

DOCTORAL THESIS



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UNIVERSIDAD CATÓLICA
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INTERNATIONAL DOCTORAL SCHOOL

Doctoral Programme in Social Sciences

Promoting Digital Health Literacy
in the German Healthcare System:
A Delphi Study on Framework Conditions,
Responsibilities and Promotion Measures

Author:

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Supervisor:

Prof. Dr. David Matusiewicz

Murcia, July 2025

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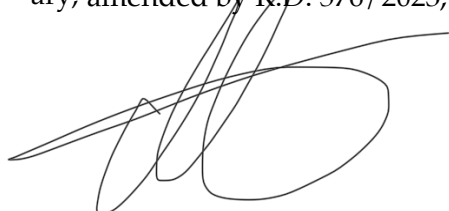
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Murcia, July 2025

THESIS SUPERVISORS' AUTHORISATION FOR THESIS SUBMISSION

Prof. Dr. David Matusiewicz as Supervisor of the Doctoral Thesis 'Promoting Digital Health Literacy in the German Healthcare System: A Delphi Study on Framework Conditions, Responsibilities and Promotion Measures' by Ms Julia Ulbrich in the Doctorate Programme Social Sciences, authorises 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, amended by R.D. 576/2023, of July 4, which regulates official doctoral studies.



In Murcia on 2 of July 2025

ABSTRACT

The German healthcare system is facing considerable challenges such as a shortage of skilled workers, demographic change, and rising treatment costs. Digitalization is seen as the key to increasing efficiency and quality. However, the population's ability to deal adequately with digital health information and applications, summarized as the concept of digital health literacy (dHL), is poorly developed. This might lead to errors in diagnoses, careless use of digital applications and risky medication changes. The current approaches to the promotion of dHL by health insurance companies are regulated in § 20k SGB V. However, this often follows a one size fits all approach, which does not do justice to the complexity of dHL and the needs of the population. In the German healthcare system, the conceptual understanding, responsibilities, and specific support measures for dHL come too short. Despite the high relevance of a high dHL for insured people, but also for the sustainability of the healthcare system, there is a clear implementation problem.

The dissertation therefore aimed to generate expert opinions and recommendations for action for the future proactive and structured design of framework conditions, responsibilities, and measures to promote dHL among people with statutory health insurance in Germany. To answer the research question, a Delphi study was conducted using a mixed-methods design. This initially comprised a pre-study with a literature review and guided expert interviews. The results were then translated into theses. These theses were evaluated by 32 experts in two rounds of the Delphi survey with regard to their relevance and feasibility.

There was a high degree of agreement among the experts regarding the need for activities to promote dHL, but there were also some uncertainties, heterogeneous views, and obstacles to implementation. The results led to 18 specific recommendations for action. Among other things, a need for a uniform and more holistic conceptual understanding of dHL became evident. This should not only take into account individual abilities, but also systemic framework conditions and influencing factors. Support should not only take place in the SHI system, but also include other policy areas such as schools. In addition, content and skills facets must be continuously reviewed and further developed. This becomes even more important

because of the fast technological developments, for example dealing with AI-generated information. In addition, proposals for the expansion of responsibilities beyond the health insurance funds were developed. Stakeholders such as doctors, self-help groups, patient organizations and adult education centers can contribute to dHL promotion in direct contact with the patients. Promotional measures are considered most feasible if they are integrated into existing structures of the SHI system, for example by using existing contact points. Measures should be established that both promote individual competence and raise general awareness of dHL.

Overall, the study contributes to closing the existing research gap in the area of dHL promotion in Germany. It makes it clear that dHL is a dynamic concept whose promotion requires continuous adaptation to changing skills requirements and technological developments. Integrative cooperation between different levels and stakeholders, taking into account individual and systemic requirements, is seen as crucial for successful dHL promotion in the German SHI system.

KEY WORDS

Digital health literacy, SHI system, Germany, healthcare, digitalization

RESUMEN

El sistema sanitario alemán se enfrenta a considerables desafíos como la escasez de trabajadores cualificados, el cambio demográfico y el aumento de los costes de tratamiento. La digitalización se considera clave para incrementar la eficiencia y la calidad. Sin embargo, la capacidad de la población para manejar adecuadamente la información y las aplicaciones de salud digital, conceptualizada como alfabetización digital en salud (ADS), se encuentra poco desarrollada. Esto podría conducir a errores en los diagnósticos, uso descuidado de aplicaciones digitales y cambios arriesgados en la medicación. Los enfoques actuales para la promoción de la ADS por parte de las compañías de seguros de salud están regulados en el § 20k SGB V. No obstante, esto a menudo sigue un enfoque de "talla única", que no hace justicia a la complejidad de la ADS y a las necesidades de la población. En el sistema sanitario alemán, la comprensión conceptual, las responsabilidades y las medidas de apoyo específicas para la ADS resultan insuficientes. A pesar de la alta relevancia de una ADS elevada para los asegurados, pero también para la sostenibilidad del sistema sanitario, existe un claro problema de implementación.

