz, U., & Rädiker, S. (2023). *Qualitative Content Analysis Methods, Practice and Software* (2. ed.). New York: SAGE Publications.
- Kurze, K. (2018). *Die Etablierung der Energiepolitik für Europa Policy-Making in der EU aus konstruktivistisch-diskursiver Perspektive*. Wiesbaden: Springer Verlag.

- Lambernd, J. (2022). *NDR*. Retrieved December 2023, from NDR: <https://www.ndr.de/ratgeber/verbraucher/Einrichtungsideen-Platz-schaffen-in-kleinen-Wohnungen,wohnraum172.html>
- Lamnek, S. (1995). *Qualitative Sozialforschung*. Weinheim: Beltz.
- Lamnek, S., & Krell, C. (2016). *Qualitative Sozialforschung* (6. ed.). Weinheim: Beltz Verlag.
- LaTour, S. A., & Peat, N. (1979). Conceptual and Methodological Issues in Consumer Satisfaction Research. *Advances in Consumer Research*, 6(1), 431-437.
- Laylany, L. (2023) *ZDF*. Retrieved December 2024, from ZDF: <https://www.zdf.de/nachrichten/ratgeber/fast-food-restaurant-essen-bestellen-touchscreen-100.html>
- Lebensmittel Zeitung. (2024). *Lebensmittel Zeitung*. Retrieved December 2024, from https://www.wiso-net.de/dosearch?_searchOnlyInAbstractField=&_searchOnlyInTitleField=&searchOnlyInTitleField=on&explicitSearch=true&q=Amazon+schwenkt+bei+Kassenlos-Strategie+um&x=114&y=10&dbShortcut=%3A3%3AALLEQUELLEN&searchMask=5461&TI%2CUT%2CDZ%2CBT%2COT%2CSL=&NN%2CAU%2CMM%2CZ2=&CO%2CC2%2CTA%2CKA%2CVA%2CZ1=&CT%2CZ4%2CKW=&BR%2CGW%2CN1%2CN2%2CNC%2CND%2CSC%2CWZ%2CZ5%2CAI%2CBC%2CKN%2CTN%2CVN%2CK0%2CB4%2CNW%2CVH=&Z3%2CCN%2CCE%2CKC%2CTC%2CVC=&SPRACHE-GENERATED=&DT_from=&DT_to=&timeFilterType=selected&timeFilter=NONE#LMZN__LMZNET%20176974
- Lebensmittel Zeitung. (2023). *Lebensmittel Zeitung*. Retrieved September 2023, from https://www.wiso-net.de/dosearch?_searchOnlyInAbstractField=&_searchOnlyInTitleField=&explicitSearch=true&q=Obi+streicht+das+Sortiment+zusammen&x=54&y=8&dbShortcut=%3A3%3AALLEQUELLEN&searchMask=5461&TI%2CUT%2CDZ%2CBT%2COT%2CSL=&NN%2CAU%2CMM%2CZ2=&CO%2CC2%2CTA%2CKA%2CVA%2CZ1=&CT%2CZ4%2CKW=&BR%2CGW%2CN1%2CN2%2CNC%2CND%2CSC%2CWZ%2CZ5%2CAI%2CBC%2CKN%2CTN%2CVN%2CK0%2CB4%2CNW%2CVH=&Z3%2CCN%2CCE%2CKC%2CTC%2CVC=&SPRACHE-GENERATED=&DT_from=&DT_to=&timeFilterType=selected&timeFilter=NONE#LMZN__LMZNET%20176974

- Lebensmittel Zeitung. (2018). *Staista*. Retrieved December 2023, from Statista - Umfrage zur Individualisierung und Personalisierung von Produkten in Deutschland im Jahr 2017: <https://de.statista.com/statistik/daten/studie/961243/umfrage/einstellung-zu-individuellen-und-persoennlichen-produktvarianten-in-deutschland/>
- Leitherer, J. (2024). *Springer Fachmedien Wiesbaden GmbH*. Retrieved December 2024, from Springer Fachmedien Wiesbaden GmbH: <https://www.springerprofessional.de/kundenservice/chatbots/chatbots-kommen-im-kundenservice-gut-an/26685448>
- Lewis-Beck, M., Bryman, A., & Liao, T. (2004). *The SAGE Encyclopedia of Social Science Research Methods*. California: SAGE Publications.
- Lidl. (2023). *Lidl*. Retrieved August 2023, from <https://jobs.lidl.de/lidl-als-arbeitgeber/unsere-geschichte>
- Liebold, R., & Trinczek, R. (2009). Experteninterview. In S. Kühl, P. Strodtholz, & A. Taffertshofer, *Handbuch Methoden der Organisationsforschung Quantitative und Qualitative Methoden* (pp. 32-56). Wiesbaden: Verlag für Sozialwissenschaften.
- Lindemann, F. (2019). Digitale Vernetzung und (Cyber-) Sicherheit – unlösbarer Widerspruch oder zwei Seiten einer Medaille? Für ein neues Zusammenspiel von Staat, Wirtschaft und Gesellschaft. In C. Vogt, C. Endreß, & P. Peters, *Wirtschaftsschutz in der Praxis Positionen zur Unternehmenssicherheit und Kriminalprävention in der Wirtschaft* (pp. 87-113). Wiesbaden: Springer Fachmedien Wiesbaden GmbH.
- Lippold, D. (2024). *Marketing für Unternehmensberatungen B2B-Marketing im digitalen Wandel*. Berlin: Walter de Gruyter GmbH
- Locke, E. A. (1967). Relationship of success and expectation to affect on goal seeking tasks. *Journal of Personality and Social Psychology*, 7(2), 125–134.
- Loebbecke, C. (2006). Digitalisierung – Technologien und Unternehmensstrategien. In C. Scholz, *Handbuch Medienmanagement* (pp. 359-373). Berlin / Heidelberg: Springer-Verlag.
- Löffler, S. (2020). *Organisationale Lernprozesse zur Bindung von Auszubildenden Eine Interviewstudie zum organisationalen Lernen zur Verringerung von*

- Ausbildungsabbrüchen in der Gesundheits- und Krankenpflege*. Norderstedt: BoD - Books on Demand.
- Logemann, J., & Kreis, R. (2022). *Konsumgeschichte*. Berlin: Walter de Gruyter.
- Low, S. M., Taplin, D., & Scheld, S. (2005). *Rethinking Urban Parks Public Space and Cultural Diversity*. Austin: University of Texas Press.
- LOWE'S. (2023). LOWES. Retrieved September 2023, from <https://corporate.lowes.com/who-we-are/our-history>
- Lucks, K. (2020). *Der Wettlauf um die Digitalisierung Potenziale und Hürden in Industrie, Gesellschaft und Verwaltung*. Stuttgart: Schäffer-Poeschel Verlag für Wirtschaft - Steuern - Recht GmbH.
- Madondo, S. M. (2021). *Data Analysis and Methods of Qualitative Research Emerging Research and Opportunities*. Zimbabwe: IGI Global.
- Magerhans, A. (2015). *Marktforschung Eine praxisorientierte Einführung*. Wiesbaden: Springer Fachmedien.
- Majka, M. Understanding Customer Satisfaction Score.
- Marr, B. (2021). *Extended Reality in Practice: 100+ Amazing Ways Virtual, Augmented and Mixed Reality Are Changing Business and Society*. West Sussex: John Wiley & Sons Ltd.
- Maschke, S., & Stecher, L. (2012). Strategien einer integrativen Sozialforschung am Beispiel der beruflichen Entscheidungsfindung. In K. Schittenhelm, *Qualitative Bildungs- und Arbeitsmarktforschung Grundlagen, Perspektiven, Methoden* (pp. 379-406). Wiesbaden: Springer Verlag.
- Massenbach, F. von. (2009). *Automobile Erlebniswelten als Kommunikationsmittel - Eine verhaltenswissenschaftliche Analyse am Beispiel des Premiummarktes in Deutschland und Singapur*. Wiesbaden: VS Verlag für Sozialwissenschaften I GWV Fachverlage GmbH
- MAXQDA. (2023). MAXQDA. Retrieved December 2023, from MAXQDA: https://www.maxqda.com/de/software-inhaltsanalyse?gad_source=1&gclid=EAIaIQobChMIrKXLiBsggMVXZKD Bx07MATqEAAYASAAEgKEmpD_BwE#
- Mayring, P. (1985). Qualitative Inhaltsanalyse. *Qualitative Forschung in der Psychologie : Grundfragen, Verfahrensweisen, Anwendungsfelder*, 187-211.

- Mayring, P. (2001). Kombination und Integration qualitativer und quantitativer Analyse. *Forum: Qualitative Social Research*, 2(1).
- Mayring, P. (2019). Qualitative Inhaltsanalyse - Abgrenzungen, Spielarten, Weiterentwicklungen. *Forum: Qualitative Social Research*, 20(3), 1-15.
- Mayring, P. (2022). *Qualitative Inhaltsanalyse - Grundlagen und Techniken* (13. ed.). Weinheim: Beltz.
- Mayring, P. (2022a). *Qualitative Content Analysis A Step-by-Step Guide*. London: SAGE Publications Ltd.
- Mayring, P., & Fenzl, T. (2019). Qualitative Inhaltsanalyse. In N. Baur, & J. Blasius, *Handbuch Methoden der empirischen Sozialforschung* (pp. 633–648). Wiesbaden: Springer Verlag.
- McGovern, M. (2023). *The Drum*. Retrieved December 2024, from The Drum: <https://www.thedrum.com/opinion/2023/11/13/the-future-the-fitting-room-4-brands-innovating-behind-the-curtain>
- McKellar, S., & Sparke, P. (2004). *Interior Design and Identity*. Manchester: Manchester University Press.
- Medrano, N-V., Soler-Dominguez, J. L., Pons, P. (2024). Mixed Reality for a collective and adaptive mental health metaverse. In Greenbaum, D., Nazanin, A., *Mental health, social media, and the metaverse*. Lausanne: Frontiers Media SA.
- Meffert, H., Bruhn, M., & Hadwich, K. (2015). *Dienstleistungsmarketing Grundlagen - Konzepte - Methoden* (8. ed.). Wiesbaden: Springer Fachmedien.
- Meinefeld, W. (2019). *Realität und Konstruktion Erkenntnistheoretische Grundlagen einer Methodologie der empirischen Sozialforschung*. Wiesbaden: Springer Verlag.
- Meuser, M., & Nagel, U. (1991). ExpertInneninterviews - vielfach erprobt, wenig bedacht: ein Beitrag zur qualitativen Methodendiskussion. In D. Garz, & K. Kraimer, *Qualitativ-empirische Sozialforschung : Konzepte, Methoden, Analysen* (pp. 441-471). Opladen: Westdeutscher Verlag.
- Meyer, A. (2010). *Kundenbindung im gewerblichen Automobilmarkt Eine empirische Kausalanalyse*. Wiesbaden: Gabler Verlag I Springer Fachmedien.

- Meyer, H., & Reher, H.-J. (2016). *Projektmanagement Von der Definition über die Projektplanung zum erfolgreichen Abschluss* (2. ed.). Wiesbaden: Springer Fachmedien Wiesbaden GmbH, ein Teil von Springer Nature.
- Mieg, H. A., & Brunner, B. (2001). Experteninterviews eine Einführung und Anleitung. *Working Paper / MUB, Professur für Mensch-Umwelt-Beziehungen*, 6.
- Misoch, S. (2019). *Qualitative Interviews* (2. ed.). Berlin: Walter de Gruyter.
- Morton, J. (2022). *Mugglehead Magazine*. Retrieved December 2024, from Mugglehead Magazine: <https://mugglehead.com/de/starbucks-boards-the-web3-tech-train-with-nft-based-loyalty-program/>
- Mundt, J.-K. (2008). *Kulturkooperationen im Ruhrgebiet: Ziele - Projekte - Erträge Dissertation über die Formen der Zusammenarbeit von öffentlicher Hand und Wirtschaft bei kulturellen Projekten im Ruhrgebiet*. Norderstedt: BoD – Books on Demand.
- Müller, B. (2009). *Wissen managen in formal organisierten Sozialsystemen Der Einfluss von Erwartungsstrukturen auf die Wissensretention aus systemtheoretischer Perspektive*. Wiesbaden: Gabler.
- Müller, L., & Werner, M. (2014). Hornbach. In P. Siegfried, *Onlinehandel – Band 1 - 19 erfolgreiche Unternehmenskonzepte* (pp. 407-428). München: AVM - Akademische Verlagsgemeinschaft München.
- Müller, S. (2022). *Kompetenzen von Lehrenden im Studienfach Elementare Musikpädagogik*. Waxmann Verlag.
- Nerdinger, F. W., Neumann, C., & Curth, S. (2015). Kundenzufriedenheit und Kundenbindung. In K. Moser, *Wirtschaftspsychologie* (pp. 119-138). Berlin / Heidelberg: Springer Verlag.
- Niederberger, M., & Renn, O. (2018). *Das Gruppendelphi-Verfahren Vom Konzept bis zur Anwendung*. Wiesbaden: Springer Fachmedien.
- Nowroth, M. (2024). *Rheinische Post*. Retrieved December 2024, from https://rp-online.de/nrw/staedte/duesseldorf/aldi-duesseldorf-selbstscan-kassen-veraergern-kunden-v1_aid-118917921#:~:text=Aldi%20verärger%20Düsseldorfer%20Kunden%20,,Keinen,und%20stört%20auch%20die%20Mitarbeiter.

- OBI GmbH & Co. Deutschland KG. (2023). *obi*. Retrieved December 2023, from obi: https://www.obi.de/corporate/presse/pm_dnp
- OBI GmbH & Co. Deutschland KG. (2023a). *OBI*. Retrieved December 2023, from <https://www.obi.de/baumarkt/services/markt-services/zuschnitt-service/>
- Oehlrich, M. (2019). *Wissenschaftliches Arbeiten und Schreiben: Schritt für Schritt zur Bachelor- und Master-Thesis in den Wirtschaftswissenschaften* (2. ed.). Wiesbaden: Springer Gabler
- Oliver, R. L. (1997). *Satisfaction: A Behavioral Perspective on the Consumer*. Boston.
- Oliver, R. L. (2015). *Satisfaction: A Behavioral Perspective on the Consumer* (2. ed.). Oxon: Taylor and Francis.
- Omeni, E. (2020). *Violence Exposure and Transitional Coping Strategies Among International Students in Poland*. Wiesbaden: Springer Fachmedien Wiesbaden.
- Oswald, G., & Krcmar, H. (2018). In G. Oswald, & H. Krcmar, *Digitale Transformation Fallbeispiele und Branchenanalysen*. Wiesbaden: Springer Gabler Verlag.
- Parviainen, P., Kääriäinen, J., Tihinen, M., & Teppola, S. (2017). Tackling the digitalization challenge: how to benefit from digitalization in practice. *International Journal of Information Systems and Project Management*, 5(1), 63-77.
- Perplexity version 2.37.0, Perplexity: <https://www.perplexity.ai/>. Perplexity was questioned about the research topic, the results were compared with personal research. Reformulating draft texts to improve readability
- Peters, S. (2022). Consumer Debt in Germany: Status and Development. *Wirtschaftsdienst - Zeitschrift für Wirtschaftspolitik*, 102(3), 162-165. Retrieved from Wirtschaftsdienst - Zeitschrift für Wirtschaftspolitik: <https://www.wirtschaftsdienst.eu/inhalt/jahr/2022/heft/3/beitrag/verschuldung-von-verbraucher-innen-in-deutschland-stand-und-entwicklung.html#:~:text=Die%20Ver%C3%B6ffentlichung%20der%20aktuellen%20Zahlen,Wirtschaftsforschung%2C%202021%2C%207>.
- Pfaff-Rüdiger, S. (2016). Qualitative Online-Befragungen in der Kommunikationswissenschaft. In S. Averbek-Lietz, & M. Meyen,

- Handbuch nicht standardisierte Methoden in der Kommunikationswissenschaft* (pp. 191-208). Wiesbaden: Springer Fachmedien.
- Pianos, T., & Krüger, N. (2014). *Erfolgreich recherchieren - Wirtschaftswissenschaften*. Berlin: Walter de Gruyter.
- Pieper, K. (2006). *Regionalpolitik in Ungarn und Polen Zwei Staaten im EU-Beitrittsprozess*. Wiesbaden: Verlag für Sozialwissenschaften.
- Porsche AG, Dr. Ing. h.c. F.. (2024). *Technik anschaulich präsentieren: so Porsche Mixed-Reality-Anwendungen*. Retrieved December 2024, from newsroom.porsche.com:
<https://newsroom.porsche.com/de/2024/innovation/porsche-mixed-reality-workshop-augmented-reality-34997.html>
- Proschofsky, A. (2024). *Der Standard*. Retrieved December 2024, from Der Standard:
<https://www.derstandard.de/story/3000000214248/just-walk-out-amazon-dreht-sein-einkaufen-unter-totalueberwachung-ab>
- Pucko, W. A. (2010). *Kundenzufriedenheit in der Werbevermarktung durch Online-Werbebörsen Eine explorative Analyse aus Sicht der Inthalteanbieter*. Hamburg: Diplomica Verlag.
- Pursch, A. (2021). Handel 4.0: Wettbewerbsvorteile im Rahmen der digitalen Transformation für stationäre Handelsunternehmen. In P. Siegfried, *Handel 4.0 Die Digitalisierung des Handels Strategien und Konzepte 1* (pp. 197-230). Norderstedt: BoD - Books on Demand.
- Röderstein, R. (2009). *Erfolgsfaktoren im Supply Chain Management der DIY-Branche*. Wiesbaden: Gabler | GWV Fachverlage GmbH.
- Raithel, J. (2008). *Quantitative Forschung Ein Praxiskurs* (2. ed.). Wiesbaden: VS Verlag für Sozialwissenschaften.
- Rana, J., Gaur, L., Singh, G., Awan, U. and Rasheed, M.I. (2022), "Reinforcing customer journey through artificial intelligence: a review and research agenda", *International Journal of Emerging Markets*, Vol. 17 No. 7, pp. 1738-1758. <https://doi.org/10.1108/IJOEM-08-2021-1214>
- Rausch, J. (2009). *Schule führen im Spannungsfeld von Stabilisierung und Veränderung Zur Begründung eines Managementmodells an evangelischen Schulen*. Wiesbaden: Verlag für Sozialwissenschaften.