Por consiguiente, la disertación tuvo como objetivo generar opiniones de expertos y recomendaciones de acción para el diseño futuro proactivo y estructurado de las condiciones marco, responsabilidades y medidas para promover la ADS entre las personas con seguro de salud obligatorio en Alemania. Para responder a la pregunta de investigación, se realizó un estudio Delphi utilizando un diseño de métodos mixtos. Este comprendió inicialmente un estudio preliminar con una revisión de literatura y entrevistas dirigidas a expertos. Los resultados se tradujeron posteriormente en tesis. Estas tesis fueron evaluadas por 32 expertos en dos rondas de la encuesta Delphi con respecto a su relevancia y viabilidad.

Hubo un alto grado de acuerdo entre los expertos respecto a la necesidad de actividades para promover la ADS, pero también existieron algunas incertidumbres, puntos de vista heterogéneos y obstáculos para la implementación. Los resultados condujeron a 18 recomendaciones específicas de acción. Entre otras cosas, se evidenció la necesidad de una comprensión conceptual uniforme y más holística de la ADS. Esta no solo debería tener en cuenta las capacidades individuales, sino también las condiciones marco sistémicas y los factores influyentes. El apoyo no

solo debería tener lugar en el sistema de seguro de salud obligatorio, sino que también debería incluir otras áreas políticas como las escuelas. Además, las facetas de contenido y habilidades deben ser revisadas y desarrolladas continuamente. Esto se vuelve aún más importante debido a los rápidos desarrollos tecnológicos, por ejemplo, el manejo de información generada por inteligencia artificial. Asimismo, se desarrollaron propuestas para la expansión de responsabilidades más allá de los fondos de seguro de salud. Las partes interesadas como médicos, grupos de autoayuda, organizaciones de pacientes y centros de educación para adultos pueden contribuir a la promoción de la ADS en contacto directo con los pacientes. Las medidas promocionales se consideran más viables si se integran en las estructuras existentes del sistema de seguro de salud obligatorio, por ejemplo, utilizando puntos de contacto existentes. Deberían establecerse medidas que tanto promuevan la competencia individual como aumenten la conciencia general sobre la ADS.

En general, el estudio contribuye a cerrar la brecha de investigación existente en el área de promoción de la ADS en Alemania. Deja claro que la ADS es un concepto dinámico cuya promoción requiere adaptación continua a los cambiantes requisitos de habilidades y desarrollos tecnológicos. La cooperación integrativa entre diferentes niveles y partes interesadas, teniendo en cuenta los requisitos individuales y sistémicos, se considera crucial para la promoción exitosa de la ADS en el sistema de seguro de salud obligatorio alemán.

PALABRAS CLAVE

Alfabetización digital en salud, sistema de seguro de salud obligatorio, Alemania, atención sanitaria, digitalización

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*To Kerstin,
my forever motivation to keep going on.*

Digital health literacy: I did not have to think long about whether this was a suitable topic for a dissertation that would take at least three years to complete. As my daily work has shown me for years how relevant this topic is for the successful digital transformation of the German healthcare system, it was an easy choice. Nevertheless, the path was not always easy, but that's what they say about a marathon. The fact that I have now completed it is also down to the people around me.

First of all, I would like to thank my supervisor David Matusiewicz for your continuous and professional support and especially for your creative ideas, which have always pushed my research forward. Thank you to Nina-Alexandra Götz for the valuable research impulses and the constant challenging of my ideas. Another thanks go to Patricia Beck for your great support over the last few meters. Being in the same boat with someone like you made the final sprint a lot more enjoyable.

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"You can have the most technologically advanced device in the world, but if you don't know how to operate it, it will be as useful as a jumbo-jet without a pilot."

- European Health Parliament (2016)

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ACRONYMS AND ABBREVIATIONS

AI, Artificial Intelligence

BMG, Federal Ministry of Health

BzgA, Federal Center for Health Education

COVID-19 pandemic, Global Pandemic of Coronavirus Disease

DFG, German Research Foundation

dHL, digital Health Literacy

DHLI, Digital Health Literacy Instrument

DKG, German Hospital Federation

e. g., example given

eHealth, electronic health

eHEALS, Electronic Health Literacy Scale

eHEALS-E, Electronic Health Literacy Scale Extended

eHL, eHealth Literacy

eHLA, eHealth Literacy Assessment

eHLE, eHealth Literacy Framework

eHLQ, eHealth Literacy Questionnaire

eHLS, eHealth Literacy Scale

EI, Expert Interview

GDP, Gross Domestic Product

GKV, Statutory Health Insurance

GKV-SV, Central Federal Association of Health Insurance Funds

HiaP, Health in all Policies

i.e., id est (that is)

KBV, National Association of Statutory Health Insurance Physicians

KHG, German Hospital Act

KV, Association of Statutory Health Insurance Physicians

KZBV, German Federal Association of Statutory Health Insurance Dentists

MV, mean value

MV_{all}, mean value of all answers of expert group

MV_{OTH}, mean value of the answers of the professions except SHI

MV_{SHI}, mean value of the answers of SHI employees

ÖGD, Public Health Service

PRE-HIT, Patient Readiness to Engage in Health Internet Technology

R₁, Round 1

R₂, Round 2

SD, Standard Deviation

SGB, German Social Code

SGB V, Fifth Book of the German Social Code

SHI, Statutory Health Insurance

WHO, World Health Organization

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I – INTRODUCTION

I - INTRODUCTION

1.1. PROBLEM DEFINITION AND PURPOSE OF INVESTIGATION

The German healthcare system is facing a variety of challenges, which are primarily due to current megatrends. The key challenges include ageing populations due to demographic changes, shortage of specialists or rising costs for medical treatment. Therefore, they urgently need to implement strategies to improve their efficiency (Harvey et al., 2025, p. 759). Digitalization is also designated a worldwide mega trend that affects health systems, medical care and health services (Petersen & Steiner, 2019, p. 1) and also has the potential for a higher efficiency. Disruptive digital technologies open possibilities to improve processes, medical care and as a result also the economic and cost efficiency in the healthcare sector. To name some examples, relevant information can be made available at the right place at the right time by connecting the major actors that are involved in patient's treatment. Ultimately, double examinations can be avoided, and resources can be saved. Nursing staff can be relieved by digital assisting solutions and patients can be involved in their therapy stronger by using telemedical devices or additional health apps, which may finally result in a higher compliance and a positive treatment progress (Henninger et al., 2022, p. 103 f). The changes not only affect the structures and processes in the healthcare system, but also the patients who make use of medical services.

People that intend to use digital health information and services therefore need to bring along specific knowledge and skills in order to act as successful and self-determined as possible. The combination of these skills is described as the concept of digital health literacy (dHL; H. Müller, 2022, p. 114 f). There is a variety of definitions and concepts for dHL. One of the most famous but also oldest definitions of dHL is the one of Norman and Skinner, who understand dHL as "ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (Norman & Skinner, 2006a, p. 2). With their lily model, they combined six relevant core competences that build the concept of dHL: traditional literacy (which means

general competences such as reading ability or text comprehension), health competence, information competence, science competence, media competence and computer skills (Norman & Skinner, 2006a, p. 2 f). The combined presence of these six skills leads to a better user experience with digital health services and enables people to make well-informed decisions with regard to health prevention, health promotion and disease management (Aulenkamp et al., 2020, p. 77). Over the years, the concept has constantly evolved to include a relational context. More recent contributions today understand dHL as "ability to deal with health-related digital information and information options [...], which is shaped by structural conditions and the availability of (technical and other) resources" (Dratva et al., 2024, p. 3).¹

Despite the many benefits, the use of digital health information and services may also conflict with patient's security. The misinterpretation of digital health information can have far-reaching consequences for patients' health if, for example, treatment plans are changed without authorization or digital applications are used incorrectly (Langkafel, 2021, p. 4). In order to keep patient's security high, a lot of legal and ethical aspects need to be considered when it comes to the use of new technologies in health context. This aspect underlines furthermore, that especially patients need to be empowered to use digital services in an appropriate and beneficial way (Henninger et al., 2022, p. 105).

On an individual level, a high dHL is a major condition to use digital health services in an appropriate way and enables patients to minimize potential risks of new technologies (Aulenkamp et al., 2020, p. 79). On a higher level, the appropriate use of digital health information and services is a key factor to increase efficiency in health systems and finally leads to the development of the potentials digitalization brings with itself. Empowering patient's dHL actively can therefore not only contribute to the right use of technology, but on a higher level also to the solution of resource problems in the health sector (H. Müller, 2022, p. 114 f). A nationwide and high dHL should nowadays be seen a key skill and a basic prerequisite for well-informed and self-determines patients as well as for the success of digital transformation in the health system. Therefore, it should be a seen as a desirable and important aim for any nation.

¹ Translated from German.

Taking a closer look to the situation in Germany as one of the most important economies in the world, it becomes evident that digitalization in the health sector as well as the dHL of the German population are claimed to be improvable (Samerski & Müller, 2019b, p. 45). The international comparative study of Bertelsmann for example attested Germany a slow implementation of digital services and technologies as well as a non-stringent digitalization strategy. As a result, Germany only reached the penultimate place in the international ranking (Lux et al., 2017, p. 693; Thiel et al., 2018, p. 6). The dHL of the German population is also limited (Dratva et al., 2024, p. 4). Studies hereby do not only reveal that the different skills that sum up to the concept of dHL become evident in varying degrees. Moreover, dHL also differs among population subgroups, whereby especially those persons with many touch points to the health sector such as elderly and chronically sick people show up a low dHL (Schaeffer, Gille, et al., 2023, p. 326). To promote this competence and for a further involvement of people in treatment processes, the German legislator obligated social health insurance (SHI) funds to implement measures that promote the dHL of their insured persons (H. Müller, 2022, p. 113). Specifically, this means that SHI funds have to implement services that promote a self-determined use of digital and telemedical technologies. The services shall thereby help to impart needed skills in this context (German Social Code, § 20k).