- Rauschert, P. (2014). *Intercultural Service Learning im Englischunterricht Ein Modell zur Förderung interkultureller Kompetenz auf der Basis journalistischen Schreibens*. Münster: Waxmann Verlag.
- Rauter, R. (2013). *Interorganisationaler Wissenstransfer Zusammenarbeit zwischen Forschungseinrichtungen und KMU*. Wiesbaden: Springer Fachmedien Wiesbaden.
- Rehme, F. (2022). *Zukunft des Einkaufens*. Retrieved December 2023, from Zukunft des Einkaufens: <https://zukunfdeeseinkaufens.de/dyi-4-0/>
- Reichertz, J. (2014). Die Konjunktur der qualitativen Sozialforschung und Konjunkturen innerhalb der qualitativen Sozialforschung. In G. Mey, & K. Mruck, *Qualitative Forschung - Analysen und Diskussionen – 10 Jahre Berliner Methodentreffen* (pp. 87-102). Wiesbaden: Springer Fachmedien.
- Reichertz, J., & Englert, C. (2011). *Einführung in die qualitative Videoanalyse: Eine hermeneutisch-wissenssoziologische Fallanalyse*. Wiesbaden: Verlag für Sozialwissenschaften.
- Reinders, H. (2012). *Qualitative Interviews mit Jugendlichen führen Ein Leitfaden*. München: Oldenbourg Wissenschaftsverlag.
- Reis, J. C., Amorim, M., Melao, N., & Cohen, Y. (2020). Digitalization: A Literature Review and Research Agenda. In A. Z., L. B., & G. D., *Proceedings on 25th International Joint Conference on Industrial Engineering and Operations Management – IJCIEOM. IJCIEOM 2019. Lecture Notes on Multidisciplinary Industrial Engineering* (pp. 443-456). Cham: Springer.
- Reith, C. (2007). *Convenience im Handel*. Frankfurt am Main: Lang Verlag.
- Renner, K.-H., Heydasch, T., & Ströhle, G. (2012). *Forschungsmethoden der Psychologie Von der Fragestellung zur Präsentation*. Wiesbaden: Springer Fachmedien.
- REWE Markt GmbH. (2024). *REWE Media Center*. Retrieved December 2024, from REWE Media Center: <https://mediacenter.rewe.de/regionen/nord/pressemitteilungen/eroeffnung-pick-and-go>

- Richter, U. (2023). *Handelsblatt*. Retrieved December 2024, from Handelsblatt.com: <https://www.handelsblatt.com/adv/firmen/digitalisierung-im-einzelhandel.html>
- Rieß, M. (2018). *Zum Einfluss digitaler Werkzeuge auf die Konstruktion mathematischen Wissens*. Wiesbaden : Springer Verlag.
- Rock, S. (2022). Digitalisierung und Erfolg. In M. Knoppe, S. Rock, & M. Wild, *Der zukunftsfähige Handel - Neue online und offline Konzepte sowie digitale und KI-basierte Lösungen* (pp. 47-65). Wiesbaden: Springer Gabler.
- Rode, D. (2022). Digital Technologies Within the DIY Store: A Systematic Literature Review. *Business Ethics and Leadership*, 6(2), pp. 116-126.
- Rode, D., Stammen-Hegener, C., González Gallego, N. (2021). Digital Touchpoints at the POS. In: Naskrent, J., Stumpf, M., Westphal, J. (eds) *Marketing & Innovation 2021* (pp. 23-46). Wiesbaden: Springer Gabler.
- Rössler, P., Wirth, Werner (2001). *Inhaltsanalyse im Worts Wide Web. Probleme und Perspektiven*. In: Wirth, W; Lauf, E. *Inhaltsanalyse: Perspektiven, Probleme, Potentiale*. Köln: Herbert von Halem Verlag, 280-302.
- Rothfuß, E., & Dörfler, T. (2012). Prolog – Raumbezogene Qualitative Sozialforschung. Konzeptionelle Überlegungen zwischen Geographie und Soziologie. In E. Rothfuß, & T. Dörfler, *Raumbezogene qualitative Sozialforschung* (pp. 7-31). Wiesbaden: Springer Fachmedien.
- Rowley, J., & Slack, F. (2003). Kiosks in retailing: the quiet revolution. *International Journal of Retail & Distribution Management*, 31(6), 329-339.
- Rüf, F., Böcking, S., Kummer, S. (2015). *Automatisierte Inhaltsanalysen im Internet: Möglichkeiten und Grenzen am Beispiel des Sindbad-Knowledge-Generators*. In M. Welker, C. Wünsch. *Die Online-Inhaltsanalyse: Forschungsobjekt Internet* (pp. 313-340). Köln: Herbert von Halem Verlag.
- Rusch, M., Schöggel, J.-P., & Baumgartner, R. (2022). Application of digital technologies for sustainable product management in a circular economy: A review. *Business Strategy and the Environment*, 32(3), 1159-1174.
- Santos, S., Gonçalves, H.M. (2021). Touchpoints and Channels: Classifications, Characteristics, and Issues for Future Research. In: Rocha, Á., Reis, J.L., Peter, M.K., Cayolla, R., Loureiro, S., Bogdanović, Z. (eds) *Marketing and*

- Smart Technologies. *Smart Innovation, Systems and Technologies*, vol 205. Springer, Singapore. https://doi.org/10.1007/978-981-33-4183-8_25
- Sapsford, R., & Jupp, V. (2006). *Data Collection and Analysis* (2. ed.). London: SAGE Publications.
- Scheiermann, G. (2022). *Integrationsperspektive duales System? Gelingensbedingungen für die Eingliederung Geflüchteter in die betriebliche Ausbildung*. Bielefeld: wbv Publikationen.
- Schmalzried, D., Hurst, M., Wentzien, M., & Gräser, M. (2023). Analyse der Rolle Künstlicher Intelligenz für eine menschenzentrierte Industrie 5.0. *HMD Praxis der Wirtschaftsinformatik*, 1143-1155.
- Schmidt, D. (2017). Serviceleistungen im DIY-Kernmarkt am Beispiel der HORNBACH Baumarkt AG. In P. Siegfried (Ed.), *Dienstleistungsmanagement am Beispiel erfolgreicher Unternehmenskonzepte - Fallstudien mit Arbeitsfragen: Emerson, Lufthansa, DHL, Shell, Eckes-Granini, Techniker Krankenkasse, Hornbach, BMW, TNT, Mercedes* (pp. 153-180). München: Akademische Verlagsgemeinschaft München.
- Schneider, A. (2016). *Forschungsperspektiven in der Sozialen Arbeit* (2. ed.). Schwalbach: Wochenschau Verlag.
- Schroder, J. (2018). *Fashion United*. Retrieved December 2024, from Fashion United: <https://fashionunited.de/nachrichten/einzelhandel/roboter-und-erweiterte-realitaet-zara-eroeffnet-futuristischen-flagshipstore-in-london/2018052125385>
- Science Museum Group. (2020). *Science Museum*. Retrieved September 2023, from <https://www.sciencemuseum.org.uk/objects-and-stories/everyday-wonders/brief-history-diy>
- Seeborn, J. (1999). *Gabler Kompakt Lexikon Werbepaxis*. Wiesbaden: Betriebswirtschaftlicher Verlag Dr. Th. Gabler GmbH.
- Senger, A. (2021). *Determinanten und regulatorische Dimensionen der Berichterstattungsqualität immaterieller Werte Theoretische Fundierung und empirische Evidenz für deutsche, börsennotierte Familienunternehmen*. Göttingen: Cuvillier Verlag.

- Sentinel Haus Institut GmbH. (2023). *Sentinel Haus Institut GmbH*. Retrieved December 2023, from Sentinel Haus Institut GmbH: <https://www.sentinel-haus.de/de>
- Sethi, I. K. (2001). Data Mining: An Introduction. In D. Braha, *Data Mining for Design and Manufacturing Methods and Applications*. Dordrecht: Springer Science and Business Media.
- Sharma, R. N., & Sharma, R. (2006). *Experimental Psychology*. New Delhi: Atlantic Publishers & Distributors.
- Silberer, G. A. (2010). Digital Signage im stationären Handel – Das Anwendungs- und Wirkungspotenzial eines neuen POS-Mediums. *der markt - Journal für Marketing*, 49, 3-16.
- Silva, S.C., Silva, F.P. and Dias, J.C. (2024), Exploring omnichannel strategies: a path to improve customer experiences, *International Journal of Retail & Distribution Management*, Vol. 52 No. 1, pp. 62-88. <https://doi.org/10.1108/IJRDM-03-2023-0198>
- Skala-Gast, D. (2012). Zusammenhang zwischen Kundenzufriedenheit und Kundenloyalität Eine empirische Analyse am Beispiel der deutschen Automobilindustrie. In C. Burmann, & M. Kirchgeorg. Wiesbaden: Springer Gabler.
- Smiles, S. (1859). *Self Help; With illustrations of character and conduct*. Ticknor and Fields.
- Smith, S. M., & Albaum, G. S. (2005). *Fundamentals of Marketing Research*. Thousand Oaks: SAGE Publications.
- Soeffner, H.-G., & Hitzler, R. (1994). Qualitatives Vorgehen - "Interpretation". In T. Herrmann, & W. Tack, *Methodologische Grundlagen der Psychologie* (pp. 98-136). Göttingen: Hogrefe.
- Spreer, P. (2013). Die Digitalisierung des PoS. Ein Leitfaden zur Implementierung innovativer In-Store-Medien. *Marketing Review St Gallen*, 30(5), 48-59.
- Spreer, P. (2013a). *Digitales In-Store-Marketing: Erkenntnisse zu Akzeptanz und Wirkung*. Göttingen.
- Statistisches Bundesamt (Destatis). (2023). *Statistisches Bundesamt (Destatis)*. Retrieved December 2023, from Statistisches Bundesamt (Destatis):

- <https://www.destatis.de/DE/Themen/Querschnitt/Demografischer-Wandel/demografie-mitten-im-wandel.html>
- Statistisches Bundesamt (Destatis). (2023a). *Statistisches Bundesamt (Destatis)*. Retrieved December 2023, from Statistisches Bundesamt (Destatis): <https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsstand/Tabellen/bevoelkerung-altersgruppen-deutschland.html>
- Statistisches Bundesamt. (2023). Höhe der Konsumausgaben privater Haushalte in Deutschland von 1991 bis 2022 (in Milliarden Euro). In Statista.
- Steffen, A., & Doppler, S. (2020). *Einführung in die Qualitative Marktforschung Design – Datengewinnung – Datenauswertung*. Wiesbaden: Gabler Verlag.
- Steinke, I. (2009). Die Güte qualitativer Marktforschung. In R. Buber, & H. H. Holzmüller, *Qualitative Marktforschung Konzepte – Methoden – Analysen* (2. ed., pp. 261-284). Wiesbaden: Springer Verlag.
- Stock-Homburg, R. (2012). *Der Zusammenhang zwischen Mitarbeiter- und Kundenzufriedenheit: Direkte, indirekte und moderierende Effekte* (5. ed.). Wiesbaden: Gabler Verlag | Springer Fachmedien Wiesbaden.
- Strasser, J. (2006). *Erfahrung und Wissen in der Beratung theoretische und empirische Analysen zum Entstehen professionellen Wissens in der Erziehungsberatung*. Göttingen: Cuvillier Verlag Göttingen.
- Strübing, J. (2018). *Qualitative Sozialforschung Eine komprimierte Einführung*. Berlin: Walter de Gruyter Verlag.
- Strüker, J. (2013). *Individualisierung im stationären Einzelhandel Ökonomische Analyse elektronischer Formen der Kundenkommunikation*. Wiesbaden: Deutscher Universitätsverlag.
- Su, S., Sheu, S-H., Wang, K-H. (2023). Does Self-Checkout Service Really Improve Customer Service in Systems Subject to Congestion? – An Empirical Investigation in the Retail Industry. *Queueing Models and Service Management*, 6(2), pp. 59-76.
- Sukowski, N. (2012). *Führen unter Unsicherheit Eine empirisch fundierte Typologie der Identitätsarbeit von Führungskräften*. Springer Fachmedien: Wiesbaden.

- Sumy State University. (2022). *Business Ethics and Leadership (BEL)*. Sumy: Published by Sumy State University.
- Tachmatzidou, S. (2019). *Folding furniture: From design to production*. Thessaloniki.
- Tarnowska, K. A., Ras, Z., Daniel, L., & Fowler, D. (2018). Visual Analysis of Relevant Features in Customer Loyalty Improvement Recommendation. In B. Zielosko, L. Jain, & U. Stańczyk, *Advances in Feature Selection for Data and Pattern Recognition* (pp. 269-294). Cham: Springer International Publishing.
- Tausendpfund, M. (2018). *Quantitative Methoden in der Politikwissenschaft Eine Einführung*. Wiesbaden: Springer Verlag.
- Technikum Wien GmbH. (2024). *Blockchain- Was ist das?*. Retrieved December 2024 from Technikum Wien GmbH: [https://academy.technikum-wien.at/ratgeber/blockchain-was-ist-das/#:~:text=Blockchains%20basieren%20auf%20der%20Distributed%2DLedger%2DTechnologie%20\(DLT\),Informationen%20dezentral%20im%20Netzwerk%20gespeichert.](https://academy.technikum-wien.at/ratgeber/blockchain-was-ist-das/#:~:text=Blockchains%20basieren%20auf%20der%20Distributed%2DLedger%2DTechnologie%20(DLT),Informationen%20dezentral%20im%20Netzwerk%20gespeichert.)
- Textilwirtschaft (2024). *Wie Händler-Apps das Einkaufsverhalten beeinflussen*. Retrieved December 2024 from Textilwirtschaft: <https://www.textilwirtschaft.de/business/news/studie-wie-haendler-apps-das-einkaufsverhalten-beeinflussen-246830>
- Thiering, D. (2006). *Strategische Marketingkonzeption zur Gewinnung neuer Kunden im deutschen Mittelstand Am Beispiel der Netzwerk Mittelstand GmbH*. Hamburg: Diplomica Verlag.
- Timm, M., Kortum, C. (2023) Kriterien der Einkaufsstättenwahl in der DIY-Branche. Eine empirische Untersuchung zum Konsumentenverhalten in der Baumarktbranche. Norderstedt: BoD Books on Demand.
- toom Baumarkt GmbH. (2022). *toom Baumarkt GmbH*. Retrieved December 2023, from toom Baumarkt GmbH: <https://blog.toom.de/engagement/umweltengagement/umweltfreundliche-verpackungen-das-steckt-dahinter>
- toom Baumarkt GmbH. (2023). *toom*. Retrieved December 2023, from toom: <https://toom.de/ueber-toom/nachhaltigkeit/>

- toom Baumarkt GmbH. (2023a). *toom*. Retrieved December 2023, from toom: <https://toom.de/service/videoberatung/>
- Träger, J. (2009). *Familie im Umbruch Quantitative und qualitative Befunde zur Wahl von Familienmodellen*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Turban, E., Pollard, C., & Wood, G. (2021). *Information Technology for Management: Driving Digital Transformation to Increase Local and Global Performance, Growth and Sustainability*. John Wiley & Sons, Inc.
- Ulaywi, R. K. (2022). DIY Learning. *Imam Jaafar Al-Sadiq University journal of Human and social sciences*, 2(3), 5-32.
- Universität Basel. (2024). *Leitfaden «Aus KI zitieren»*. Retrieved January 2025, from Universität Basel: https://bildungswissenschaften.unibas.ch/fileadmin/user_upload/bildungswissenschaften/02_Master/Dokumente/Leitfaden-KI-zitieren_Apr-2023_publiziert.pdf
- Universitätsbibliothek Mainz. (2024). *KI zitieren*. Retrieved January 2025, from Universitätsbibliothek Mainz: https://www.akin.uni-mainz.de/files/2024/06/S8_KI-zitieren.pdf
- UPM. (2023). <https://www.f-mp.de/res/expertenteam-papier/Papierherstellung.pdf>. Retrieved December 2023, from <https://www.f-mp.de/res/expertenteam-papier/Papierherstellung.pdf>
- Verdict Research. (2004). *Who's Who in Retailing*. London: Kogan Page.
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The journal of strategic information systems*, 28(2), pp. 118-144.
- Van de Sanden, S., Willems, K., Poncin, I., Brengman, M. (2020). Digital Signage in the Store Atmosphere: Balancing Gains and Pains. In E. Pantano, *Retail Futures: The Good, the Bad and the Ugly of the Digital Transformation* (pp. 53-70). Bingley: Emerald Publishing Limited.
- Vartanian, A. (2020). *PROXR2025 The Future of VR for Professional Use*. Retrieved from: Techviz: <https://blog.techviz.net/future-of-professional-vr>
- Veitl, I. (2018). Klassische manuelle Inhaltsanalyse und automatisierte Inhaltsanalyse in der Kommunikationswissenschaft: Definitionen,

- Einsatzmöglichkeiten und Grenzen auf Basis einer Metaanalyse empirischer, europäischer Studien von 2011 bis 2018. Wien.
- Voeth, M., Herbst, U. (2013). *Marketing-Management Grundlagen, Konzeption und Umsetzung*. Stuttgart: Schaeffer-Poeschel Verlag für Wirtschaft Steuern Recht GmbH
- Vogel, D., & Funck, B. J. (2018). Immer nur die zweitbeste Lösung? Protokolle als Dokumentationsmethode für qualitative Interviews. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 19(1), 1-29.
- Vollberg, L. (2012). Markenbildung von Systemunternehmen am POS als Stellhebel für profitables Wachstum Formatvergleich und Folgerung. In G. Q.-M. GmbH. Norderstedt: Books on Demand.
- VuMA. (2023). *Bevölkerung in Deutschland nach Einkauf in Bau- und Heimwerkermärkten (in den letzten 6 Monaten) von 2018 bis 2021 (Personen in Millionen)*. Retrieved December 2023, from Statista: <https://de.statista.com/statistik/daten/studie/407708/umfrage/umfrage-in-deutschland-zum-einkauf-in-baumaerkten-und-heimwerkermaerkten/#:~:text=Im%20Jahr%202021%20gab%20es,Heimwerkermarkt%20eingekauft%20hatten>.
- Wang, Q. (2024). Application of Digital Art Display Technique in Exhibition Space Under Information Background. In Pei, Y., Shang Ma, H., Chan, Y-W., Jeong, H-Y., *Proceedings of Innovative Computing 2024, Vol. 2 Proceedings of The 7th International Conference on Innovative Computing* (pp. 65-75). Singapore: Springer Nature Singapore Pte Ltd. 2024
- Weitzel, F., Wendt, N., & Zimmermann, A. (2017). *Chefsache Weiterbildung So fördern Sie Ihre Mitarbeiter*. Wiesbaden: Springer Fachmedien Wiesbaden GmbH.
- Westbrook, R. A., & Reilly, M. (1983). Value-Percept Disparity: an Alternative to the Disconfirmation of Expectations Theory of Consumer Satisfaction. *Advances in Consumer Research*, 10, 256-261.
- Wettstein, M. (2016). in der Kommunikationswissenschaft in der Kommunikationswissenschaft.
- Wichmann, A. (2019). *Quantitative und Qualitative Forschung im Vergleich Denkweisen, Zielsetzungen und Arbeitsprozesse*. Berlin: Springer Verlag.

- Williams, C. C. (2008). Re-thinking the motives of do-it-yourself (DIY) consumers. *The International Review of Retail, Distribution and Consumer Research*, 18(3), 311-323.
- Winter, S. (2005). *Mitarbeiterzufriedenheit und Kundenzufriedenheit: Eine mehrbenenanalytische Untersuchung der Zusammenhänge auf Basis multidimensionaler Zufriedenheitsmessung*. Mannheim.
- Witt, H. (2001). Forschungsstrategien bei quantitativer und qualitativer Sozialforschung. *Forum: Qualitative Sozialforschung*, 1(2).
- Wolf, M., & McQuitty, S. (2011). Understanding the do-it-yourself consumer: DIY motivations and outcomes. *Academy of Marketing Science Review*, 1, 154-170.
- Wonneberger, E. (2018). *Neues Wohnen auf dem Land Demografischer Wandel und gemeinschaftliche Wohnformen im ländlichen Raum*. Wiesbaden: Springer Verlag.
- Wright, D. B., Breakwell, G., & Barnett, J. (1985). *Research Methods in Psychology*. SAGE Publications.
- Wulff, C. (2008). *Religiöse Dimensionen in der Einstellung zu Tieren*. Kassel: Unidruckerei der Universität Kassel.
- Zander, R. v. (2022). Lernen, Arbeiten und Wirken in der VUCA-Welt. In M. Permantier, *Ich Wir Alle 24 Transformationsgestalter:innen geben wegweisende Impulse für die Zukunft* (pp. 48-57). München: Verlag Franz Vahlen GmbH.