By taking a closer look at the current situation and existing research in Germany, a paradox becomes evident: On the one hand, one can find a lot of studies that deal with the measurement of dHL of the German population and in this context, prove the lack of the relevant skills. On the other hand, there are only a few concrete elaborations that imply promotion possibilities, recommendations for a purposeful implementation or further content analyses (Ulbrich & Matusiewicz, 2024, p. 240).

Even if there is a broad accord of how important dHL is on the individual as well as on a global level, there only exist a few well-founded theoretical papers that deal with the structured implementation of suitable measures and holistic approaches to increase dHL in Germany. For instance, there is no common understanding of concrete contents or responsibilities when talking about the implementation of measures in Germany (H. Müller, 2019, p. 114). On top of that, the existing

research papers mostly focus on a high-level perspective or an unspecific or international implementation context, which limits the applicability to the German circumstances (Ulbrich & Matusiewicz, 2024, p. 240). Further analyses mostly focus on smaller subgroups such as students (Dadaczynski et al., 2021) or children (Bittlingmayer et al., 2020).

In Germany, SHI funds are currently the only institutions that must fulfill a legal order to promote the dHL of their insured persons. In practice, however, the implementation of specific promotion measures is rather undifferentiated and follows the one size fits all principle (Scherenberg & Preuß, 2023, p. 62 f). On top of that, the legislator did not reveal, which measures exactly need to be promoted and the companies need to find suitable solutions themselves. All in all, it becomes clear that there exists a research gap on how dHL in Germany can be promoted at the basis of a more holistic approach. Against the background of the problem outlined above, the dissertation aims to answer the following research question:

"How must the framework conditions, responsibilities, and measures for promoting digital health literacy among people with statutory health insurance in Germany develop?".

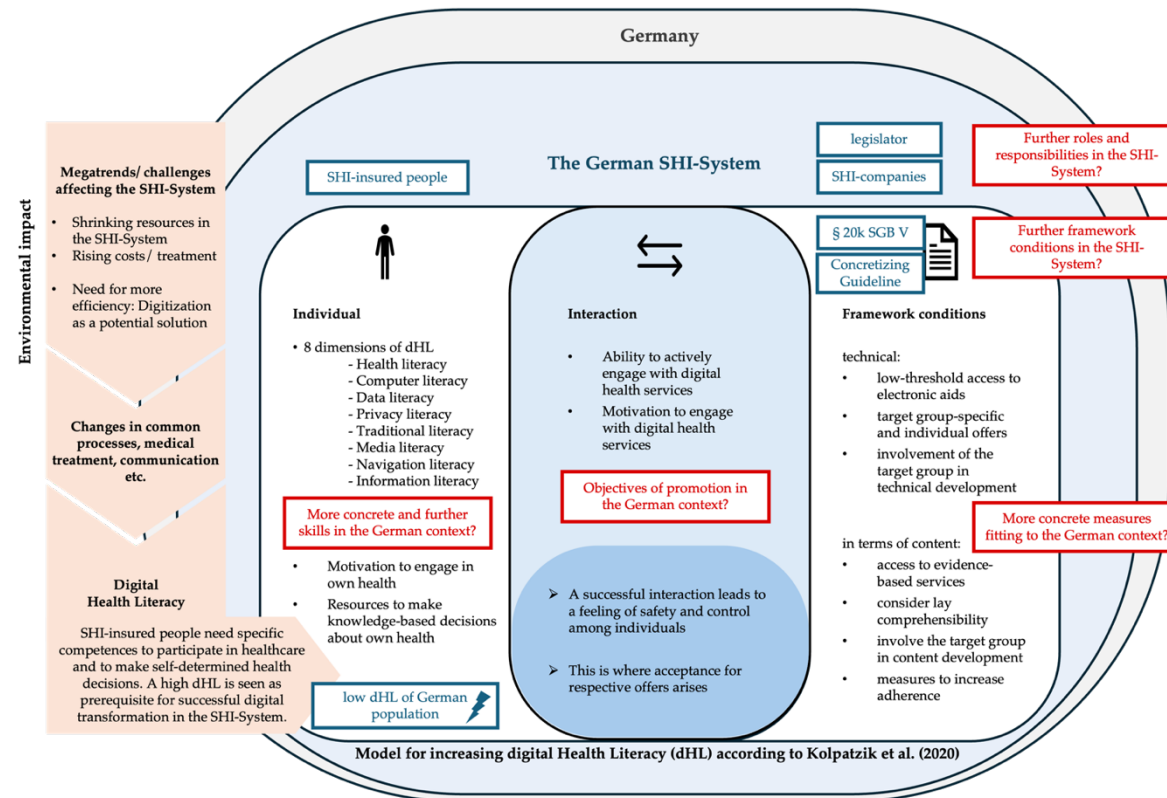
The research question shall set the framework for an own empiric investigation. The aim of the dissertation is to generate expert opinions and recommendations for action on the proactive and structured design of framework conditions, responsibilities, and measures to promote the dHL of statutory health insurance people in Germany. As there are no scientifically substantiated statements on this yet, this part of the work will be the main contribution to the research field.

The theoretical framework of the work and the resulting research question with its various facets is visualized in Figure 1. The illustration is to be understood from left to right. The left-hand side shows the challenges in the German healthcare system that ultimately lead to the need for insured persons to obtain a high level of dHL. The promotion of dHL is based on a conceptual model according to Kolpatzik et al. (2020), which is originally based on a framework by Norgaard et al. (2015). From a basic understanding, dHL is thus an ability that results from the interplay

of individual abilities and systemic framework conditions and must therefore always be considered in the respective context of the surrounding system. The concept of dHL is therefore deliberately based on a broad understanding within the scope of the work. On the one hand, this corresponds to the current state of research, and on the other hand, the dissertation is explicitly designed to derive recommendations for action for the necessary framework conditions, responsibilities, and measures to promote dHL, which in essence already refers to a broad understanding of the concept. The surrounding system is the SHI system in Germany, which is visualized by the two circles enclosing the model. The research thus explicitly refers to people with statutory health insurance in Germany and the context of the German SHI system. The reason for this is the explicit regulations of § 20k SGB V, which represent the starting point of the research and a delimited research framework. It should be noted that the SHI system provides health insurance cover for around 88% of the German population, but not the whole of society (Baas et al., 2025, p. 26). Nevertheless, a high level of dHL is important for all people in Germany. This restriction must be taken into account in the research work. In the following, the work therefore refers to SHI insured persons and not patients in general.

Based on the research gap identified, the question arises whether and to what extent the framework conditions, responsibilities, and measures for the promotion of dHL need to be further developed. The status quo on dHL in Germany is shown in the blue and white boxes in the illustration. The model by Kolpatzik et al. (2020) serves as a supporting starting point for the conceptual understanding and necessary conditions. The central facets of the research question are integrated in the figure by the red and white boxes.

Figure 1. Theoretical Framework and Research Objectives.

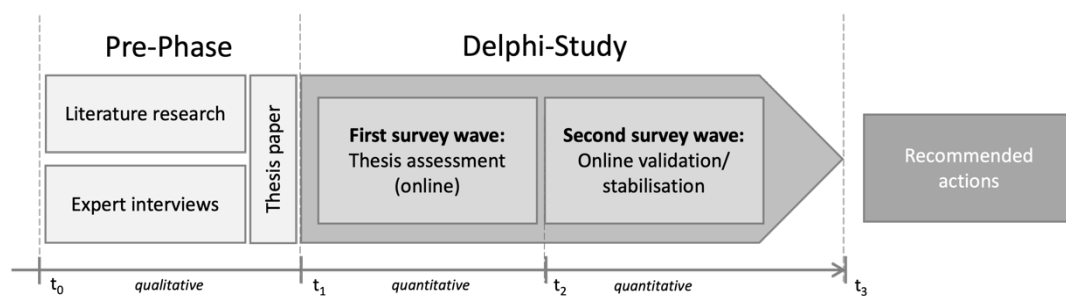


Note. Author's elaboration.

1.2. METHODOLOGY

To answer the research question, a Delphi study will be set up to analyze how the framework conditions, responsibilities, and measures for promoting dHL in Germany should develop so that on the one hand people with SHI can use digital information and services properly to make health-conscious decisions. On the other hand, a high dHL is a key success factor for the digital transformation in healthcare. The research design of the Delphi study follows the mixed methods approach and is shown in Figure 2. The survey design includes both qualitative and quantitative methods and furthermore combines different research instruments.

Figure 2. Research design.



Note. Author's elaboration.

At t_0 , the research is determined by the question how the framework conditions, responsibilities and measures for promoting dHL are currently structured in Germany. This question will be investigated by means of a literature review. Guided interviews with experts, who are primarily researching or dealing with the digital transformation in the healthcare system and the associated changes in the competence requirements for patients, shall help to take a look at future developments in an increasingly digitalized healthcare system and the effects on patients, as well as the resulting requirements for framework conditions, responsibilities, and measures to promote dHL. A qualitative content analysis according to Kuckartz & Rädiker (2022) is used to evaluate the expert interviews. With the help

of the qualitative preliminary study, theses for the future design of the framework conditions, responsibilities, and measures to promote dHL are to be derived. Both existing study results and new findings will be used for this purpose.

As the main part of the empirical research, a type 3 Delphi study will be conducted. A type 3 Delphi study is usually designed to map the diversity of opinions among experts on a specific, uncertain issue. Due to the complexity of the issue, the inclusion of a wide range of expert opinions is intended to generate practice-oriented recommendations for action that could not be created through individual knowledge alone (Chalmers & Armour, 2019, p. 715 f). Based on the findings of the first survey phase, the research question will first be operationalized with the help of the facet theory. Afterwards, a thesis paper on the areas of framework conditions, responsibilities and measures for the promotion of dHL will be designed (Häder, 2014, pp. 37, 91). The thesis paper is presented anonymously online in two waves (t_1 , t_2) to selected experts, who are asked to evaluate the theses derived. Mainly, closed questions are used. Using Likert scales, the respondents are asked to assess the necessity, significance, or likeliness of the theses for the successful promotion of dHL. If necessary, additional open questions are asked. Overall, the development needs in the areas of framework conditions, responsibilities, and measures will be specified within the two survey rounds.