VII - DOCUMENTATION OF USED AI TOOLS

Table 14: Documentation of used AI tools.

AI-based tool	Form of deployment	Affected parts of the study
DeepL Translator	Translation of text passages	Entire dissertation
Perplexity	Perplexity was questioned about the research topic; the results were compared with personal research Reformulating draft texts to improve readability	Chapter 2.7; 4.9.5; 4.9.6; 4.11.5; 4.12.6; 5 Introduction of Chapter 1; Introduction of Chapter 2; Introduction of Chapter 3; Introduction of Chapter 4; 1.1; 1.2; 1.3; 2.7; 3.2; 4.9.5; 4.9.6; 4.11.5; 4.12.6; 5

[source: own elaboration based on (Universitätsbibliothek Mainz)]

VIII – APPENDIXES

VIII - APPENDIXES

APPENDIX 1: Interview Guide: Retailer

Performed on:	xx.xx.xxxx (xx:xxh – xx:xxh)
Interviewer:	Dominik Rode
Interviewee:	xxxxx
Kind of interview:	Face-to-Face / Phone Call / Video Call
Interview Language:	German

First of all, a few introductory questions about your person:

- 1) How old are you?
- 2) What is the current position in your company?
- 3) How many years of professional experience do you have in the DIY store industry?

To begin with, a few general questions about the POS in your store/stores:

- 4) Which factors of a store visit lead to an (extraordinary) satisfied customer?
 - a. Product availability, product information, competitive prices, advice, product variety, guidance etc.
- 5) Which of these factors do you fulfill well/are in need of improvement?
Please explain your answer.
- 6) Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

Consider today's POS of your store/s:

- 7) Which digital technologies do you use in your stores?
 - a. Video-tutorials, product-configurators, terminals, augmented reality, apps, QR-codes, self-scanning, metaverse (e.g. virtual reality glasses), Click & Meet etc.
- 8) Which of these used digital technologies...
 - a. have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
 - b. have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
 - c. exceed expectations and justify them (the customer is extremely satisfied)?

A few general questions about digital technologies that can be used at the POS in a DIY store:

- 9) In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?
 - a. Usability, security (in the sense of acquiring the appropriate product), up-to-dateness, data protection, transparency, efficiency, functionality, documentation, etc.
- 10) In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?
- 11) What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?
- 12) For which customer group(s) are digital technologies well / particularly well suited?

Think of your stores' future point of sale:

- 13) What level of importance will digital technologies have in the future compared to today?
- 14) Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?
- 15) Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?
- 16) Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?
- 17) Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

And finally, a more general question:

- 18) Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

APPENDIX 2: Interview Guide: Supplier

Performed on:	xx.xx.xxxx (xx:xxh – xx:xxh)
Interviewer:	Dominik Rode
Interviewee:	xxxxx
Kind of interview:	Face-to-Face / Phone Call / Video Call
Interview Language:	German

First of all, a few introductory questions about your person:

- 1) How old are you?
- 2) What is the current position in your company?
- 3) How many years of professional experience do you have in the DIY store industry?

To begin with, a few general questions about the POS in DIY stores:

- 4) Which factors of a store visit lead to an (extraordinary) satisfied customer?
 - a. Product availability, product information, competitive prices, advice, product variety, guidance etc.
- 5) Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.
- 6) Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

Consider today's POS of your store/s:

- 7) Which digital technologies does DIY retail use in its stores?
 - a. Video-tutorials, product-configurators, terminals, augmented reality, apps, QR-codes, self-scanning, metaverse (e.g. virtual reality glasses), Click & Meet etc.

- 8) Which of these used digital technologies...
- a. have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
 - b. have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
 - c. exceed expectations and justify them (the customer is extremely satisfied)?

A few general questions about digital technologies that can be used at the POS in a DIY store:

- 9) In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?
- b. Usability, security (in the sense of acquiring the appropriate product), up-to-dateness, data protection, transparency, efficiency, functionality, documentation, etc.
- 10) In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?
- 11) What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?
- 12) For which customer group(s) are digital technologies well / particularly well suited?

Think of DIY stores' future point of sale:

- 13) What level of importance will digital technologies have in the future compared to today?
- 14) Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

- 15) Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?
- 16) Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?
- 17) Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

And finally, a more general question:

- 18) Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

APPENDIX 3: Retailer Expert Interview: R1

Performed on:	XX.09.2023
Duration:	43 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Video Call
Interview Language:	German

How old are you?

A: XX years old. [between 31 – 40 years old]

What is the current position in your company?

A: Lead Marketing Technology.

How many years of professional experience do you have in the DIY store industry?

A: XX years [>10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: From my point of view, a distinction must be made between commercial customers, i.e. small craft businesses that buy equipment at the DIY store, and private customers, i.e. the average consumer who wants to redesign their garden. For me, these are two different customers with different needs. For the first one, the degree of product availability and documentation regarding ingredients and risks of any kind must meet a different level of quality than for private customers. The private customer would rather equip himself with resources at a lower price and do his gardening or DIY project at the weekend. Both dimensions are united by the factor that the goods must be available and that they must be easy to find within the store. In my view, in the DIY store industry, the assortment and the assortment presentation are different for each store because

the conditions are always different. This is different from food retailing or discount stores, where all stores look the same and the areas look the same. It is different for the DIY store because various halls have been purchased, areas have been purchased and assortments are displayed differently in different locations. For me, these are the two dimensions that both customer dimensions have in common. Availability of goods and quick location in the store.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: So the availability of the range can be more easily met in terms of customer satisfaction, because the DIY store is also subject to seasonal effects. The keyword here is gardening, which is a classic and is always tackled by our customers in spring, who are now more likely to be private individuals. This can be easily taken into account when designing the range and in procurement. The range is also not subject to any major fluctuations. On the other hand, the searchability of goods or the product information itself is much more challenging. Especially if it is the first visit to the store and the customer has to find his way around. How is the store organized? What is where? There are certainly also differences between a commercial customer and someone who is entering a hardware store for the first time or after a long time. Therefore, I think that this point is much more challenging to fulfill the target state of your customer.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: If we had conducted the interview thirty years ago, I would have said no. The idea was to extend the time spent in the store as much as possible, based on the old belief that the longer a customer is in the store, the more sales can be generated. I see it differently today. In this regard, I would go back to the two types of customers. If I am a tradesman who just wants to quickly buy resources at the hardware store, then the important thing is that it happens quickly. On the other hand, we also have corporate interests that we pursue. We have these particularly with private customers. We have more leeway in the store visit itself. What I mean by that is that I also try to generate additional sales and revenues

through sources of inspiration, not just by selling the lawn mower or the accessories that go with it. But also to inspire customers to think about their own home. What else can you do as your own project and what possibilities and incentives are there to extend the market visit a little, especially for private customers? Not least through inspiration at the POS itself. So when products are presented, for example, using moving image screens where you can see product categories again and how you can then use them as end results. These are certainly things that go in the direction of "We want the customer to stay in the store longer."

Which digital technologies do you use in your stores?

A: Click & collect certainly plays a major role within the customer journey, even outside the market, in terms of thinking about what I actually want to buy. Ideally, you should then be able to buy the product in full online and have already gone through the complete check-out process. That way, all you have to do is pick up the product. If I can then just order it from the comfort of my couch at home and simply pick it up after work, then the customer benefits. From my point of view, this is a digital technology that has established itself in recent years, also on the customer side. This technology definitely represents basic customer needs when I think of digital technologies. But in my view, it is also the use of an app within the hardware store. Not only as a source of information for current offers or as an assortment finder at home. The app should also be used as a source of inspiration for small projects. For example, renovating the bathroom or kitchen, sprucing up the garden, laying paving slabs at the front door, and so on. This means that the app can be used not only on the sofa at home but also increasingly at the point of sale, and not only in the pre-purchase phase but also in the last mile when it comes to paying.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: So, exceeding customer expectations: as a basic attitude, I would say that you always have to work on that. We must not believe that we fully meet customer expectations, but always look at what we can optimize within the customer journey. We are now quite good at Click & Collect, but these are more of the basics. If that doesn't work, then we differentiate ourselves negatively from the competition. In principle, I believe that when it comes to the use of digital technologies on the customer side, it must be convenient. It should not be the case that digital technologies are introduced at the POS as an end in themselves because someone thinks it's innovative, but rather you have to make sure that the customer's needs are met. Ideally, it makes life easier for the customer. Especially when it comes to clearly defined needs. If we take the topic of product availability and findability, we are also experimenting with different approaches. The rule of thumb here is "as simple as possible". What we then offer within the app must be so intuitive and convenient to use that every customer segment can use this app. Whether it's an older gentleman over 60 downloading an app for the first time or the 14-29 target group that has grown up with technology. Everything should be convenient and no unnecessary time should be lost at the POS. I think anything that is simple and self-explanatory helps in the DIY sector. It's not so important for me to make a big impression on customers with the latest innovation at the point of sale in terms of technology, but rather that their needs are clearly met. This applies to both commercial and private customers. It has to be simple and easy to understand. There's no point in artificially complicating things. That tends to have a negative impact on the topic.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: Can you give another example of a factor?

I: For example, operability or security. This means that when a customer buys a garage door or a window, or another configurable item, they can be sure that the item is suitable for their home. Another issue is up-to-dateness: this means that your data is also maintained and that the stocks, for example, are regularly updated. Other topics could include: data protection, transparency, functionality, how complex digital technologies can be built, or similar.

A: To pick up on that: for trivial products like a screw, discoverability is important. If I can say in an app where the product is and I am then actually standing in front of the screw I want to find, then that is very simple and very effective. The customer then notices that what the app says is true. For configured items, digital technologies can provide assistance, for example through screens in the assortment area itself. How to use things, for example. Much more essential for me is the personal and expert advice from the employees. You can cover a lot with digital and a clean, well-maintained metadata structure, keyword: dimensions, accuracy of fit, does the sink fit into the worktop. But often it turns out that personal on-site consultation is even more important. Digital technologies can only be a companion for the customer. At some point, the context is so complex and complicated that expert advice should also be provided by employees, so that digital technologies support this process but do not completely replace it. Another topic, when I now find myself in a commercial context again, is the topic of documentation, which is very important there. I don't know whether data protection is absolutely essential, but information about harmful substances within product categories is certainly important. There are certainly other regulations that apply there than in a private context. This is an area where digital technologies should be used. Far removed from these simple things like Click & Collect.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: I believe that digital technologies can be used above all for highly configurable products and goods. For example, in garden displays and bathroom fittings. There is the issue of documentation and the issue of security. These play a major role there. A lot can certainly be achieved with the help of screens, QR codes, tutorials on your own media or on YouTube, for example, that is, away from the technical advice of employees on site. You can certainly get a lot out of this for customers as well. The higher the degree of configuration, the more digital technology can help to positively influence customer satisfaction. The counterexample here would be the trivial item, the screw. The case is so trivial that, in my view, it is a basic requirement that the screw is found where the digital assistant (e.g. an app) indicates it.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: In the end, the common element between all industries is the customer journey. This always looks different. Take the fashion industry, for example. Inspiration plays a very important role here. The customer frequency is different than in a hardware store. As an average customer, I might go to the hardware store three to four times a year, so certain steps in the customer journey look quite different. In the fashion industry, inspiration occurs much earlier than in the hardware store. How often do I go home and look at the latest jacket and shoes I want to buy? This probably happens a lot more often than looking at the latest bathroom accessory. I might do that once or twice and then go to the hardware store and just buy it. Of course, it's quite different for fashion. Basically, I believe that the topic of documentation, security, expert advice plays a completely different role in the DIY store segment due to the variety and diversity of products compared to other industries. Whether it's fashion or food retailing, it's often the case that in the DIY store, the customer doesn't really know exactly what they want or need. If I now reintroduce the equation "The higher my need for configuration, the more support I need from technology," then I am

of the opinion that in other industries, such as fashion or food retailing, the customer there knows exactly what he wants and can more easily find the product online or offline. The buying behavior there is much more frequent and routine. The degree of support needed is much lower than in the hardware store, let's take the commercial customers out of it for now. We often deal with customers who don't know how a drill works. So the frequency plays a role and the customer knowledge. The customer looks different, both at the POS and within the buying process in the hardware store. The more often I shop, the less information material I need. In the hardware store, it's different. I extend the frequency and the information phase is longer. The level of quality, in terms of documentation, as well as findability and clarity of information, is significantly greater than in retail.

For which customer group(s) are digital technologies well / particularly well suited?

A: Generally for all digitally savvy customer groups. My theory: if a customer uses an app to check the availability of an item at the POS before visiting the store, their openness to digital technologies can be estimated higher.

What level of importance will digital technologies have in the future compared to today?

A: Everything that goes in the direction of augmented reality is exciting. I have already observed this in other industries, such as the furniture industry. To what extent can we present this at the POS in the hardware store? For example, if the customer brings the dimensions of his project with him to the store. We simulate a provision of the products we offer in the store with AR. How can we then present this at the POS? This would also be important in part as a source of inspiration to see what variations of items look like when you are redesigning your bathroom. For example, Ikea has a kitchen planner and you plan your kitchen completely at home. In the store itself, there is then another kitchen planner on site and you bring the plans with you and talk to an employee about them. I can also imagine something like that in the DIY store segment. For example, in the bathroom or garden area. In addition, I can very well imagine

using AR or VR, such as virtual reality glasses, to see and imagine what my home looks like.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: Where we are certainly lagging behind some competitors is in the area of digital assistants. My concern here is that others are further ahead in this area, at home but also on the ground, in terms of obtaining information in terms of whether products are available or suitable. My concern here is that we need to improve in bringing the two worlds of online and offline together. For example, employees must always have the same information available as the customer. It's important that the employee on site can quickly put themselves in the customer's shoes. Digital technologies play a major role here. Otherwise, I would like to see us become more willing to experiment and not put sales first in everything we do. The DIY store is too conservative for that.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: I am a big believer in digital signage at the POS, where we can also generate moving images to create a final impulse to buy. This would be useful, for example, for a group of goods that the customer had not yet considered in such detail. Another topic is retail media, such as video and display advertising or brand shops. I see great opportunities here, especially for brand manufacturers.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: So what I would like to do is to have the topic of the metaverse at the POS. I think that's a bet that's currently taking place there. Will customers in the future put on a pair of glasses and then fly through our hardware store? The main question here is: Are hardware store customers even ready for an approach like this? So if money were no object, I would like to pursue this approach. I think it

would be a very good way of validating the hypothesis that a digital technology can increase our customers' satisfaction.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I think the things that are being used today have become established. By that I mean, among other things, Click & Collect or QR codes. However, I could also imagine that QR codes will soon be replaced by something new. For me, the decisive factor is that the DIY market is a conservative industry and when things are used there, they have usually already become widely established. The topic of apps will certainly continue to develop and remain; these will certainly be developed to such an extent that the customer can interact much more intensively on site, for example in the form of advice and tutorials. What will become significantly more prevalent is the topic of self-scanning; this will come to the point where an item is already paid for when it is removed from the shelf. I have already mentioned the topic of digital signage several times, and it will certainly establish itself in connection with retail media. The important thing here is that we establish several touchpoints. I think that what will come more is the merging of online and offline and the synchronization of customer and employee knowledge, as already mentioned. Everything else is a playground, such as AR and AI. It remains to be seen to what extent these will play a role in the hardware store.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: The topic of employee education on site is important. If the customer on site knows more than the employee at the POS, then we as a company have a problem. So if there is an imbalance between customer knowledge and employee knowledge, to the detriment of our company, then we have a problem. That's why we should make sure that digital technologies not only lead to satisfaction on the customer side, but also among our employees, and give them the chance to educate and develop themselves through these technologies. Then there are

often trivial questions: Does the employee use their private cell phone on site or is hardware provided by the company?

APPENDIX 4: Retailer Expert Interview: R2

Performed on:	XX.09.2023
Duration:	44 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Face-to-Face
Interview Language:	German

How old are you?

A: XX years old. [between 51 – 60 years old]

What is the current position in your company?

A: Managing director.

How many years of professional experience do you have in the DIY store industry?

A: I have had XX years of professional experience since XX 1 of this year. XX years old. [> 40 years old]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: Finding the goods, quick checkout process, value for money, friendly staff.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: We fulfill the availability of goods very well. We fulfill the well-humored employees half, because it also depends on the weekday. At the checkout process, we take too long, so our checkout paths are just too long.

I: What exactly do you mean by the checkout process?

A: The checkout process itself, from start to finish, takes too long for us. We have different target groups, private and commercial. The private customer receives a receipt, the commercial customer receives an invoice. We have a customer card system, a discount system, and processing these things takes too long for me.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: No, because we prefer a product presentation that is designed to inspire customers to come up with new ideas for their projects.

Which digital technologies do you use in your stores?

A: The classic video terminals. We use our own app that provides customers with product information and information about their past purchases; the app does not give advice. Click & collect, yes. For products that require explanation, we use digital technologies, but these are then used by the salesperson. In one store, however, we have installed a XXX-Finder from the supplier, where the customer can enter their product application on a monitor, and this finder then tells the customer whether we have the item, in which aisle the item is located, and on which shelf the item is located. Interestingly, the customer doesn't even use the computer, zero effect, but there is a QR code on the shelves that the customer can use to find the product they are looking for in our store, and this is used regularly.

I: Does that mean you can track how often the QR code is used?**A:** Yes, exactly, the problem is that our customer doesn't use this finder. We have a fairly high average age among our customers; our customer is 55 years old on average and these customers have a very hard time with this monitor. The QR code is used. However, with the QR code, we cannot see which age group uses it.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: We have already discussed in the first topic what is good, what is not good and what the customer wants. All digital technologies that support and accelerate the purchasing process are what will make the customer satisfied and perhaps extremely satisfied. For me personally, self-scanning is a great thing because I can control the process myself. We see our lengthy checkout processes, but our DIY store sector is very difficult for this topic. The range consists of a lot of bulk goods and so on. But self-scanning is a big topic, and I think it will make the shopping process much easier for customers. They can take control and don't have to stand in line waiting for the cashier. They can actively shape their shopping process themselves. I believe that customers are extremely satisfied when the shopping process works in a simple, structured, fast and stress-free way from the moment they enter the store. It starts with whether the goods are available and whether I know whether the goods are there. Do I find the goods I am looking for, and also the communication about where I can find which product in which areas. We still live in a world where our product definition differs from the customer definition and does not match. That is the first test process. Then comes the checkout, purchase and completion process.

I: From your point of view, are there any aspects that are not working and that are causing customer dissatisfaction?

A: Yes. The technical coverage of the WiFi in the stores. That's a huge problem and a huge technical challenge. In addition to the available internet connection that is available in the building, the WiFi coverage in general is a problem when we work with apps or similar things. The checkout process is becoming more and more complicated, so the whole checkout process is perceived as extremely disruptive and too long. If we draw the parallel, then we sell much faster on Amazon today. Meanwhile, the benchmark for this is also our checkout. If you as a company install an app that then comes close to Amazon, then the

expectations of the Amazon customer generation at the checkout are quite different. Online, this means that the customer wants a similar checkout process to that on the most important online platforms, such as Amazon or Zalando. The internet fuels expectations of fast, uncomplicated and streamlined processes. In addition to the fact that it has to be inexpensive or even cheaper, this is a very big issue. What I still see as a problem is clear price communication. Confusion arises at the checkout when the price on the goods is perceived differently from the price stored in the checkout. This is not about incorrectly labeled goods. Rather, you have to explain to the customer what the product costs. If the right price is in the right place and the customer understands it. These are often conflict situations.

I: Does your company still use paper labels?

A: We still have paper and no digital labels. The topic is one for the future. The investment is very high. We don't have to do research and development for large DIY store companies. We can confidently wait until the big ones have tried things out and if something works, then we can take it over. Exceeding customer expectations has been limited to the technical area so far. I am firmly convinced that especially today, in the digital age, that the advisory discussion, the communication from the employee to the customer, plays an important role in exceeding expectations. When we look at online media, video tutorials, etc., there is still a generation that needs a personal approach.**I:** How important is it then to equip employees with digital technologies for items that require explanation, such as moveIT?

A: I see potential for a solution for our industry. I think a smartphone solution makes sense for e-mail communication, for providing information about items, as a customer telephone, and for communicating with customers via WhatsApp. These are all topics that I consider important for the future. Today, our employees carry a phone around with them, paper, notes and all sorts of other things, and still have to operate the PC at the information desk. But in my view, this only makes sense if we manage to map all the products that we have in stock in our buildings and then sell them in the online store. That's the big challenge for me. It's not about buying a smartphone that costs money. It's peanuts what a smartphone costs today. You have to have the data somewhere and everyone

must be able to access it from anywhere and at any time. Setting up the site shouldn't take ten minutes per item. That would be one issue. This is where the big sticking point for me comes in. We have to succeed in motivating and inspiring the people who are supposed to use the device to use this technology. That will be the biggest challenge. Buying and setting up a smartphone is not the problem. However, it is exhausting and it takes so much effort to get people to work with such a topic. Example: We have an app for customers. I have XXX customer card holders and 35% of them now use the app. I have XXX employees. If I'm lucky, 50% of them will have the app on their cell phones. I always have to make updates, I don't have any apps, I don't need that, it takes up storage space, I don't need it, I don't want it. These are often statements made by employees. It's an issue where you have to put so much effort into making sure colleagues want it and understand it. It has nothing to do with whether we buy Wi-Fi or the technology. How do I get a customer to use the app as a shopping or payment aid when the employees, who are the multipliers for you and should actually be saying how awesome the app is, don't even know the app themselves and don't even want to sell it. Then we can buy as much technology as we want, but we won't get it done.

I: Does that mean that the app can at least lead to customer satisfaction or even delight?

A: Yes, we have just updated the app. One of our customers' favorite topics is returns. With the app, the customer no longer needs a receipt. They can open the app at any time and view their purchases. Our colleagues no longer need a till receipt. It's all a relief from the customer's point of view.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: The most important thing for customers is simple. Simple and clear. Everything else comes after that. The topic of data protection and security is a hygiene factor and everyone expects that. But why should I use a technology that is complicated and requires training? It has to be simple. It has to correspond to the customer benefit. The question is always, what benefit does the customer get from it? They always have their receipt with them, so they have the benefit. That

is an enormous advantage for him. Does he really have an advantage if my app tells me: I need this door, in size and that's the price. The customer does that at home on the tablet. He doesn't do it in the store. I think what the customer wants is to find his product. Then we need a good product search. A reasonable product search function like on Amazon. You enter three keywords and find the article you are looking for. We have a very hard time doing that. It would be easy for the customer. For example, the customer is looking for nails in the product range. In our supplier's system, the nail is called a wire nail. The term is technically correct, but everyone searches for the term nails. So we have to make sure that our product data has a connection and a link to the usual designations. Of course, people from Bavaria may have a different term than those from Hamburg. The customer wants to know: Is the product available? What does it cost? Can I take it with me? That is the most important information. What I can imagine is that there is a digital app that has a payment function. Lidl already has that. You can transfer discounts and vouchers digitally to the app. It creates incentives to buy.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: I now think from the customer's point of view: for me, there is no special range for digital technologies. If it means that I can display the information about the product and the information about where I can find the product, then it is suitable for every range.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: We actually have a case like this right now in-house. We are using headsets as a test field in XXX stores. The reason for this is that, due to staffing and shift times, coverage is not always guaranteed. This is a project that is doomed to fail. We are scrapping it because the employee at the hardware store has far too much external communication. For example: the Lidl employee receives a request for a price at the checkout or which fruit he should pull in. The salesperson at the hardware store receives calls from customers and from the field service. The

checkout wants something, he has to call a supplier and he is approached by a customer at the same time. The guys have so many things affecting them at once. We tested that for XXX years and are now going to scrap it because it didn't work. I know of a solution that works in the food and textile sectors. It doesn't work in the consulting area. In the electronics sector, there are digital price labels. This is a technology that we will also urgently need in our industry at some point, but I would not see this aspect as a unique selling point for sales.

For which customer group(s) are digital technologies well / particularly well suited?

A: Our customer groups are roughly private customers, DIY enthusiasts and commercial customers. In addition to private customers, we have XXX commercial customers. We don't have an app for commercial customers, and commercial customers are clamouring for one. There is a technical problem at the moment because commercial customers naturally have different prices and discounts, etc. This technical challenge can be solved, but we have not yet got around to it. There is no differentiation between private and commercial customers. The commercial customer has a constant demand. For them, it would be a greater technical facilitation than for the private customer, who goes shopping on average four to six times a year. There is no age for which the technologies are particularly suitable. I do see that women are more digitally open-minded. That's not so obvious with men. Young people are not necessarily our target group yet. I don't know if they would download an app. They want to shop through social media and an app is totally old school. They want to see a Tik-Tok video, see the item displayed and then order the item.

What level of importance will digital technologies have in the future compared to today?

A: We haven't come far yet. I think we will implement a lot more and the market will drive us forward. I am convinced of that. I have already mentioned the topic of smartphones for employees. I think we should be ready in a time frame of five to six years. We can already see it today: dm is already doing something like this in another area with fewer choices and classic products, but it is already working

quite well. We have to talk today about artificial intelligence and the decreasing number of employees willing to work in hardware store sales. The topic of checkout systems will change significantly. We already have the first stores where customers can shop without salespeople and cashiers. It's certainly still on a small scale, but why shouldn't it happen in our industry too? Würth has small mom-and-pop shops for consumers where you can register. The industry will have no other choice due to the shortage of skilled workers, and when we do have skilled workers, they want to earn so much money that we can't pay more than two. But when I see what's happening in artificial intelligence, this topic, starting with Chat GPT, it's popping up everywhere right now. We're currently testing Chat GPT to write texts for the shop. We wanted to create a text on how to use an XXX. There were already mistakes in the text. Some of them were technical errors. But relatively speaking, in such a short time, there were so few mistakes that actually only one person has to look over it once. The system also learns from it. I see it like this: in a very short time, we will have devices that can do this. I'll give you another example. Alexa asks about the product. We have to get there.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: When it comes to digital technologies, we always think about the process of the customer making a purchase. But what about the after-sales process? The customers have bought and don't want more. How does this process work? The customer has bought the product and returns it. How should this work in the future? That would be my next point. So far, we have only thought about the sale, but we are no longer in the sales phase.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: There is nothing more for me to add. I think we have talked about this enough.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: The question is too specific for me. I would see the topic of digitization as a project. It wouldn't start with us spending the smartphone on the employee. That's just one part. You have to ask yourself the question, what does a digital retail company in the DIY sector look like from the entrance to the checkout? So many factors play a role here. Technical things like Wi-Fi, the ability to find goods, and employee communication via smartphone. I see so many paperless and simple, fast processes. For example, electronic price tags. The whole topic is part of this and I think that it has to be a complete concept. What I consider important, I would work out with the customer focus group. We did that in preparation for many of our projects. We asked the customers: What does the customer want and what does he perceive? Everyone is throwing away their paper advertising because it has become too expensive and can no longer be justified under the heading of sustainability. There is a very high proportion of customers who want print advertising. Is there an alternative between print and online for the customer? Is the app the alternative that I send the customer his advertising personally? For me, it would also be an issue if we made everything more transparent. If we knew which customer was buying what. How can I make an offer to the customer based on his purchasing behavior? Analysis of customer purchasing behavior and which interesting supplementary products I offer.

I: Do you mean a customer also bought... option?

A: Yes, exactly. There are so many possibilities here, if only the suitcases of money were endless to work with. Today we are doing fragments. We start something and ask ourselves the questions: Is it good? Is it beautiful? Is it useful? We would have to take a holistic view. Why does the customer still have to bring their returns to us? Can't we pick them up or have a secondary utilization platform? I'm just rambling on a bit now, but then it goes further.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: Electronic labels are definitely coming. We will communicate through all possible channels. That will change. We have to do a lot of things, with a lot more

wastage. Wastage still comes from the old wording. I don't think we can get away from the fact that customers want to know everything about the entire range: What is in the store? Can I take it with me? What does it cost? 70% of our calls are based on these questions. Even if you have the greatest online shop, wire nails and nails. Then we come back to the topic. If we make it clear to the customer that this is the way. It starts again with the employee at the information desk when a customer calls and asks for nails. No, but we have wire nails. If we can implement this, then we will have a lot fewer administrative tasks and it will be easier for the customer.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: Today or in the future?

I: It doesn't matter. In every respect.

A: In my opinion, what we have to do in the future is to focus on the topic of sustainability. It's not about using peat-free soil, but about answering the following questions: How do I deal with the products? What do I do with products that I have not sold well? Where does the goods come from? How do I deal with employees? This may not be related to sustainability, but it is an important topic. I believe that the next generation of customers we will have will place much more value on how we handle it. I believe it is different from my generation today.

APPENDIX 5: Retailer Expert Interview: R3

Performed on:	XX.10.2023
Duration:	33 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Phone Call
Interview Language:	German

How old are you?

A: XX. [zwischen 51 – 60 years]

What is the current position in your company?

A: Deputy store manager.

How many years of professional experience do you have in the DIY store industry?

A: XX Jahre. [> 20 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: The most important thing, I think, is the availability of goods, then personal advice and thirdly, the price is very important, in the sense that we are not too expensive.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: We are good at providing goods and at offering competitive prices. Sometimes, however, we could be friendlier in our dealings with customers.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: I think we have to differentiate between the various customers. On the one hand, there are customers who want to get in quickly, find the item they want and buy it, and then get out again. On the other hand, there are perhaps more female customers who also want to stroll through the hardware store, the garden or decoration department and who might end up staying a little longer if they find inspiring displays.

Which digital technologies do you use in your stores?

A: For us XXX employees, we have the XXX system. This is very helpful because you can use it to do a lot of different things: for example, you can make requests to other stores, carry out stock transfers or check stock levels. Then there are the configurators for employees, for example moveIT, which our employees can use to pick up configurable items. We have an app for our employees and customers that is used a lot by both our customers and our employees. Then there are also monitors for the customer, although I always find this very difficult because they are always very popular with thieves. These days, even USB sticks are sometimes stolen from computers.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: What contributes to dissatisfaction is when the app is not currently maintained. This is an issue, for example, when customers come to our stores and show us an item on the app that they want to buy. However, this item may no longer be available, sometimes for quite some time. This leads to customer dissatisfaction. What contributes to satisfaction, for example, is that our app

offers customers a wide range of options, such as making an appointment for a consultation, which can then take place by phone or even by video.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: It is very important that it is up to date. I have already explained this with an example. Usability is an important factor. And I believe that in general, the options available to a customer, such as our app, where the customer can do a lot of things, is important. For example, it offers crafting ideas. You have the option of arranging specialist advice appointments. You can book container services, rent equipment or book a tradesman service.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: I believe that the product ranges where the customer needs advice are very important, simply to give them security. I also think that high-priced product ranges play an important role.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: What always comes to mind are those self-scanning checkouts. I can't say how well or poorly they work. But it's something we don't use and that is often already available elsewhere and that consumers know from other industries.

For which customer group(s) are digital technologies well / particularly well suited?

A: I believe that, with the digital technologies we use today, the very young customer is not even one of the most important customer groups. I also believe that older customers, those aged 50 and up, don't use digital technologies all that much. It's more likely to be the customer in between, in middle age. These customers very often come to us with the app and show us items or have

questions about items. But often it's about showing us, based on the app, that we're supposed to be too expensive for some items, for example.

What level of importance will digital technologies have in the future compared to today?

A: I do believe that more and more things are being digitized. Just thinking about what we are currently doing. More and more of that is being digitized. But I would still like to see the personal touch, personal advice, personal friendliness or just a simple personal conversation to be preserved as much as possible. Even though, of course, the lack of personnel makes this a very difficult topic.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: I think it's very difficult. What's important is that people want to do it. These days, we often find that employees don't want to do anything. Take our e-learning courses, for example. That's why I think it's important to make these things fun. That's an important aspect of this topic in general.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: I think that self-scanning checkouts will soon be here, along with hand-held scanners that customers can use to scan the items they want to buy themselves. As for the configurators that customers can use, I think that these first have to work well and reliably. I still see the problem that misconfigurations can often occur there, which then lead to conflicts with suppliers afterwards, because the customer has entered a number incorrectly, for example. In general, however, I always see something sinister in this topic when it comes to the fact that the potential for theft is always present with digital technologies, when I see what is being stolen from our stores these days.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: For me, the topic of digital price labeling would be a dream. I think there is so much potential for savings and the information would always be up to date. You wouldn't have any discussions with customers about wrong prices. In addition, the topic of price labeling takes up so much of employees' time that it should be implemented first before investing in any other things.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I don't think that the monitors will catch on. These monitors just annoy the customer. That's why I don't think they will establish themselves. Besides, they don't stand out unless they've been stolen, because then the employees are happy because the things are no longer annoying. I think that's just too much when I think that our XXX radio is still running on the side. Then the customer and especially our employees, who are in the store all day, are going crazy. What is good and also simple are explanatory videos. If a customer has a problem, for example hanging curtains, then he can find a video on how to do it directly on YouTube, for example. There is a video for every topic and problem. That's really the simplest thing.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No.

APPENDIX 6: Retailer Expert Interview: R4

Performed on:	XX.11.2023
Duration:	37 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Face-to-Face
Interview Language:	German

How old are you?

A: XX. [between 31 – 40 years]

What is the current position in your company?

A: General Manager.

How many years of professional experience do you have in the DIY store industry?

A: XX Jahre. [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: Consulting services, as this differentiates online sales, product quality, along with the price, in order to stand out in comparison to the www. Of course, the availability of goods in combination with product variety is an important topic for finding a selection when I don't yet know exactly what I need. In fact, it is also a shopping experience for me, as I may also collect ideas for other projects, so that I can, for example, also pick up items and check the feel, etc.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: In fact, I don't always feel like I'm talking to professionals when I'm at the hardware store. Unfortunately, it's not always the case that I feel like I'm dealing with experienced employees. In contrast, however, the shopping experience is good. Now I also enjoy going to the hardware store to browse.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: I think it makes sense to keep customers in the store for a relatively long time and, if possible, to introduce them to other product ranges so that spontaneous sales can be made. By contrast, there are groups of shoppers who are interested in a short stay if, for example, they only want to pick up a specific item that was ordered in advance via Click & Collect.

Which digital technologies do you use in your stores?

A: Click & Collect, video tutorials, product configurators, self-checkouts, QR codes and apps.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: I think that Click & Collect leads to a satisfied customer. I think video tutorials are helpful, for example for larger projects such as building a patio. Self-checkout leads to satisfaction because of the time saved. The rest of the technologies just mentioned are more of a standard. Sometimes I think that an app should be able to do more than it can today; I see potential there.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: With digital technologies, I generally expect added value at first, maybe even an “aha” effect that improves or optimizes the sales experience. This must lead to a satisfying experience in symbiosis with the physically present item that I have in front of me. In principle, it is important that digital technologies can be operated intuitively so that even people who are less digitally savvy can make good use of the technologies.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: For items that require less explanation, digital technologies tend to be less useful, for example when I look at our products like XXX. However, if the customer has a garden irrigation project in mind, then digital technology can certainly be very helpful.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: Other industries have the means to create simulations in 3D. I don't know of any in the hardware store.

For which customer group(s) are digital technologies well / particularly well suited?

A: Generally for tech-savvy middle-agers, as they are very open to digital technologies if they provide added value and thus a satisfying shopping experience. However, when I think of customer groups in the senior age range who don't have much contact with digital technologies in their daily lives, I think that it is certainly more difficult to communicate with and/or deal with them.

What level of importance will digital technologies have in the future compared to today?

A: I think that today we can't even imagine what will be possible in the future. Entire business models will be developed from this. We will certainly see things that we can't even begin to imagine today.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: In my opinion, the design of apps needs to be more diversified, there are still opportunities for further features and usability can also be improved. I also think that digital technologies should do more to improve the shopping experience. AI and VR can help a lot more here. This goes so far as to ensure that cross-selling items are also given much more attention. One idea, for example, would be to upload your shopping list to the app and then be automatically guided through the store, regardless of how it is laid out.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: I've already said that, I see AI and VR in particular.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: For example, I can see a digital consultant, as in the metaverse, who advises on products and projects with an individual personality. Or maybe even a hardware store that manages without staff.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I think AI will be adopted everywhere, regardless of industry. There is no getting around it. In my view, the advantages outweigh the disadvantages.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No, I thought the questionnaire was very well designed. I send my regards to my wife and children.

APPENDIX 7: Retailer Expert Interview: R5

Performed on:	XX.11.2023
Duration:	49 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Phone Call
Interview Language:	German

How old are you?

A: XX Jahre. [between 41 – 50 years]

What is the current position in your company?

A: Regional Sales Manager.

How many years of professional experience do you have in the DIY store industry?

A: XXXX. [> 30 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: First of all, the range and product selection, as well as the availability of goods, is of course important. When it comes to employee specifications, it is about competence and its availability. The next thing is the pricing and a market-driven price structure, as well as attractive offers. Furthermore, perhaps even special offers for projects. Then the quick processing of the payment process and, if necessary, support with services, such as loading heavy goods. If the location is convenient and easy to reach, then the customer is satisfied. I think it's extremely difficult to satisfy a customer at first.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: So, of the factors I mentioned, the high density of DIY stores is a given, and the variety of the range is a given. The price display is also generally good. Self-scanning is becoming more and more popular, and it works. What is not good is the availability of employees, which is constantly decreasing. Then there are long waiting times at the checkout and employee expertise is developing in a bad direction. Compared to the past, the number of unskilled employees is significantly higher. Fluctuation also plays a major role, of course. Regarding services: These are still too disorganized at the hardware store. There are always waiting times between the individual services. If you need to clarify something with someone on site, there are always waiting times between the various steps, and this takes too long, right up to the checkout process.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: I think the goal is to extend the length of the customer's stay. It's about offering inspiration and selling cross-selling items. Today, however, it is increasingly the case that the customer, following the ROPO principle, informs themselves at home and picks up the items in the store. Today, the trend is more towards Click & Collect. This reduces waiting times.

Which digital technologies do you use in your stores?