After the first wave, the answers are analyzed and returned to the participants as feedback with the second wave. The two quantifying evaluation rounds are used on the one hand to check the various opinions of experts on the theses derived, and on the other hand to give the participants the opportunity to reconsider their attitudes against the background of the answers given overall. However, the aim here is explicitly not to find a consensus among the respondents, but rather to examine the current state of opinion among the participating experts on how the promotion of dHL can be actively designed in the future (Häder, 2014, p. 109 ff).

On the basis of the survey results, recommendations for action are then to be derived for an active design of future framework conditions, responsibilities, and measures for the promotion of dHL (t_3). The Delphi study is intended to explicitly involve experts who deal with the topic of dHL in everyday practice. The collaborative approach allows to collect different opinions and to check the applicability

of possible options for action to be assessed. Ultimately, this provides the opportunity to ensure that the recommended actions derived are highly practical (Ansell et al., 2017).

1.3. STRUCTURE OF THE WORK

This thesis is divided into the four areas (1) Introduction, (2) Theoretical Framework, (3) Empiry and (4) Closing Remarks. The overall structure of the thesis is shown in Figure 3. In the (1) introduction, the underlying problem and the research objective are presented, and an initial overview of the methodology and structure of the work is given. The problem definition includes an introduction to the current challenges in the healthcare sector and the need for a high dHL. The current status of dHL in Germany is presented and a paradox is highlighted in this context: although dHL is seen as an essential prerequisite for a successful digital transformation in healthcare, the skill set itself is poorly developed in the population. Furthermore, there are few initiatives to improve this status quo. The research question and objectives of the thesis are derived and presented on the basis of this initial situation (Chapter 1.1). Chapter 1.2 then presents the research methodology and the associated research process for answering the research question. Subsequently, the basic structure of the thesis with its main content is presented in Chapter 1.3.

The (2) Theoretical Framework presents the current state of research on trends and digitalization in the German healthcare sector and therefore the results of the literature research (Chapter 2). First, the term "megatrends" is explained and their relevance in relation to the healthcare sector is presented. Due to their high impact, megatrends influence all areas of social life and therefore also the healthcare sector. The German healthcare system itself is also outlined in the second chapter in order to support the later comprehensibility of structures, players, and options for action (Chapter 2.1). The effects of megatrends on the German healthcare system are then described in more detail, with a particular focus on the impact on key players such as health insurance funds, doctors, and SHI-insured people. The main aim here is to show that megatrends such as demographic change or the shortage of skilled workers are leading to far-reaching challenges in the

healthcare sector and require an increase in efficiency. Digitalization is generally seen as a key to increasing efficiency, but also requires the development of skills to ensure the proper handling of digital processes, health information and applications (Chapter 2.2).

The skills required for this are described by the concept of dHL. This is presented in more detail in Chapter 3. Chapter 3.1 begins with a general overview of the basic terms and related concepts such as general health literacy. In addition, the discussion on the conceptual understanding of dHL is taken up and existing theoretical models and measurement tools are presented. The concept of dHL is then brought into the context of the German SHI system. According to § 20k SGB V, the SHI companies are currently the only institution in the German SHI system that is obliged to promote the dHL of its insured persons. In the course of this, the legal paragraph and an additional concretizing guideline are explained to build up an understanding of the existing regulations for the promotion of dHL. In addition, current study results on the status of dHL in the German population and existing criticisms on the implementation status of measures to promote dHL are presented on the basis of existing literature (Chapter 3.2).

Based on the (2) theoretical framework, the (3) research design is derived and presented. This is largely determined by the research question on which the work is based. The core of the work is a Delphi study. This is preceded by a pre-study in which, in addition to the literature research, expert interviews are conducted to generate theses on the future design of framework conditions, responsibilities and measures to promote dHL in Germany. In Chapter 4, the research design is first presented by deriving the research question and explaining the basic research process (Chapter 4.1). The theoretical foundations of the Delphi methodology are then described (Chapter 4.2). Chapter 4.3 then explains the research process of the pre-study by presenting both the methodological concept and the key results of the expert interviews. The Delphi study itself is designed on the basis of the literature research and the results of the expert interviews (Chapter 4.5). The fifth chapter presents the results of the Delphi study and relates them to the theoretical background and the findings of the expert interviews. Chapter 6 derives recommendations for the future design of framework conditions, responsibilities, and measures to promote dHL in the German SHI system (Chapters 6.1 to 6.5). In Chapter 6.6, the

results are embedded in the theoretical framework of the work. On this basis, a practice-oriented further development of the model for the promotion of dHL in the context of the German SHI system (Figure 1) is carried out. Within the concluding remarks (4), limitations of the research approach and further research approaches are presented in Chapters 7.1 and 7.2. Last but not least, the central findings of the work are summarized in Chapter 8.

Figure 3. Structure of the work.



Note. Author's elaboration.