A: The first topic is self-scanning. Then, app advice, where you can get information and make an appointment for a consultation. Occasionally, support for QR codes for instructions, for example. Then the topic of Click & Collect in connection with payment using a payment service such as PayPal. Then system-supported garden planning on the PC using a configurator. VR bathroom planning is possible in many DIY stores. Then there is the topic of the gas machine, where gas bottles can be pre-ordered and picked up. Then there is the topic of online presence and RoPo. Digital price labeling. Rental equipment in pick-up boxes, paid for online, accessible at any time. Let's take the rental

sprinter as an example. Borrowing one today works without personnel costs for the store; compared to the past, that used to involve a lot of work. Today, all you need is the QR code to book a sprinter. The handover is done by video, without an employee having to come out of the store.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: The customer is satisfied with Click & Collect, an updated online store. Then, as of today, I would say the self-scanning checkouts. The topic of digital price labeling is more of a retailer topic, it's not so much of a customer topic. The topic of digital advice is important for customer satisfaction. Then there's the topic of digital services. Pre-ordering online and then picking up at pick-up points in the parking lot. This certainly contributes to very high customer satisfaction. But it is certainly not yet offered everywhere. Digital technologies have a negative impact on customer satisfaction if they are not operated correctly, in the sense of errors and not being up to date. Although every service leads to satisfaction, these services are not yet always operated without errors by the DIY stores. When it comes to exceeding expectations, I would mention garden planning or VR advice for the bathroom or a digital consultation appointment. Even if you can watch videos at the POS, for example using a QR code, this is still not used enough and with insufficient transparency, but for precisely this reason it leads to extraordinary satisfaction. If it's also easy to pay digitally, then that's something that makes the customer feel extremely positive about their project and connects them to the DIY store.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: The services must be easy to use. It has to be so simple that I don't need anyone else to help me. It has to lead to specific purchase recommendations. The customer must know specifically what he needs without being made to feel insecure. It must be non-binding in the sense of data protection. The customer must not have to enter his address or other personal data in order to receive an advance service.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Everything that has to do with the processing of services. Take the color-mixing machine, for example: you don't need a salesperson for that if the technology works. You could even handle the payment. But it can also be good for gas cylinders, take the pick-up service in combination with the digital payment function. In the garden and plant sector, as well as garden accessories, digital technologies are less useful, partly because some of the products are not freely available. Where it is very suitable to use digital technologies is, for example, with wallpaper, where you can upload photos. Video tutorials work in all areas.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: I'm not sure exactly, but in general you have more of a project idea in the hardware store than in other industries, such as in the beauty or food sectors. In the hardware store, the commission idea is more present. Even at the back end, who takes over the craftsman's service, in the hardware store, everything is more connected to the project idea.

For which customer group(s) are digital technologies well / particularly well suited?

A: So basically for anyone who has integrated their smartphone or tablet into their daily lives. If there are people with an attitude who also reject the tablet at home, then they won't be suitable either. The framework conditions have changed. Anyone who is open to it can be suitable.

What level of importance will digital technologies have in the future compared to today?

A: The use of digital technologies will be essential for the survival of the construction market. Those who have not yet dealt with it will no longer exist in the future. Every DIY store operator must invest in digital technologies today and then, if they do it right, they will also reap the benefits. And then the following applies: customers today are so well informed that a lot is happening at home. The easier it is to integrate digital technologies into the shopping experience, the more successful DIY stores will be.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: In principle, ease of use must be guaranteed. The technologies must be designed in a simple and pragmatic way.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: Scan & Go is not yet that widespread in hardware stores. This reduces waiting times immensely. In the future, the topic of disposal and deposits, for example, will become more relevant, I'm sure. Hardware store operator XXX, for example, offers the option of disposing of waste paper and other rubbish without the need for employee contact; it's all done online.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: Regardless of whether this can work and is realistic, my aim would be to use digital technologies in all areas where I currently have to wait for salespeople, so that all these waiting times are eliminated and I am much faster thanks to digital technologies, regardless of the technology. What annoys me most is the checkout. It has to be cashless and without waiting time. And, for each product on the scanner rail, a QR code. I would like a product description for each product. This is where the advantages of apps could be put to good use: the market could provide advertising information and think for the customer. But sustainability issues could also be given more attention. For example, only the power consumption, so that the customer can see directly how high the power consumption of this article is.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I think the on-site employee will have to become an all-rounder and all other services and products will become digital. I think that 80% of purchasing will be digital. VR bathroom planning will soon become the standard. And the all-round concept will become more important, so that the entire project execution will be much more digital.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No, I don't have anything more to add.

APPENDIX 8: Retailer Expert Interview: R6

Performed on:	XX.11.2024
Duration:	37 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Face-to-Face
Interview Language:	German

How old are you?

A: XX. [between 41 – 50 years]

What is the current position in your company?

A: I work in purchasing.

How many years of professional experience do you have in the DIY store industry?

A: XX. [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: Availability of goods, advice, shopping experience, the ability to find products, a sense of fulfillment in providing a service, as well as a fair price and the ability to go home with a good feeling.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: I think we give our customers a good shopping experience in our stores. We are also good at making customers feel good when they are being advised, whether it's through the spoken word or through order confirmations, which can be very detailed. Customers find the products they need at a fair price, or we

help them find them with good advice. Goods are almost always available, maybe not in the desired brand, but a substitute or a different brand is.

I: And what could be improved?

A: I think that it is above all the service that goes beyond product advice and gives the DIY store a unique selling point compared to online shops. A smile, helping customers, letting them touch products that have a haptic quality, for example, explaining the function of a security door to the product in the store and then perhaps putting the item in the shopping cart or taking it off the shelf. That's why people come to the hardware store. We have one or two good employees, but in general there is room for improvement.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: On the one hand, we have customers who would be annoyed if the length of their stay was artificially extended, because they want to get to the products they want to buy quickly and directly. On the other hand, we have customers who are in direct contrast to these customers. Customers who might buy more if they stay in the store longer. We want to offer the right thing for every customer, so I think the right answer is to strike a balance.

Which digital technologies do you use in your stores?

A: We are currently testing electronic price labeling in some stores. QR codes are used in our stores, and we are sure they are also used on our suppliers' products. Displays are used. We have an app in use and we use product configurators in various departments that are available to our employees.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: An app is an all-rounder. An app allows you to view inserts, place Click & Collect orders, make reservations, watch videos, and encourages creativity by providing suggestions. In general, the app today is something that has a positive effect on customer satisfaction. However, if I offer more features than my competitors and design the app to be intuitive and attractive, then it inspires and I don't open other retailers' apps. On the negative side, I think displays are perceived as annoying by customers, and the same applies to our employees, some of whom disconnect the power supply to these devices.

I: Why is that? How can you be sure?

A: The reason is simply that the videos that are played there in a loop are disturbing and the employees of the department in particular cannot listen to them all day long. They pull the plug and just want to make sure that the things can no longer produce any sound.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: I think the most important thing is that it has to work. If that's the case, it's good. It has to work so that I can get where I want to go or achieve something quickly and safely. That has to be guaranteed. Although one thing always has to be considered, and here again, it is of course important to see which customers we are dealing with. We have such diverse customer groups: young people who are innovative or people who are digitally savvy, but older, who are of course ideal for approaches to things like virtual reality for example or robots. On the other hand, we have customers, such as the professional or semi-professional, who would rather not put on the glasses that project virtual reality. So it is always

important to look at who the technologies are aimed at in my departments and in my market.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: I think that covers the entire home improvement range. Imagine you need special fasteners for special surfaces, you are renovating the bathroom, redesigning the garden, things like that. In general, the focus is mainly on the high-priced shopping baskets or project shopping baskets. Or, of course, the projects where customers want to get involved in the design. If a customer wants to get an idea of what the paint from the bucket or the wallpaper on the roll will look like in their 20-square-meter living room, then they need simulations, pictorial representations of rooms, preferably on large, colorful photos or directly in the real world with a view of their iPad.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: I don't think that the technologies used in the various industries are necessarily different. It's what the industries sell that's different. Each industry seeks a solution that works for them. In the hardware store, our challenge is to appeal to every DIY customer, whether at the professional or semi-professional level. To do that, we need the right technologies. The main difference is that, for us, it can sometimes be dusty in quotation marks. The customer doesn't always need entertainment. Sometimes a pragmatic and quick solution is exactly what is needed. The difference is that it doesn't have to be high-tech. The customer needs technologies that help them do their craft, not a good feeling, like finding a new pair of sneakers.

For which customer group(s) are digital technologies well / particularly well suited?

A: I think it has to do with the technology. Apps, for example, can now serve almost all generations. Putting VR goggles on someone and using hand movements to design a room is certainly a little more disconcerting for some people. I don't think it's possible to generalize about this.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: I would go straight to a few technologies and apply it to specific examples, since it can vary from technology to technology. With an app, I see above all the number of customers who use the app, clicks, views, the number of shares, for example, of articles from the app. We have quite a few levers that we can use to make this measurable. For technologies such as robots or VR, which are generally newer and largely unused in our industry, a survey would of course be the method of choice. Either directly, albeit costly and expensive, but in return personal and with the opportunity to ask the customer, for example, directly after using a robot or VR glasses. In the course of these measurements, we primarily determine the dynamics of customer satisfaction. Things that were still inspiring yesterday are standard today and may be outdated tomorrow. This would also work online, where it is perhaps more suitable for technologies that are used more widely: websites, apps, click & collect. This would be more expedient or the classic approach would be a scale-based survey following use.

What level of importance will digital technologies have in the future compared to today?

A: One thing is clear: they will be indispensable. What's more, anyone who doesn't use them won't be able to survive as a company or as a retailer. It will be a must to take part in omni-channel life, with all means and for that digital technologies are indispensable.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: I think the biggest hurdle is data security. We live in times where data security and data protection are becoming increasingly important because cases of data misuse are increasing significantly.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: We will establish the topic of product discovery. Other industries have good solutions for this, with apps that go directly to the items being sought on the market.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: I'm a fan of VR and can easily imagine using robots. Other industries are already demonstrating that these are good technologies for supporting employees on the shop floor. I can easily imagine this – more broadly integrated – in the DIY store world.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: As I just said, virtual reality and robots – and in all possible variations. QR codes, click & collect and apps will also remain with us. Digital and analog are blurring together. I also think that everything that pays for the payment process will be used: checkout systems will become digital, and so will price labeling.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: I think everything was there, thank you for having me!

APPENDIX 9: Retailer Expert Interview: R7

Performed on:	XX.11.2024
Duration:	51 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Face-to-Face
Interview Language:	German

How old are you?

A: XX. [between 51 – 60 years]

What is the current position in your company?

A: Purchasing Department.

How many years of professional experience do you have in the DIY store industry?

A: XX years. [> 20 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: First of all, the customer has to go to the right hardware store to find us. And then there are a number of factors, such as finding the right product, which he is looking for as quickly as possible. If he needs good advice, then the item must of course be ready to take away, and the price must be right for the customer. If everything goes really well, and he is extremely satisfied, then he will receive support in the form of special services, whether at the saw or at the mixing machine. Then he will go home with a good feeling – and come back again.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: Usually, the customer wants to go to the store because they need one or more products for a construction or renovation project. They want to come to the store for this project, find the product or products quickly and take them with them. The customer doesn't need any frills. Find and go so they can move on. That's important. If the price is OK from their point of view, it fits. If it's not that easy and he needs advice first, then that has to be reflected so that the customer is completely satisfied. Nothing more. We can do that. What we could sometimes do better would be to add a friendly service and sometimes a little bit extra.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: Definitely not. We are not a Swedish furniture store and we don't want to drag customers through all the aisles. As a rule, we want customers to come to us and then quickly find what they are looking for. Even if they need advice, it is in our interest that the customer receives advice quickly and then leaves the store quickly. Of course, there are also customers who just want to go shopping, but that's less common. In their case, it's not in our interest if their time in the store is shorter, because that can work to our advantage. But all in all, we don't want customers to be in our store longer than they want to be. That's what I meant about the furniture store.

Which digital technologies do you use in your stores?

A: Today we use: our app, Click & Collect, which has become particularly important during the coronavirus pandemic; VR glasses in a few places; screens; QR codes; and configuration programs for all needs, from home or in the store. We even use these to create orders and send them.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: VR is perfect for the construction market. Our industry supports customers in creating new things, allowing them to visualize these visions as if by magic. This is the enthusiasm factor that must become more prevalent in our industry.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: I think exactly what has just been said. Digital technologies are only used when they work, and all these points play a role in that.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Basically the entire range; from fastening materials to wall design and the garden. I think it is mainly articles that need to be visualized or generally explained and commission items. When it comes to items that are customized, the customer expects transparency, plausibility and trust. Digital technologies can convey this.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: I think it mainly depends on the degree of utilization. There are industries that are significantly further ahead than we are. They use significantly more innovative technologies. But that doesn't mean it's better. As I said, the hardware

store doesn't always need bells and whistles. We have just discussed the important goals that satisfy the customer.

For which customer group(s) are digital technologies well / particularly well suited?

A: We could exclude a few groups now, but let's be honest, today everyone is able to use an app or the internet. And if it is other technologies that, as I said, are not yet available at the hardware store, then we would have to take another look, but I think everyone. An exception is perhaps VR, although even there I am always surprised. Just because someone is old doesn't mean they don't want to look through those glasses.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: I'll start with something very specific. I mentioned VR testing, which we carry out, so I'm on topic. We are currently discussing how we can measure the success of this technology and which metrics may be suitable. On the one hand, there is the duration of use or the period of time until the customer or user was able to successfully complete the request they made. But it is also about whether we can use an NPS, Net Promoter Score, or a CSAT, Customer Satisfaction Score, to determine customer satisfaction in a profitable way. Personally, I think that on the one hand, you shouldn't overdo it when it comes to this whole analysis, especially at the beginning, when things just need a little time to get established, but I think that both NPS and CSAT are two useful ways of measuring customer satisfaction in order to evaluate it. CSAT, where we use a scale to ask in a transaction-oriented way whether the customer was satisfied with the technology, and also the NPS score, which is more long-term oriented, where we again use a scale to ask whether the customer would recommend the technology in this case. In practice XXXX. It always depends on what we are talking about. If we are thinking of a survey for an app that is used by well over 10,000 customers, then an online survey or a CSAT would be much more suitable.

What level of importance will digital technologies have in the future compared to today?

A: We're still at the beginning. Yes. Yes. Done.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: In my opinion, the biggest hurdle is wanting to enter your data, wanting to provide your account information, wanting to enter your home address. Customers don't do that everywhere, at least not very often. Trust plays a major role here. We have to fulfill that, then the customer is willing to do it. They don't cheer when that's the case. But if it's not the case, they won't enter anything with us.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: If we look at the food sector: in-store navigation is becoming essential simply due to the shortage of skilled workers. When customers visit our stores, they need to find the products they are looking for quickly. They can't afford to wait for an employee to guide them to the product they are looking for. Therefore, the tool, what I see there in other industries, is something I can well imagine in the hardware store. It simply gives the customer a straightforward way to find the product they are looking for on their own, without having to wander the aisles looking for staff or the product itself. And it frees up staff capacity. Yes, that.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: In-store navigation. I just think it gives us a big advantage. We have the problem that it is becoming increasingly difficult for us to find employees in our stores, and they largely deal with questions like "Where is this?" and "Where is

that?" This is a suitable vehicle for that, and I would like to not only test it, but also introduce it across the board.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: Digital price labeling, just to finally get rid of the manual effort of putting labels on things. But I think that if we look very far into the future, we will also see the metaverse as a new universe, so that significantly more things can be simulated and displayed virtually. Digital checkouts will be normal. The customer will no longer have to lift goods, especially heavy cement bags, out of the shopping cart to place them on a checkout conveyor belt and then take them back down again. All that will be eliminated. And we will expand the app and continue to pursue the use of QR codes to be able to offer videos or similar content that is directly related to the product. Digital technologies will also be more interactive. If we take a look at the displays that play the same video clip all day long in a shelf unit today, they will no longer exist in the future. We are already seeing this. Suppliers who had these displays installed are phasing them out. Both the industry and we in retail are no longer interested in these devices. The customer wants added value. Interactive technologies achieve this better than static ones.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No, I'm excited to see what comes out.

APPENDIX 10: Retailer Expert Interview: R8

Performed on:	XX.11.2024
Duration:	49 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Video-Call
Interview Language:	German

How old are you?

A: XX. [between 51 and 60 years old]

What is the current position in your company?

A: I am a managing director.

How many years of professional experience do you have in the DIY store industry?

A: XX. [> 20 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: A good price or an attractive offer. The possibility to find a desired product in an appealing selection and then to pay for it quickly and easily, and preferably never to have to exchange it again because it does what it promises or what we promise the customer.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: As a rule, we have a wide variety of products and we are not a pharmacy, so it works. The well-known prejudice that it is difficult to find a product, also because there is no employee, is sometimes true, but not always.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: Let me put it the other way around: we don't force an extension. That doesn't do us any good. Of course it's nice when someone comes in to browse. But artificially prolonging that is not our thing. But neither is quickly putting someone out the door. Each to their own. In this context, however, it is also important to see that some of our customers have very different backgrounds and motivations for entering the market. The roofer probably wants to stay in the market for significantly less time than the retiree who wants to spend time in XXXX in the mornings.

Which digital technologies do you use in your stores?

A: We use digital point-of-sale systems, order and pick-up, configuration programs and programs that we, our customers, use in the market, and QR codes are actually used on every corner, as is the app.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A.: The product configurators help customers to get a first idea of what an item that requires explanation and is often individually manufactured might look like, such as different features. These are available for numerous items even today. This is always a good basis for a technical discussion with the consultant in the store. However, the customer often only gains certainty about expensive items that require explanation after they have created the item in the specialist program with the consultant.

I: What doesn't work so well?

A: Our app is not as sophisticated as it could be. It's good, but it could do more to improve customer satisfaction, but we're working on it.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: Good, intuitive usability and responsive display. If that's not the case, I close the browser or the app.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Our technical articles, where the customer needs detailed knowledge, certainly have potential and anything that can be projected in the sense of being visually simulated. That includes everything from timber construction, floor coverings, technical elements such as doors, gates, windows, wall design, paint, heating and plumbing, basically all product ranges.

I: What exactly characterizes these product ranges?

A: These are often exactly the items that have to be picked. Technology can help here.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: Generally speaking, other industries are often further ahead than the DIY store industry. The possibilities that currently exist for checkout systems are a good example of how the DIY store sector is not at the forefront of industry comparison. While other industries are already testing just-walk-out technologies, or purchases in other industries can already be paid for automatically using camera technology without the customer having to do anything, our industry is usually not that far along. We learn a lot from other industries, or, to put it positively, we certainly save a lot of money that would be spent on testing in other industries. The DIY market is more likely to follow suit

when innovative technologies have been successfully implemented and tested in other industries, and then participates in and uses these results with less risk for itself and only then implements them. That's why our industry is often not among the pioneers.

For which customer group(s) are digital technologies well / particularly well suited?

A: Of course, many people in old age now also write messages on their smartphones or use an app. But when it comes to newer technologies, it tends to be younger people. The DIY store is sometimes on shaky ground with the average age of its customers.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: Of course, there are hard figures, such as sales or the number of users, that can be used for the evaluation. But what I always find important is the following example of a digital checkout: on the one hand, I can look at the turnover generated by it, but I also recommend looking at the share of turnover it generates compared to all checkouts, including traditional checkouts operated by employees, because the share can be less meaningful compared to a single value. Generally speaking, individual figures are always of little use on their own and must be placed in the overall context. How is the company doing overall? How many customers have visited my stores in total during a certain period of time? This should not be forgotten. That's why proportions or calculation methods, where I put something into perspective, always make more sense in my opinion. A completely different approach could also be to use test users. Why not recruit test users for digital technologies, as is the case for products that can be purchased, this would help to get feedback afterwards. These could be very specific groups that deal with exactly this topic and thus offer added value and feedback.

What level of importance will digital technologies have in the future compared to today?