II – FUTURE CHALLENGES IN THE GERMAN HEALTHCARE SYSTEM

II - FUTURE CHALLENGES IN THE GERMAN HEALTHCARE SYSTEM

2.1. MEGATRENDS IN THE GERMAN HEALTHCARE SYSTEM: KEY FEATURES

2.1.1. Megatrends and Their Relevance for the Healthcare Sector

Megatrends were firstly mentioned by Naisbitt (1982) and usually describe complex societal changes that affect and reform many different areas of life in a long-term perspective and over the world (Androsch & Redl, 2019, p. 480). Over the years, new megatrends have repeatedly emerged. They are characterized by their multi-layered and complex mode of action. Megatrends are not isolated, but influence and reinforce each other. Furthermore, they are multidimensional phenomena that arise from a large number of individual trends and always give rise to countertrends, which in turn lead to interactions. This complexity means that megatrends act as drivers of social change. Dealing with megatrends is a key prerequisite for proactively facing the future and actively shaping it (Carsten et al., 2021, p. 6).

From a methodological point of view, megatrends do not reflect reality, but should rather be understood as a model that describes how the world is changing. They are stable in the long term, which means that there will be changes in their detailed characteristics over time, but they remain constant in terms of their direction. They therefore indicate long-term development priorities that remain dynamic and subject to change along the way. They are change trends full of contradictions and paradoxes that are subject to the complexity of today's world (D. Naisbitt & Naisbitt, 2019, p. 6 f). Megatrends are generally long-term developments, but their effects can be felt extremely quickly in the networked world. For example, social awareness of sustainability has grown continuously in recent years. However, the resulting changes in customer demand behavior can also present companies with new challenges in the short term, for example if the demand for environmentally friendly products increases in the short term and changes sales markets. In addition to focusing on long-term goals, adaptive and flexible capabilities are therefore also necessary in today's world to be able to react to changes and

new opportunities at short notice. The analysis and consideration of megatrends provides a basis for long-term decisions about the future (Gatterer & Tewes, 2023, p. 45). In Germany, the Zukunftsinstitut has identified twelve megatrends that are characterized by their duration and, in particular, their influence on society: Individualization, Gender Shift, Silver Society, Health, New Work Neo-Ecology, Knowledge Culture, Connectivity, Urbanization, Globalization, Mobility and Security. Among the megatrends, there are further in-depth sub-trends that differ in terms of their significance and scope (Carsten et al., 2021, p. 11). Due to their extensive impact on all areas of society, the healthcare system is also subject to the influence of megatrends. Proactive engagement with these topics is relevant for a future-oriented design of the SHI system (Bruhn, 2025, p. 61 f). It can also be assumed that new trends will emerge in the future, which in turn will have to be dealt with. The influence of some of these megatrends on the German Healthcare System will be described in the following chapters.

2.1.2. Overview About the German Healthcare System

The "term healthcare system" in a broader sense means the "totality of organized action in response to the occurrence of illness and disability and to avert health risks"² (Busse et al., 2013, p. 2). In a narrow definition, it is the "systems of individual arrangements and social institutions through which health services of a personal nature are provided, organized, financed and controlled" (Myers, 1986). The German healthcare system is responsible for the healthcare of about 80 million citizens (Bundesministerium für Gesundheit, 2021, p. 108). Taking into account some of the most relevant actors, it consists of approximately 1.900 hospitals, 150.000 doctors, 28.000 psychotherapists and 18.800 pharmacies (Bundesministerium für Gesundheit, 2020, p. 8; 2022, p. 33). In 2023, about 501 billion € were spent on healthcare, which is about 12.0% of the German Gross Domestic Product (GDP; Statistisches Bundesamt, 2025). In 2020, Germany was one of the largest healthcare spenders in the world behind the USA and Norway (Tabish, 2024, p. 10). About 98% of total spending is on current healthcare spending, while

² Translated from German.

the remaining 2% are used for investments. Of current healthcare expenditure, half was attributable to outpatient services and about 36% to inpatient care. The largest source of expenditure by far is the SHI system with 55.7% followed by private households (12%) and private health insurers (8.2%, Statistisches Bundesamt, 2025).

The German health insurance system is based on five main principles that underline its values and functionality. The first principle says that health insurance is mandatory in Germany. Therefore, people are generally insured with a statutory health insurance or in certain cases with a private one. This divide is based on historical reasons. About 90% of the German population is insured in a statutory health insurance fund, especially when they are employed, and their regular monthly income does not cross a certain border. People with a higher regular income or self-employed people can choose whether they take a statutory or a private health insurance (Bundesministerium für Gesundheit, 2020, p. 8; 2021, p. 108). The second principle of the German healthcare system is about the financing and called the solidarity principle. Statutory as well as private health insurances are both financed by the contributions of their members (Obermann et al., 2013, p. 23). The way of financing in the statutory health insurance surrounding leads to the third principle which is the principle of apportionment. This means that all health costs produced by a single statutorily insured person are covered by the whole of statutorily insured people. This principle ensures that every person has the same claim for health services regardless of the individual income (Bundesministerium für Gesundheit, 2020, p. 10). Statutorily insured people receive health services according to the benefits-in-kind-principle which primarily means that they can go to a doctor without having to pay for it directly. Healthcare professionals such as doctors, pharmacies, therapists and hospitals invoice directly with the statutory health insurances (Bundesministerium für Gesundheit, 2020, p. 10). One main character of the German political system is the separation of powers between the federal government, federal states, and civil organizations. This separation is also reflecting in the healthcare system (Busse et al., 2017, p. 43). The fifth principle of the German healthcare system, the principle of self-governance, namely determines that the relevant actors are responsible themselves to design the system and to for example decide about which medical treatments are financed.