A: I think we can agree on that. The significance will be of great importance.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: I am thinking of intuitive usability. I believe that when a technology is brought to market, it should work at least 97.5% of the time. I think it's a risk to let the customer test it without labeling it.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: The payment system, as we know it from other industries, will be contactless. We will see that in DIY. We will stick to Click & Collect and expand it to Click & Meet. Why should the customer only be able to order goods in the future and pick them up from an agreed time? Similar to Click & Collect, the customer will receive advice at a fixed time or even in real time in the future. For example, via an advisor who can be connected directly via an app. If the customer has bought an item from us and has a question about how to assemble it, they don't want to have to drive back to the store to ask a question.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: I think very highly of robots. Not necessarily as a jack of all trades, but if it can advise on just one range, and do so in a targeted and competent way, that would be interesting.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: Robots, artificial worlds, such as augmented reality or the metaverse. This is the future. The reasons: it will take experience and advice to the next level. Those

who don't go along with it won't get ahead in the market. In addition, apps will cover a large proportion of the market, as they can easily solve numerous problems.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: I can't think of anything else. Thank you.

APPENDIX 11: Retailer Expert Interview: R9

Performed on:	XX.11.2024
Duration:	43 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxx
Kind of interview:	Face-to-Face
Interview Language:	German

How old are you?

A: XX. [between 51 and 60 years old]

What is the current position in your company?

A: I am on the management team.

How many years of professional experience do you have in the DIY store industry?

A: That's twenty years. [more than ten years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: Good advice, good quality, quick access to the goods. A fair price...

I: ...that means?

A: It doesn't always have to be the cheapest price, but it also shouldn't be the most expensive. A streamlined checkout process.

Which of these factors do you fulfill well/are in need of improvement? Please explain your answer.

A: I think in terms of price, we are in the world. On the whole, we are good at everything, but as always in life, there is always room for improvement.

Is it your goal to shorten the length of a stay of your customers in the store/s? What is your reason for this?

A: No, but it shouldn't be extended either. Here, the heterogeneity of our customers must be taken into account: every customer can and should be as free as they want to be. I know from other industries that artificial extensions can be negative, but on the other hand, I don't think it makes sense to want to shorten them either.

Which digital technologies do you use in your stores?

A: We have our app, cash register systems, every possible way of configuring products, for example using an app or even programs that we use at our information desks to advise customers, click & collect and barcodes that link to websites, for example videos or instructions, and we are also testing robots to find products. This is still very new, but on the one hand it helps with the practical task of finding a product when there are no employees around. Of course, it is also an experience for the customer, because it is not yet so common to have a robot guiding you through the shelves in a hardware store.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: I've already said something about the robot, which is certainly a technology that can be extremely inspiring. I think that configuration programs definitely contribute to customer satisfaction when the customer pre-configures an item via an app or on their PC at home. If the self-configured items are then entered into our technical planning tools and, ideally, sketches and illustrations are added, and the salesperson thus also confirms all critical points, such as terms like internal dimensions or butt joints, then that's the moment when customer

expectations are exceeded and enthusiasm is sparked. The customer feels taken by the hand, secure and motivated to continue with their project.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: At the hardware store, they are expedient, i.e. they quickly, correctly, understandably and without complications lead to the desired result.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Primarily design-oriented product ranges: bathrooms, paint and wallpaper, home furnishings. The reason for this is the need for support in customer service, but also the demand for customization.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: Sometimes we have software developed for the construction market that we get provided by industry. But I think that's the case in every industry.

I: Can you be more specific? What should I imagine?

A: Let's take a piece of software that simulates flooring or cutting software, things like that. You won't find that in the supermarket; it will have software that we won't use.

For which customer group(s) are digital technologies well / particularly well suited?

A: The very young and the relatively old customer groups are to be excluded, albeit only to a limited extent. But otherwise: for everyone.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: We use a whole range of key figures. It starts with quantitative variables such as turnover, sales, or users for our social media pages or the app. On the other hand, we also have qualitative checks in the form of surveys that are conducted in whatever form. With regard to digital technologies, it would of course be interesting to analyze how often they are used, for how long, and how long it takes for the customer to reach their goal, if they reach it at all. But also analyses that are driven semantically. We use software support for this. It analyzes how we are rated on the web, how we are written about, not only on our pages, but also on social media, scouring search engines, portals, forums, all these things. Positive things are then identified, but so are complaints. We often notice such things when analyzing our own websites or, for example, Google reviews, where customers post comments and give feedback on everything: on items, on shipping speed, on individual employees, on any experiences, including those with advice, both analog and digital.

I: Are there still very specific challenges for hardware stores in this context?

A: The theoretical foundations available for measuring customer satisfaction are not new. For us, it is therefore important to know how we can explicitly measure our specific industry and, in this case, the success of digital technologies in our specific industry. For example, we intensively evaluate the use of video tutorials and learn, among other things, for which product categories these videos are clicked particularly often in order to learn which products are relevant for customers with regard to video tutorials. Semantic analysis can also evaluate the comments in these videos to determine whether video tutorials for certain products or product groups are explicitly requested. I think that's the universal thing, throwing on the DIY costume.

What level of importance will digital technologies have in the future compared to today?

A: The whole world is becoming more digitalized every day. The construction market is part of this world and will continue to be so for us. Its importance is growing every day.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: Maybe there should be fewer offers and I have more generalist support. The problem is that everyone is working on technologies right now, and in the end everyone has a selection of tens of thousands of options and has to constantly rethink. So I think the range has to be established but limited.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: There will be more unmanned checkouts and advice at the push of a button. I'm thinking of technology companies that can connect directly to my computer and provide support. This is also needed in our DIY world.

Regardless of any regulations: Are there other digital technologies that you would like to use in your store(s) in the future?

A: Advice using digital glasses with headphones, preferably in specially designed consultation rooms, not on the open sales floor. That would be an important step.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: The app and the QR code. The QR code has the advantage of being versatile. It can link directly to the desired target, so that the customer can quickly find the information they want. I see the app as standard. Virtual reality will also gain in importance. Click & collect will remain, video displays will remain and videos that can be accessed will also remain, especially with us.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: One point we must not forget in this context is that all the technologies we are talking about add a great deal of value in theory. We must not forget that the reality is often different: not every market has electricity or the internet in the desired locations for the integration of a digital technology; employees do not want to integrate these technologies because of a fear of the new; and we can we introduce technologies that, for example, film customers and store data at all in the context of data protection laws? Quite apart from the financial investments behind it, where we don't know how long it will take for a return. That is the reality.

APPENDIX 12: Supplier Expert Interview: S1

Performed on:	XX.10.2023
Duration:	26 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxxx
Kind of interview:	Video Call
Interview Language:	German

How old are you?

A: XX years. [between 41– 50 years]

What is the current position in your company?

A: Area Sales Manager.

How many years of professional experience do you have in the DIY store industry?

A: XX years. [> 30 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: I would be satisfied with expert advice. Of course, the topics of range and price are also important points. In my opinion, further services, such as a tradesman service, would be extremely satisfying.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: Of course, we need to differentiate between the various DIY store groups here. There are DIY stores that offer the customer the complete carefree package, from online reservation, click & collect, prepared goods collection, to installation, and other groups that perform significantly less well. I believe that customer

expectations also vary depending on which DIY store group they visit. [short interruption]

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: I think that the goal of the construction market is to extend the length of stay, as long as it is associated with the customer buying more items.

Which digital technologies does DIY retail use in its stores?

A: These are partly displays for special items or configurators that can be used for products with individual dimensions, such as windows. moveIT, for example, also plays an important role here.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: First of all, I believe that displays that play sound on one side have a negative impact on customer satisfaction. Digital technologies that satisfy, or even exceptionally satisfy, are, for me, configurators, because the customer would not necessarily expect this when buying, for example, a worktop with a sink cut-out or perhaps a door.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: In my view, safety is very important, so that the customer can be sure that the product is suitable for their home. I also believe that transparency is important.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: There are definitely product ranges where you don't need it. For example, in the area of building materials, for example cement. However, if I work constructively, i.e. in a planning capacity, and digital technologies can provide me with information that is relevant to my construction project, then these are certainly important. For example, if I want to build a carport and digital technologies tell me which materials I need, then the suitability would certainly be important and also give the customer the necessary security.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: I think the basic ideas are the same, but other industries are further ahead in terms of features.

For which customer group(s) are digital technologies well / particularly well suited?

A: I would categorize them by age group. The young generation is certainly more digitally savvy. In my opinion, silver agers are more likely to work with inserts and cannot be inspired by an app. So you probably need a combination of both.

What level of importance will digital technologies have in the future compared to today?

A: I also think that this will depend on the home improvement store groups. Perhaps there will even be home improvement store groups that no longer have employees on site, but only avatars. However, there will also be local suppliers that continue to operate in the traditional way. I think that the gap between extreme digitalization and those who have not made the leap will continue to widen.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: I think the most important thing here is that digital technologies are understandable and secure. Today, there are some technologies that have still not been thought through to the end. I think that in the future this must no longer be the case if customers are to be truly satisfied.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: Perhaps these self-service checkouts, I can imagine that, and digital price tags, I think.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: I would like to try virtual reality goggles that allow you to touch real objects, because the feel of many products also plays an important role.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: In my opinion, the configurators will continue to increase. The same applies to digital price labeling, in order to be able to react to possible price fluctuations on the part of industry.

Zum Abschluss eine **allgemeine Frage**:

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: I think that a big issue is still that when I buy really expensive products, that I get the security in the hardware store and also the feeling that I am in the right

place, because in the future there will be fewer and fewer skilled workers there and digital technologies can be a great support.

APPENDIX 13: Supplier Expert Interview: S2

Performed on:	XX.10.2023
Duration:	46 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxxx
Kind of interview:	Face-to-Face
Interview Language:	German

How old are you?

A: XX. [between 51 and 60 years old]

What is the current position in your company?

A: Senior Sales Manager

How many years of professional experience do you have in the DIY store industry?

A: XX years. [> 20 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: As I see it, the availability of goods and finding the goods is an important point in the first instance, and I am satisfied. If the price is right and more lucrative compared to other items, then I am even happier. If I also get personal advice on top of that, then I am extremely satisfied. I see the added value in the advice that I actually go to the hardware store and hope that all the products are available and, best of all, at the best price. The advice then leads me to recommend additional items. In today's world, I see these points as the most important. What I would also like to add is that the focus should be on branded items, for example by demonstrating them to industrial employees on site.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: I believe that the DIY stores are well positioned in terms of product variety. I think that the DIY stores are well to very well positioned. I also believe that the issue of price is very well met, since the prices are more or less the same. Promotions are certainly an exception to this. I see a need for improvement in terms of service and the range of services. In this sense, I mean, for example, advice, but also product repairs, for example. For me, it's not just about exchanging the product or refunding the purchase price, but really about providing a service. I think that money is not always the only solution.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: I'll give you a mixed answer. You have to differentiate between the target group. The handyman certainly needs to find the product quickly and complete the purchase. The project customer is likely to be looking for several items and would like a little guidance here. By projects, I mean, for example, garden projects or extensive renovation projects. A third group is that of pensioners who want to spend time in the hardware store. They certainly also expect to find inspiration to a certain extent.

Which digital technologies does DIY retail use in its stores?

A: The video tutorials are definitely there, as are the terminals, QR codes, apps and click & collect. You have less artificial intelligence and augmented reality.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: The self-scanning, QR codes and apps certainly contribute to customer satisfaction. The same applies to Click & Collect. Now, where I think it's less good is certainly augmented reality. I think there is room for improvement there, and the same goes for product configurators. I don't think the product configurators are quite optimal yet, for example when building a kitchen. Video terminals certainly look nice. However, they tend to be rather annoying for customers, because the video usually doesn't tell you what you really need. That's rather negative. The topics of virtual reality and augmented reality, if they are used, are not really for DIY customers, because DIY customers are on average older than 50 and this group uses these things less.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: The most important thing is certainly security. By that I mean not only having the right product, but also the guarantee that the whole thing will work, especially for projects. This is an issue, for example, when painting, where the customer needs to know something about surfaces and the appropriate primer to ensure that the project works. Data protection is certainly also very important because, as a customer, I don't want my data to be misused. I always look at the threshold when a customer first has to register somewhere, for example, with personal information. Something like that is always difficult for the customer. Transparency, of course. Then, especially when it comes to sustainability, I would go very far and consider certifications to be very important. This should also be displayed by digital technologies or placed in the foreground. Therefore, I think that the more transparently we present things, the more satisfied the

customer is. In conclusion, I have to say that usability, transparency and timeliness are most important.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Where I find digital technologies very useful is in technical products or in modular products or projects. Where I consider digital technologies to be important is in emotional products, even if you later have avatars or something similar that represents your personal situation at home and brings it to the screen and simulates your actual and target situation. I see even more great opportunities there.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: I believe that digital technologies are more likely to be used in the electrical sector, which makes sense, since if a customer buys electronic or digital high-tech items, they are likely to be more receptive to digital technologies at the POS that promote sales and customer satisfaction. The food retail sector is certainly also further ahead. For example, when I look at how much inspiration there is there in terms of various recipes, weight loss programs or cooking tutorials. In this area, they are also much further ahead in terms of topics such as how to deliver a lot of inspiration in analog and digital form at the point of sale during asparagus season. A lot more is happening in food retailing than in DIY. The automotive industry is certainly leading the way when I think about how far configurators have come, including illustrations and details.

For which customer group(s) are digital technologies well / particularly well suited?

A: A young customer is certainly the most suitable for digital technology, but is not the classic DIY customer, as they are, as I said, over 50 years old.

What level of importance will digital technologies have in the future compared to today?

A: They will certainly become more and more important. I just look at the other industries around us, they are much further along and the DIY store will get there too. Maybe not in the dimension, but the importance will continue to grow.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: Certainly, the topic of artificial intelligence needs to be used more, as it is expected by younger customers in particular. Here I am just thinking of Chat GPT. I am certainly also concerned about influence, which can be more strongly promoted using technologies, even if this is certainly ethically difficult. In general, I think that digital technologies have to run more securely than they do today, in the sense that they do what the customer expects. I believe that digital technologies today often fail to meet real customer needs in the course of application, because it jerks here and there, and their use is then aborted. Also, there is the issue of illustrating colors, for example, which I have already mentioned. This could be fulfilled by augmented reality at all and even better. The aim is to get closer to reality.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: Certainly anything that contributes to digital advice. Such as chat bots or video telephony, for example, which allows you to speak to specialist staff who are not currently at your home or in the hardware store.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: That would clearly be the topic of Meta Verse. That would be great, of course, because it would help me reach a level that an interior designer, for example, would help me with. Or even if I just know that I want to create a home office

and am completely out of ideas, the digital world could be used to project comprehensive suggestions directly onto a pair of glasses, for example. If that could then take place interactively with specialist consultants, that would be best.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: So, for sure, these are apps, QR codes, because these brochures and generally paper will replace, which is becoming more and more expensive and will be less in the future. Videos will also remain in the hardware store, but the content will be more targeted. In the hardware store, it is certainly also important that digital technologies project the topics of trends, spatial planning or even garden projects in an advisory capacity. I think that this will become even more important due to the fact that space in hardware stores is becoming increasingly expensive and specialist staff are becoming increasingly rare. In summary, digital technologies should therefore replace specialist staff and provide advice. When it comes to artificial intelligence, I think the DIY store still needs something, because this only works when products that require explanation are explained flawlessly and without errors. This is certainly still a long way off today due to the complexity.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No, not like that. I think the questionnaire contains all the important questions. So I don't have anything to add.

APPENDIX 14: Supplier Expert Interview: S3

Performed on:	XX.10.2023
Duration:	44 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxxx
Kind of interview:	Phone Call
Interview Language:	German

How old are you?

A: XX years. [between 51 – 60 years]

What is the current position in your company?

A: Area manager DIY.

How many years of professional experience do you have in the DIY store industry?

A: About XX years. [> 20 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: That is the availability of goods, prices of course, especially for comparable items. The product depth is very important; by that I mean that one or two DIY stores have a few more items that go beyond the standard product range, i.e. the standard items; that is also inspiring. Guidance is another important element, this is certainly a prerequisite.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: Depending on the hardware store, availability is not always guaranteed. The prices are usually very identical. The topic of guidance is good. Consulting services, in my opinion, could be improved again. You simply don't usually have enough specialized staff.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: In my opinion, it's impossible to say. For tradespeople, it's certainly the case that they don't want to spend a long time in the DIY store; they want to get back to the construction site quickly, which is why there are drive-in stores, for example. The end customer should stay in the DIY store for longer, as they don't always have all the items in full view, and this is also because they don't always have all the details in front of them, such as product features. Therefore, the customer should be kept in the DIY store for a longer period of time, not in the IKEA way, the aisles are labeled, but you try to show the customer things.

Which digital technologies does DIY retail use in its stores?

A: Video tutorials are available, yes. Product configurators for employees, but not for customers. Apps, QR codes are available and sometimes even self-scanning checkouts. I would exclude augmented reality, meta-verses and artificial intelligence.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: Apps, QR codes, self-scanning are positive, configurators are positive and so is Click & Meet, when you order at home and then pick it up in the store, that's what you mean, right?

I: Yes, indeed.

A: Then that too, yes. I think these are all things that people can deal with today and that satisfy people. Basically, I see things as positive that successfully support the customer. In my view, advertising that runs automatically on screens and is one-sided is negative. This tends to annoy customers, and I am also critical of AI because I think that customers tend to be afraid of it. In summary, in my view, the things that support and the negative things are the things that want to replace. As for exceeding expectations, I think that's AI and augmented reality when it works and you can look at your bathroom with such glasses, I think it's pretty cool when the customer can look at their bathroom.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: From the end customer's point of view, it must be absolutely possible to use; it must be self-explanatory, it must work intuitively. In my opinion, it is also important to keep up to date; it is of no use if, for example, the customer decides on a certain color for a product and then, for example, the color is not displayed. In the end, it is certainly also the documentation. Particularly with products that require explanation, the customer wants to be able to look at things again later at home in peace. From an employee's point of view, security is an important point. It is important that the employee does not have problems afterwards, that a customer can say that something is wrong, for example, with an XXX, and the

DIY store employee then gets into trouble. In this respect, security and also up-to-dateness, of course.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Two areas immediately come to mind. One is color and design. There are areas where you bring a photo from home and then say, "I want to redesign this like this." It is important to give the customer an idea. At least it's always easier for me if I can see what it might look like at home given the respective conditions. A second area is the area of machines and tools. The intended use determines the selection of the machine and the tool. It is important that customers get an answer to a question they have, that they are helped.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: What you can see, what is currently spilling over from the food trade, is the topic of digital price labeling. This is just beginning at XXX or at XXX you can see that too. With food, the customer often has his brand, his variety, in front of his eyes, and at the hardware store, I believe that the customer usually only buys things once or twice in a lifetime. And here it would be good if AI could help, for example, if the customer wants to hang a shelf and the AI then helps by taking into account the respective surface. This is different for plasterboard walls or other surfaces.

For which customer group(s) are digital technologies well / particularly well suited?

A: I think digital technologies are particularly suitable for customers who are 20-35 years old. If this customer group asks a question there, it will be answered specifically. I also think that people of this age group are very comfortable with this kind of thing – digital natives, as you would probably say. I also think that people who don't have the background can handle it well. For example, people who prefer to ask questions anonymously and don't want to reveal their

helplessness. Older people tend to seek personal contact and want to enjoy personal advice, I think.

What level of importance will digital technologies have in the future compared to today?

A: I think that in the future, the number of employees in hardware stores will decrease, also due to the shortage of skilled workers. Therefore, I think digital technologies will become increasingly important and will probably soon have the same value as an employee today.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: What is important is that digital technologies work in such a way that things can be displayed one-to-one, so that the image is very close to reality. The translation must work well in this respect. Technologies must convey a sense of security; the end customer must be sure that the screw is the right length and that it will hold. The technologies must be able to provide a range of correct answers.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: Definitely the topic of digital price labeling. And that would be a topic such as a robot or something that causes the topic of question-answering to be displayed. Another topic would be that of the checkout process, which speeds up the topic of the checkout process.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: I would love to test a robot that accompanies customers to the shelf and provides advice. This robot should also be able to engage in dialog with the customer and, if necessary, provide advice on other items, such as the appropriate wall plug for a screw.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: The topic of AI will certainly continue to gain ground, and DIY stores will have to prepare for that more intensively. Other things, like self-scanning, already exist, as does Click & Meet. Video meetings are also established, especially after Corona. I think we will certainly see more of that.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: For me, it is generally important that, alongside digital technologies, the topic of humanity is not forgotten. I think that being surrounded only by artificial intelligence is not the future either.

APPENDIX 15: Supplier Expert Interview: S4

Performed on:	XX.10.2023
Duration:	34 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxx
Kind of interview:	Phone Call
Interview Language:	German

How old are you?

A: XX years. [between 31 – 40 years]

What is the current position in your company?

A: Key Account Manager DIY.

How many years of professional experience do you have in the DIY store industry?

A: A total of XX years. [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: First of all, a comprehensive range of goods and availability. Then a decent guidance system that I can use without asking people to know where I have to go. In addition, an atmosphere, cleanliness and order are important so that I enjoy being in the store. Then I think that the topic of advice is important, that I can address someone. Pricing is also important. It's certainly not about the best price, but it shouldn't be 30% more expensive either. The checkout process is also important. It has to be quick.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: The availability of goods is indeed an issue, as the product is sometimes not immediately available. Then the issue of advice is an issue, that is certainly a sticking point. Orientation is also an issue; often you can't find your product immediately, that needs to be improved.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: The fundamental goal is to extend the length of time customers spend in the DIY store, thus generating further cross-selling sales. I think that's one of the DIY store's objectives.

Which digital technologies does DIY retail use in its stores?

A: So self-scanning, possibly price information terminals, possibly services via touch, i.e. digital information pillars where information is displayed or information that the customer can operate by touch. An app is still an option, as for example XXX uses it. I think that was it, yes.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: Self-scanning is one of the most important things for me. Payment should be quick, if it's not fun anyway. The XXX-Finder, for example, is a very useful tool that makes the customer happy. I think the screens that play content without the customer's request are superfluous. They tend to bother the customer.

I: You mean one-sided sound, right?

A: Yes, exactly, things I don't interact with, exactly.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: Ease of use and then there's the issue of security. If I buy a door, for example, and can take a picture of my room using AR and AI and the dimensions are calculated correctly, I think it's important that the digital technologies are easy to understand and that they work well and securely. I think the key here is always that it's easy to use the technologies and that they work. If that's not the case, then it's somehow not that cool for the end customer.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: So actually, I believe that digital technologies can be very helpful when it comes to project thinking, such as a bathroom planner. I'm thinking of floor-laying work, where technology can tell me how much I need of each item. In general, it can be said that the more extensive the range and the more explanation it needs, the more likely it is that technology can be helpful. For example, it can also be important to find instructions, such as a video, that explains a roller shutter, for example.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: The automotive industry has reached the point where I can buy a very expensive product without going to the store. This is, of course, a very big difference. In gastronomy, it is common for robots to be used, which is something that is not yet seen in hardware stores. In general, it can certainly be said that hardware stores are always very late in their use of digital technologies. Digital technologies that are available in hardware stores are usually already in use in other industries five years earlier.

For which customer group(s) are digital technologies well / particularly well suited?

A: In principle, digital technologies are suitable for the younger customer group, which I would define as 20-40 years old. The older the customer gets, the less demanding they are of digital technologies.

What level of importance will digital technologies have in the future compared to today?

A: I think it's a big part. The construction market has to invest in these technologies. It's just important.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: Usability, security and functionality must simply work, otherwise they will lead to dissatisfaction. The topic of AI will also play a major role, as it improves these factors and makes for easier use.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: The NFC checkout, where I no longer have to stand at the checkout, but simply walk out of the store with my item and the item is paid for. Robots would continue to be interesting, bringing the goods to the customer, I can imagine that we will see that in a few years, also because of the possibility that they can also provide advice. This alone against the background of the shortage of skilled workers.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: I would like to see a pair of VR glasses of the highest quality that work perfectly and have an enormous range of possible applications; or even just a frame that can do it. That would be very interesting.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I think that the topic of check-out, as described above, will be further developed in a smarter way and on the other hand, I think that one-sided sound will disappear. I also think that the QR code will disappear. I think it is more likely that the QR code will become established, for example, for assembly instructions, with a link to YouTube pages, for example.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: The only other thing I would like to mention is the issue of abuse. Digitalization also opens the floodgates to abuse. Therefore, I think that this is an issue that must be kept in mind by industry and trade. This is certainly also an ethical issue.

APPENDIX 16: Supplier Expert Interview: S5

Performed on:	XX.11.2023
Duration:	37 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxx
Kind of interview:	Phone Call
Interview Language:	German

How old are you?

A: I am XX [between 31 and 40 years old]

What is the current position in your company?

A: Regional Sales Manager.

How many years of professional experience do you have in the DIY store industry?

A: XX years, XXXX. [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: For me, the most important thing at the POS is that the goods are available. The topic of guidance and findability is also important, because very often customers can't find the products at all. Another important topic is advice. Often, customers don't know whether they have found the row of shelves where the goods are, whether this is the right anchor or how to paint the wall exactly.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: This has to be analyzed by DIY store groups. Availability of goods is usually given. I think that orientation in the market is also getting better and better in the

stores. In my opinion, the biggest shortcoming is the advice given at the point of sale.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: My assessment is that the construction market is rather rudimentary in this respect. In my opinion, a DIY store does not address emotional topics so much; rather, it is more a matter of ensuring that goods are available and that the store adapts to the building. It is not the same as in the food sector, where thought is given to the height of shelves and how the customer walks through the store, for example.

Which digital technologies does DIY retail use in its stores?

A: I believe that all DIY stores now have self-scanning checkouts. If we look, apps have all of them too. Virtual reality has been tested with some customer groups, but I don't think it's used anymore because an advisor was always needed and they weren't always available. It was also dropped because of the costs. Video tutorials are used, with some DIY stores working with product configurators, but these are provided by industry. Terminals are also used, for example by XXX manufacturers.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: Apps contribute to satisfaction when they are customized, i.e. when they provide added value for the customer. If they help with a project, for example, then that can contribute to satisfaction. I think virtual reality always comes down

to the software: if it works well, then it can contribute to satisfaction. But if fundamental things are missing, it can also lead to dissatisfaction. Product configurators can be good because the customer can use this tool to see the entire product range and thus also see the dimensions and get an understanding of it. Video tutorials are indispensable, especially for today's generation. They must be designed with the target group in mind. Self-scanning checkouts can lead to dissatisfaction among people who may not be familiar with them. Terminals can be a good thing, but they can also contribute to dissatisfaction if they don't work well.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: Data protection is, of course, an issue. But even more important is the issue of security. When a customer uses a configurator to put something together, it has to be right, and it has to work properly. Security, usability and up-to-dateness are then important in combination.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: I think that in a hardware store, you can offer a digital add-on for almost every product range. In my view, this is because people do not often come into contact with DIY store items, so digital technology can help with almost any product. But there are certainly other product ranges that need it more, where advice is needed. Anchors are another example, or plumbing. The problem for DIY stores there is that they can't find staff who can provide good advice.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: I think that the other industries, above all, use technologies better and more intensively. In my opinion, the construction market often neglects such opportunities. I think that's the main difference. I see less great technology in that area, but rather more intensive use in other industries.

For which customer group(s) are digital technologies well / particularly well suited?

A: I think it has to be suitable for everyone, as staff shortages are becoming more and more of an issue; however, younger people may be a bit more open to technology.

What level of importance will digital technologies have in the future compared to today?

A: It will definitely increase. It is simply essential not to use digital technologies, but I see it as additive.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: They should A, bring added value for the customer. But you would also have to B put these technologies in focus. Using the example of XXX, there is a configurator on the shelf, but the customer doesn't even notice it or accept it. In the end, the customer then looks for the hardware store employee, who then clicks through the configuration of the configurator, because he doesn't know any better either, which the customer should actually have been able to use independently.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: In the end, we have product ranges in the DIY store that require a lot of advice and are highly complex, so I think it is AI technologies that can provide advice. That would be a problem solver. Furthermore, a digital, I'll call it customer control, could be an issue. If I have a customer who is looking for things for a project, then this technology helps in that regard. I mean something like Shop the Look, when you buy an item in the fashion sector and then an entire look can be shopped, the customer is advised on that. That's what I mean, or the

inspiration provided by booths in the furniture trade. That also encourages the sale of additional items. This can be achieved with digital technologies and you should try to reach several target groups. It should be about not only continuing to attract customers over 50 to hardware stores, but also being more creative and courageous and addressing new target groups.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: AI-based advice.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I think that there is no alternative to self-scanning checkouts, so they will stick around. This is something that everyone is growing up with, it is here to stay, and people are increasingly using them. Where things need to be done is in the area of consulting services and digitizing them, everything that contributes to this. And it's about the convenience concept, which needs to be expanded. Expanding it with digital technologies will also establish itself.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: I think that the hardware store has to do more to create an experience for the customer. Look at IKEA, people go there on weekends as a kind of outing, with lunch included. The hardware store has to do something like that.

APPENDIX 17: Supplier Expert Interview: S6

Performed on:	XX.11.2024
Duration:	53 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxx
Kind of interview:	Video Call
Interview Language:	German

How old are you?

A: I am now XX. [between 51 and 60 years old]

What is the current position in your company?

A: I am employed as a key account manager.

How many years of professional experience do you have in the DIY store industry?

A: That makes it over XX years today. [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: So, as a basic principle, I think that the customer should be able to find the products they are looking for, even if they don't know exactly what they are looking for, and that the product that will help solve their problem is in stock. This must then be offered at an attractive price; it doesn't necessarily have to be the cheapest price on the internet, but it should be affordable. Extraordinary customer satisfaction arises from enthusiasm: when employees in the store do everything they can to ensure that the customer feels good when they leave, that is extraordinary enthusiasm. Inspiring customers and perhaps also going above and beyond can be done if I don't have to wait in line at the checkout, but can perhaps pay in advance by pre-ordering goods so that the checkout process is no

longer necessary. I see these two points as extremely inspiring. At least in the hardware store.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: Home improvement stores are good at keeping products in stock, which is due to the size of the stores and the ability to store goods on high shelves. DIY stores are also good at offering prices that fit into the world. That's also good and it makes the customer feel they're in good hands. DIY stores are not always good at picking up customers in the aisles and offering advice. Unfortunately, that's sometimes lacking and it's also the typical thing. Finding someone who really provides expert, valuable advice. Unfortunately, that's not always the case everywhere. So it happens from time to time that a customer wanders through the aisles of the huge DIY stores for a long time and can't find their way around. This then leads to dissatisfaction and, in the worst case, the customer leaves without taking the item they were looking for.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: From the point of view that the customer should be served quickly and find his goods quickly, one could assume that, but the market also benefits if the customer stays in the market a little longer. From this point of view, I assume that this is not the market's motivation, no. My opinion is that the DIY store does not think in either direction, not in terms of shortening the time spent there, but also not in terms of extending it. That would be new to me.

Which digital technologies does DIY retail use in its stores?

A: Apps are widespread in the entire market and are used by all players in the market, sometimes even from within the industry. This is accompanied by videos that can be viewed there, which can be found and viewed in the app when it comes to explanatory videos. Alternatively, customers can access the videos via QR technology. What still exists, and I don't know why, are the videos that run unsolicited in the market, without anyone starting them, i.e. these

continuous video screens, for example on tablets or mini screens. The stores then also have configurators that employees can use to trigger and pre-enter orders for customer orders. What can also be seen more and more in stores are centrally managed price labels displayed on screens.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: I think that anything that doesn't provide targeted support has a negative impact. Endless brochures or, in the field of technology, video displays. For these things, too much information that I don't need applies. And with a display with sound, it's more distracting than helpful. Apps, on the other hand, are excellent and have a positive impact. The scope of the apps does not increase daily. The app provides numerous solutions that the customer is looking for, supports him in his creative process, keeps him up to date with orders, takes measurements for products or I leaf through it as a customer in a brochure.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: From my point of view, the most important factors are usability, up-to-dateness and functionality. The usability must be easy for the customer to understand and logical to work with. For me, up-to-dateness is important because this topic sometimes causes problems in the hardware store. For example, the topic of paper price labels often causes confusion. Prices at the checkout are often different from those on the shelf label. If the same thing happens with digital technologies, it's a no-go. The data should therefore always be up to date, and if, for example, an article is indicated as being available in the store, then it should also be available in the store. Otherwise, the customer will

drive to the store based on this information and in vain. Functionality is the be-all and end-all. If an app doesn't work or is difficult to understand and use, if things break off, the software crashes, freezes. All of this leads to dissatisfaction and then there is no trace of customer satisfaction.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: At the hardware store, everything related to the project. At the hardware store, the customer is most likely to buy project-related things that require explanation. We work in the bathroom, install windows, and want to lay a floor. These are the reasons or factors. These are all product ranges where I need a visual representation, these are product ranges where digital technologies can be important aids in helping customers to decide on something, perhaps even something that they weren't even sure they wanted to implement when they entered the DIY store, or the dimensions of which were much smaller before. Digital technologies are strong supporters here.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: It depends on the industry, of course. In the fashion industry, everything is more colorful, faster, further, higher and louder. We see digital technologies such as giant screens that can be larger than the customer themselves and project the customer into another world. In the food industry, it is more the case that the customer goes to the store two or three or maybe even four times a week and wants to more or less quickly work through their shopping list. And in this case, instead of being higher, faster and further, technologies must help to ensure that the customer can leave the store quickly and have time for their family. In this case, it is more a technology that speeds up the process, for example, ordering at a counter or paying for the goods. I think it is difficult to compare these things, but I think it is also clear what I am getting at.

I: I think so, but again, to be on the safe side, more specifically.

A: It's like that, in the supermarket I want to find my items quickly and work through my shopping list. In the shoe store, I might not even know if I need shoes at all and which ones are available, which ones are trendy. In the hardware store, you have this technical-manual component that you don't have in any other industry, which is why this comparison is so difficult for me and it makes so much sense to shed some light on it here.

For which customer group(s) are digital technologies well / particularly well suited?

A: Especially for digital natives, of course. Hence the name. People who are comfortable online definitely have an advantage. But on the other hand, I wouldn't want to exclude anyone these days.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: Let's start with measurable, elementary values: there would be turnover, sales, number of users, duration of use. Then it would certainly be appropriate for surveys to be conducted so that we can get in touch with users. This would be conceivable and certainly useful on a scale board or in a survey.

What level of importance will digital technologies have in the future compared to today?

A: It won't stop, there will be more and more. But that applies to every area of life. Today's technological possibilities will reach areas that no one has even thought of yet. The question is whether it will ever stop.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A:. That is related to the question we had in question nine. That says the most important thing.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: The contactless checkout, the increased use of apps, digital price tags and QR codes are here to stay and will continue to gain ground. Guidance in the sense of enabling customers to find the product they are looking for with a little help, for example directly in the app, is also here to stay.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: The contactless checkout.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: In-store navigation: I think that in a DIY store in particular, where more than 20,000 or 30,000 items are on sale, it is one of the most important aids we can offer customers to find the needle in the haystack. In-store navigation is the best solution for this. Incidentally, regarding the QR code, I still think we must not forget that the QR code offers the possibility of paying for goods or services directly. This is already happening today. Not in the hardware store, but these possibilities do exist. If we think about the topic of QR codes further, we could also securely store loyalty programs in the future, such as Payback or similar programs, via blockchain. Particularly in view of the numerous discussions currently taking place on the subject of data security and data protection, the possibility of blockchains, which are considered to be much more secure, must be given serious consideration – and that includes for the DIY store. I think I've already mentioned that videos are here to stay. But videos, i.e. instruction videos

or product comparison videos, all that will remain. This is established and in times of smartphones, which are scrolled up and down, it is impossible to imagine the world without them. After all, customers compare all the time. When they come into the store, they know where their desired item is cheapest and what it can supposedly do better than the item from the competitor's brand.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: I have nothing to add, no thanks. Very detailed.

APPENDIX 18: Supplier Expert Interview: S7

Performed on:	XX.11.2024
Duration:	48 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxxx
Kind of interview:	Video Call
Interview Language:	German

How old are you?

A: XX. [between 31 – 40 years]

What is the current position in your company?

A: I work in product management.

How many years of professional experience do you have in the DIY store industry?

A: That's twenty years. [more than ten years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: Availability of goods, competitive prices, guidance, i.e. that I can find the product I am looking for and, in the case of extraordinary things and digital technologies, enthusiasm through the mediation that I have not wasted my time here, but go home with a spring in my step, a good feeling and solved problems.

I: Sounds like there's more to come?

A: Easy payment is also something that is extraordinary. No longer having to put purchases on the checkout conveyor belt, no longer having to queue, no longer having to scan items yourself. Automated payment.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: When advice is given, it is mainly to answer specific technical questions that the customer does not always understand, because when they seek advice, they have a topic in which they are not well versed. This can be answered by employees in a concrete way. Where else would you want to achieve this other than in the DIY store? A tradesman would not advise you over the phone for free. The topics of the moment, the checkout problem, in the sense that waiting times can be long and heavy items have to be unpacked again, are in need of improvement, especially for people who are not that strong. Otherwise, there is the topic of product finding, product availability, targeted advice. If there is no advice, customers search for too long, can't find the right item, or maybe they have just picked out the one thing at home and then can't find it in the hardware store. Then there is the lack of advice, a lack of guidance.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: I don't know. I think it depends on the market. There are some that are more conducive to strolling and others that appeal to the hardcore DIYer.

I: in other words?

A: The latter needs to get things quickly, while the former has time to spend in the store. I think I choose the hardware store I want to visit depending on what I need. And some stores are better suited to my preferences than others.

Which digital technologies does DIY retail use in its stores?

A: Digital point of sale systems, digital price labeling, VR, touch displays, click & collect, applications and configurators.

I: Which configurators are we talking about exactly?

A: Configurators used in the planning departments to create order confirmations for customers based on their configurations, which they can then give to them.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: When it works, it has a positive effect on everyone. Particularly noteworthy is VR. This is great when customers have the opportunity to see a bathroom that they want to renovate fully visualized in front of them and to be able to make virtual adjustments if necessary. This really helps to put the customer at ease and gives them the feeling that things are going well and that they are in the right place. Especially when it comes to expensive products that are customized and configured, I think it's important to give the customer the good feeling that the product fits, is not too small and not too big, and has exactly the right dimensions.

I: Which digital technologies are more likely to have negative effects and be less well received by customers?

A: Displays that just run in front of you are not well received. Nobody pays attention to them anyway.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: It is essential that the digital technology I choose is faster than all the other options I have. After all, that's the motivation for using this digital technology. So the technology has to work, be easy to use and stick with me. By that I mean that it has to be interesting to complete the purchase process I'm going through, with the app or whatever technology, to the end. There must be no issues that cause me to abort the process. For example, there is the issue of me wanting to pay for an item and not being able to find a payment option that suits me. If I then abort the purchase, that's the most frustrating thing that can happen,

because I or the customer then thinks, “Now I've wasted my valuable time pointlessly.”

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: The use of digital technologies for the plumbing and bathroom area is a must. These are the most expensive rooms in the house to renovate, there is a lot of technical education needed and the customer also wants to experience and see this in a simulation. A customer doesn't know what is currently on the market, since the time frame or better the time interval for renovating bathrooms is about 20 years. So you have to find out what's going on. Of course, it's also helpful for projects in the garden, for example. Here, too, the customer wants to see or be able to better imagine what it will look like when the work is finished and what options are available. But I also find it useful for screws, because that is a range that is so extensive and, of course, not every customer knows what is available for a concrete wall, a wooden ceiling, with or without a wall plug. These are the reasons why it fits like that?

I: Yes, that's exactly what I wanted to get at, thank you.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: When I think about it, there isn't much of a difference, if only because the manufacturers of digital technologies for retail want to reach the broadest possible market. What does exist, however, is when manufacturers provide technologies that are customized only for their own product. Then, of course, there are differences. Take, for example, a configuration software. But from a bird's eye view, it is just the same configuration software that I find at car manufacturers or in an online glasses store. Therefore, the idea is usually quite the same, quite identical.

For which customer group(s) are digital technologies well / particularly well suited?

A: Let's think about all the customers who cannot be addressed in their language in a hardware store. This is where digital technologies offer a great advantage and are particularly suitable. In general, it is only a question of how complex they are. If the complexity is increased, you will also lose customers. But the challenge and the objective of those who want to establish the technologies is to include everyone. But in my opinion, the language advantage should not be underestimated.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: I am convinced that measurement should take place at this qualitative level, because we need direct, immediate feedback, especially with these technologies. Of course, we can use KPIs as a guide, but we need feedback here and if we want to do it right, we also need to be able to ask questions. But of course, it is also important to check key figures. Basically, it can be summarized as follows: Especially with new technologies that can interact with the customer, the measurement of success is highest when we combine qualitative and quantitative measurement methods.

What level of importance will digital technologies have in the future compared to today?

A: The increase in available options is not slowing down. We can be sure of that. Anything else would surprise me greatly. So, it's increasing – without a brake.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: In a word: problem solver. Digital technologies must be able to solve a problem. Like a search engine today when I am looking for something. This is only good if I get the result I am looking for – and quickly. So no matter what I have, in the context of the construction market, when I use a digital technology, it has to solve the problem. If there is a lack of imagination, the problem has to be solved. If there is a lack of understanding, then please, the understanding must be provided. Problem solver, yes.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: I am sure that all the topics related to virtual reality. VR technologies offer numerous advantages, especially for high-priced items that require a lot of explanation. Visualization makes the possible end results much more understandable and tangible for customers. This leads to a reduction in inhibitions and to the fact that an expected result can be better explained in advance and possible misunderstandings can be better avoided. This is then supported by configurators, so that customized changes are incorporated directly into the VR. Electronic price tags are another aspect that you see from time to time – they will eventually be everywhere. Something like this will come, as with XXXX, that robots are used. They are – when fully developed – a customer satisfaction guarantor in many ways.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: Virtual Reality. That would, in relation to what I just said, give the problem solver a big boost and solve so many problems.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: Contactless checkouts are here to stay. They have to. The advantages are obvious: time savings and no annoying waiting in line. This is coming and must be implemented. Apps will also be retained because retailers are currently investing so much in them. That will remain. The same goes for QR code technology. Solutions from other industries that address the issue of “finding the right product” will certainly be adapted as well. Customers will no longer find their product with the help of an employee, but with their iPhone.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No, we are excited to see where it will take us.

APPENDIX 19: Supplier Expert Interview: S8

Performed on:	XX.11.2024
Duration:	45 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxxx
Kind of interview:	Phone Call
Interview Language:	German

How old are you?

A: XX. [between 41 and 50 years old]

What is the current position in your company?

A: I work in regional sales.

How many years of professional experience do you have in the DIY store industry?

A: XX. [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: Customer satisfaction and exceptional customer satisfaction, that is, product availability in relation to a good selection, competitive prices, these are customer satisfaction factors. Exceptional customer satisfaction is achieved when store staff help me, keep me safe and informed, and I quickly get through the checkout with the feeling that I have done everything right. In other words, that feeling of being pampered, of being in the right place, of the employee being there for me. And also the checkout where things move quickly, perhaps by automatically scanning the goods, by driving the shopping basket through a scanning tunnel or by using a different, more technological design. From my point of view, that is what makes for exceptional customer satisfaction.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: The availability of goods, the selection and the price are all good. The latter two points less so.

I: So the checkout system or the process behind it and the feeling of security that it conveys, the ensnaring one?

A: Exactly, yes, like that.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: That depends on the department. There are departments where I indirectly stay longer because of the way they are laid out, and there is the shelf-ready goods, the SL shelf-ready goods. I don't stay in the aisle and take a look, at least that's not often the case and would be unusual.

Which digital technologies does DIY retail use in its stores?

A: Video tutorials, including in the market with screens, product configurators, apps, QR codes, Click & Meet not so much, rather not, Click & Collect on the other hand, pricing is also digitized, at least increasingly.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: In my opinion, displays that play sound are a no-go. In my experience, customers and market employees are annoyed by this. The reason for this is that they play sound in an entire aisle, are often small and you can't see much on them, and they don't communicate with the customer in a targeted and efficient

way at all. It's an advertising video, not a video that responds in a targeted way or addresses my individual problem. Today, this can be done much more efficiently and in a much more targeted way using other technologies.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: These points in combination are certainly all of great importance, although the topic of documentation is a priority B for me, as is the topic of data protection. Not that this is not important, but it is simply expected as a minimum requirement by the customer. In addition to these purely technical aspects, the topic of enthusiasm would be important to me and from my area of expertise, because enthusiasm is what motivates the customer to use the technology. The customer must want to use the technology. Therefore, I would like to add this aspect to the ones mentioned earlier.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Let's start with the factors: customized items that have to be customized at the customer's request, everything that goes into projects and needs to be explained, digital technologies are good advisory supporters for this, and items that cost more than 100, 200 euros, that is, are more expensive, where the customer wants to be sure that he is buying the right thing and, in the best case, only once. Then there is the range of products. This reminds me of baths, but also of machines. When you stand in front of these huge XXXX presentations and are supposed to find the right drill, as a layman, it's rather difficult without help, without employees. It's so diverse that you could go right to the gardening section. I could go on forever, but I would like to put these as the most important ones on record.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: In other industries, such as fashion or gastronomy or the electronics industry, I think people tend to expect an experience. Digital technologies support this and that's what digital technologies are for, such as touch displays or robots that support this. In the hardware store, the main focus is on the idea of redesigning or renovating rooms, gardens or, for that matter, garden houses. It's also about inspiration, but in the end, what I do at the hardware store is usually blunt. For this project, I tend to get inspiration at home in advance or I get it from my partner and now I have to realize this project. That's why I find technologies in hardware stores less inspiring. It's about the idea of renovation or the idea of redesign.

For which customer group(s) are digital technologies well / particularly well suited?

A: For customers of all kinds, an advantage with technologies of a technical nature is always the possibility to set languages or have text read aloud, which reduces challenges due to language barriers or communication barriers. Therefore, technological aids have a broader scope than direct contact, although something is also lost that would take place from person to person, such as emotions or the like.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: The use of key figures such as sales, users, clicks, recommendations – anything that can be quantified. The success of a product configurator can be derived from the sales it generates, for example. You could also apply this to the app: how much sales revenue is generated directly through the app or through Click & Collect?

What level of importance will digital technologies have in the future compared to today?

A: Enormous. Digital technologies are of great importance and will continue to gain in significance.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: Security in the process. By this I mean that digital technologies must function without disruption. How often do we still abort today because processes don't work smoothly, because perhaps a desired PDF is not created, a forwarding does not work, an image does not appear, a payment process aborts, a voucher code cannot be redeemed after all. Customer expectations must be process-secure.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: First of all, I expect that we will see more new checkout technologies, whether it's just walk-out, completely contactless, or self-scanning checkouts. These technologies will become more widespread. Click & Meet will definitely increase. Advice is still the Achilles' heel in the DIY store, something has to change there.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: Point-of-sale systems, digital, highly developed point-of-sale systems.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I am thinking first of all of possibilities that exist today and that will also exist in the future, because they have manifested themselves: apps, the use of videos

to provide support in all kinds of situations, click & collect. Click & collect proved its worth with the coronavirus in 2020 and has since become firmly anchored in the minds of customers, so that it has become the standard and it is no longer possible to imagine life without it. QR codes are also an established standard and will continue to be used. The blurring of the lines between in-store and digital will continue to increase. I believe that, coupled with the possibilities mentioned in the question earlier, this is the future.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No, but I look forward to the results. Thank you.

APPENDIX 20: Supplier Expert Interview: S9

Performed on:	XX.11.2024
Duration:	39 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxxx
Kind of interview:	Video Call
Interview Language:	German

How old are you?

A: XX. [between 31 – 40 years]

What is the current position in your company?

A: I work in marketing.

How many years of professional experience do you have in the DIY store industry?

A: XX. [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: Availability of goods, product information from the consultant, competitive prices, the fact that the customer can find products, guidance, a quick checkout process, ideally digitally supported, of course, because it's faster. But that's something that's extremely satisfying in a hardware store.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: DIY stores are good at providing advice, when they do so, and also in terms of the supply of goods. Finding products on your own is difficult in a DIY store,

also because of the supply of goods. There are so many items in the store that it can be overwhelming. The checkout process could also be improved. Sometimes I wish that DIY store employees would make me feel more secure. Often, I also experience advice that ends in a way that makes me unsure whether the item that was recommended is really the one I am looking for. In the sense of being satisfied, being really satisfied.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: Yes, customers who spend too long in the DIY store, longer than they want, are dissatisfied. That's why we have a quick checkout process, for example.

Which digital technologies does DIY retail use in its stores?

A: The following are used today: VR technologies, albeit in their infancy in my view, product configurators, C&C, apps, screen technologies and POS systems, which are digital.

I: In the case of product configurators, is it more the ones that the customer operates or the ones that are operated by the employee?

A: Oh no, no, I mean both of them, both variants.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: VR technology is difficult. The fact is, if it doesn't work well, the customer takes off the glasses and is dissatisfied and will no longer buy from us. We have to be absolutely sure that everything is working perfectly there, then it will be a groundbreaking success. Until that is the case, I would be very cautious about rolling it out across the board. Product configurators often help customers to get an initial idea of what is possible. If they can configure a garden shed, for

example, the customer can see which colors are available, which materials can be selected, and which special features are available. This is always good, so that the customer gets to know the options that are available, especially for products that they don't buy regularly, but only every ten to twenty years. In my opinion, the displays have a negative influence. They just don't help. Imagine you are walking through a shelf section and want to buy masking tape, for example, and then a video for some kind of filler is playing all the time. As a customer, you don't need that. And even if the videos were advertising a product you were interested in, you wouldn't wait around for the one point you wanted to know about to come on. By then, you would have Googled the information.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: For me, flawless usability is the most important thing. I use the technology a lot at the hardware store, because I often need to order or get explanations of technical or manual things. That's why the screw I'm looking for, for example, has to be 100 percent available for my case. If it turns out that several variants are possibly suitable, the technology would be useless. Digital technologies at the hardware store have to get the job done.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: I think that, in the future, digital technologies will be used to a much greater extent to sell customized items in particular. This brings me back to the garden shed. If, for example, a customer wants to buy a garden shed for several hundred euros that can be configured to include doors, windows and lighting, define floors and configure pre-installed shelves, and all these points and configuration steps are visually displayed, similar to in a car configurator, until the end product can be viewed from all sides and even the dimensions are included in a quote, then that is a very strong aspect of trust, which gives the customer the assurance that everything has now been entered correctly and as desired, and they can

order with a good feeling. And projects are suitable, projects that need to be explained, both as a whole and individual articles or work steps, such as a garden project, painting a fence, painting a privacy screen, oiling garden furniture, when do I need a glaze, something like that. What screws do I need for the fence, that would also be included.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: In the hardware store, technology is used to help customers find the right item in an often highly complex range, especially if the customer only deals with this range at very long intervals. In such cases, detailed, technical advice is often expected or needed. In the hardware store, the customer is looking for one of 50,000 items. This number of items does not exist in any other industry. In all other industries, the customer does not need as much information of a technical nature. In all other industries, there are not as many departments as there are in a DIY store. And this is what the technologies, or rather the manufacturers of the technologies, will have to accept and implement. The original idea is different in a world that cannot be compared to other sectors in retail.

For which customer group(s) are digital technologies well / particularly well suited?

A: Everyone, no exclusion.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: This is due to the various technologies, of course. Do you mean a specific one?

I: We would be very happy to go through all of the ones mentioned so far and the ones that come to mind now, that would be very interesting. We are happy to take the time.

A: First of all, I distinguish between soft and hard factors or the so-called qualitative and quantitative metrics. At the beginning, I see the turnover, the

number of sales that have been generated by technology. In more detail, we would then have to look at how the interaction with the technologies is going, or, to put it another way, how far the technology, or rather the customer, is getting on with the technology. To do this, we would first have to look at the interaction rate to determine how actively the customer is using a provided technology. This then shows how appealing and relevant the technology is for the customer. But then, one step further, the drop-out rate and the exit rate would also be crucial to know what the drop-out rate is, so that we don't get to the desired conclusion, or, in the worst case, a customer starts with a technology and then immediately decides to exit. And then at the end, there is the success rate, which doesn't always have to be the purchase, but rather the simple completion of a task that a technology is supposed to fulfill. Otherwise, in UX thinking, you still look at the conversion rate or customer retention rate. That would also make sense here for some technologies.

What level of importance will digital technologies have in the future compared to today?

A: Essential. To do this, it is important to look at the interaction rate to know how many customers use a particular technology and interact with it, or start using the technology but immediately stop before any interaction has taken place.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: Offer data protection, guarantee data security, do not allow any compromises. All difficult, I know, but this is a disruptive factor.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: Just a few already mentioned: VR. But robots and products are also finding it easier to provide guidance, digital guidance.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: Digital tills where purchases are recorded as they are placed in the cart.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I have already mentioned a few, product configurators, which have now proven themselves and are established; this technology is well-entrenched in the market. QR codes, apps, both established too, and apps still have more potential than is currently being used. Oh yes, and Click & Collect, I think I mentioned that before.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: I am satisfied. I hope that was OK. There are no further aspects that could be important.

APPENDIX 21: Supplier Expert Interview: S10

Performed on:	XX.12.2024
Duration:	43 minutes
Interviewer:	Dominik Rode
Interviewee:	xxxxxx
Kind of interview:	Phone Call
Interview Language:	German

How old are you?

A: I am XX years old or young, as you like. [between 31 – 40 years old]

What is the current position in your company?

A: Marketing-Manager

How many years of professional experience do you have in the DIY store industry?

A: Almost XX years [> 10 years]

Which factors of a store visit lead to an (extraordinary) satisfied customer?

A: So, let's get started. Clean, efficient checkout processes make people extremely happy; anything else has the opposite effect. The kind of certainty in consulting that comes from feeling completely good when you leave makes people extremely happy. The rest is more of a standard: classic advice and product availability. That's what a customer takes for granted today. If a customer can't find an item, they're dissatisfied.

I: OK, that's a bit of a preview of the upcoming questions.

A: Oh, sorry, I'm just warming up.

Which of these factors do DIY stores fulfill well/are in need of improvement? Please explain your answer.

A: Oh, yes, okay, as I said, it's good that, as already mentioned, hardware stores have goods. You don't leave without a product that you need, that doesn't really exist. The advice is also professional, at least from the respected dealers, which is good.

Do you think that the goal of the retail industry is to reduce the time its customers spend in the store? What is your reason for this?

A: I don't think so. The opposite is more likely to apply to industries that can offer a longer stay with more experiences, but that's not the case in a hardware store. However, it doesn't have to be any faster either.

Which digital technologies does DIY retail use in its stores?

A: Product configurators, digital price labeling, in-store navigation technologies, apps, digital checkouts and also how-to videos, QR, click & collect, meet not really yet, apps and videos, I think I already had apps, the ones only once.

Which of these used digital technologies...

- have a positive impact on customer satisfaction and how do you justify this (the customer is satisfied)?
- have a negative impact on customer satisfaction and how do you justify this (the customer is dissatisfied)?
- exceed expectations and justify them (the customer is extremely satisfied)?

A: I have only just started using in-store navigation myself. Above all, this offers the advantage of keeping a customer satisfied, even in times of staff shortages, since guiding customers to a product on the shelf is one of the main tasks of the staff. This is really helpful. An app is the technology that contributes most to customer satisfaction. The app is simply so versatile and always at hand. That's a big advantage.

In your opinion, what are the most important factors that customers expect from digital technologies in a DIY store?

A: Usability, safety and functionality.

In your opinion, for which product ranges is the use of digital technologies particularly suitable / based on which factor?

A: Indoors, it would be the floor, floor covering, tiles, laminate, which can make rooms look completely different. Window construction requires a lot of explanation, good service and cannot be achieved on a small budget. Outdoors, the garden.

What is the difference between digital technologies that can be used in a DIY store and those used in other industries (food, beverages, care products, electronics, fashion, stationery, etc.)?

A: On the one hand, that other industries continue to use them and, on the other hand, that the construction market is more extensive in terms of product range depth. This also makes it more complex. The large number of items makes it impossible to use easily. A fashion store might need a mirror for all products. However, a digital technology in a hardware store for all products is unthinkable today and will remain so for a long time to come.

For which customer group(s) are digital technologies well / particularly well suited?

A: Customers who want to. If a customer wants to use digital technologies, they can do so, they just need to be willing to do so. Someone who is looking for personal advice and needs it may not want to place an order with technological products.

In your opinion, what specific metrics or indicators can be used to measure the impact of digital technologies on customer satisfaction?

A: For qualitative measurements, the survey is definitely the method of choice, even though they are always costly, especially if they are to be conducted in person. But it would be a good idea to interview different groups and listen very carefully. I would group in terms of customers / users, staff who are responsible for digital technologies or use them in their departments or even program the technologies, and suppliers, since we also provide some technologies for retailers.

What level of importance will digital technologies have in the future compared to today?

A: Growth. Quite simply.

Which customer expectations will digital technologies have to fulfill in the future that are not or only partially met today? What influence will this have on customer satisfaction?

A: To further increase customer satisfaction in the future, digital technologies should become more intuitive, especially in DIY stores. Customers are unsure about many of the products in a DIY store, and if digital technology does not provide guidance and keeps everything on track, it creates even more uncertainty when something pops up that I cannot answer, where there is no I-circle for further, understandable information.

Which digital technologies from other sectors that are not or rarely used in DIY stores today can be used in DIY stores in the future and how do you justify this?

A: Extended reality, visual projections, all the way to the metaverse as a world in which the customer is completely immersed. This is not yet at an end in other industries either, but I am looking forward to it, it will be exciting and customer inspiring.

Regardless of any regulations: Are there other digital technologies that you would like to see used in DIY in the future?

A: With regard to the visualization of extended reality, that would be great. And sales with the help of the metaverse. That would be really exciting and would bring with it numerous new insights.

Which digital technologies do you think will become established in DIY stores in the future and how do you justify this?

A: I see the app as particularly important. I think that we are still a long way from the end of developments in the apps. There are possibilities such as in-store navigation, how-to videos, advice, also in person, by phone or video or chat, presentation of supplements, pre-ordering items or even the possibility for customers to manage all their bills or, for example, repair orders with it. I think that each of the major DIY store companies is already quite advanced in some areas, but the full potential of an app will become much more apparent in the future.

Are there, in your opinion, other important aspects that could lead to an increase in customer satisfaction that we have not sufficiently addressed in the interview?

A: No, thank you.