While the federal government, led by the Federal Ministry of Health (BMG), sets the legal framework for the actors in the healthcare system, the responsibility of the federal states primarily extends to inpatient care, hospital planning and the public health service (ÖGD). Responsibility for the direct medical care of the population in the outpatient and inpatient sectors lies primarily with the self-governing actors on the payer side as well as on the side of the healthcare professionals. This also includes decisions on the reimbursement of healthcare products and payments for medical services. To ensure good healthcare, the system is characterized by a strong regulation. The necessity of this derives from various market failures as the consumption of healthcare services generates external effects for example. There is usually an asymmetry of information between healthcare professionals and patients, and there may be a systematic underestimation of the scope and extent of future illnesses. (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 86 f). The multitude of these regulations, the legal bases, and the various players ultimately makes the German healthcare system difficult to understand and therefore, a closer view to the relevant stakeholders in the system can be helpful.

The numerous actors of the German healthcare system can be described best among the three areas of the separation of powers (Busse et al., 2017, p. 47). Firstly, the federal government creates a framework for the system by its political decisions and passed laws. Within the government, the BMG is responsible for the development of new laws. It furthermore hosts numerous institutions that deal with advanced tasks like drugs, vaccines, infection protection and health education. By setting the legal framework for the healthcare system, the BMG aims to reconcile political priorities and an efficient use of financial resources (Bundesministerium für Gesundheit, 2020, p. 16 f).

The second area in the German healthcare system is taken by the self-government. The relevant actors here are the National Association of Statutory Health Insurance Physicians (KBV), the Federal Association of Statutory Health Insurance Dentists (KZBV) and the German Hospital Federation (DKG) at the side of the healthcare professionals. At the side of the payers, the Central Federal Association of Health Insurance Funds (GKV-SV) has to be named. All these actors are respon-

sible for the determination and financing of healthcare related services that statutorily insured can make use of. Thereby, the actors are supervised by federal authorities in order to act economical (Busse et al., 2017, p. 43 f). For example, the KBV ensures the outpatient and psychotherapeutic care. On top of that, they represent the interests of their members which are physicians and psychotherapists that are approved for medical care at the expense of statutory health insurance at the federal level (Bundesministerium für Gesundheit, 2020, p. 19 f).

The GKV-SV represents the interests of all SHI companies at the federal level. It is responsible for the determination of payments for medical treatments and the costs for medical goods. Furthermore, the GKV-SV distributes the assets held in the healthcare fund and issues guidelines that the health insurances must follow in their actions. Decisions of the GKV-SV apply to all SHI companies and their associations (Obermann et al., 2013, p. 80).

The third area in the German healthcare system is taken by the single actors with direct patient contact. In this context, two kinds of actors should be mentioned. On the one hand, these are medical and non-physician actors such as doctors in the outpatient sector, hospitals, and non-physician healthcare professionals. On the other hand, advisory actors like self-help groups should be considered.

In Germany, outpatient care is initially provided primarily by physicians, dentists, and psychotherapists. Most insured persons firstly go to their family doctor when they have a health problem and are then referred to a specialist or in the third stage to a hospital in the event of more difficult problems (Schölkopf & Pressel, 2015, p. 58). Outpatient care includes among others medical treatment, the prescription of medicines and further treatment or patient steering elements such as disease management programs. On top, extensive quality assurance measures have been established, such as hygiene audits, practice inspections, frequency regulations, continuous training, intercollegiate exchange through case conferences, feedback systems and recertifications (Busse et al., 2013, p. 96).

Hospitals provide inpatient care for patients. § 2 of the German Hospital Act (KHG) defines them as "facilities in which medical and nursing care is provided to determine, cure or alleviate illnesses, ailments or physical injuries or to assist in

childbirth and in which the persons to be cared for can be accommodated".³ In addition to planned treatments, they also provide emergency care and are an important coordinating interface for further care after a hospital stay (Busse et al., 2013, p. 51). In addition to the stakeholders mentioned above, there are some more medical stakeholders with direct patient contact. These include, for example, non-physician healthcare professionals, rehabilitation clinics, pharmacies, medical device manufacturer and nursing homes. However, since these only play a minor role in direct patient contact or are mainly related to other branches of the social insurance, they are not considered in more detail in this work.

Besides the actors involved in the direct medical treatment of patients, there are several other organizations with rather advisory functions. More specifically, there is a wide range of health-related self-help groups, disability associations and organizations of socially insured persons in Germany (Bundesministerium für Gesundheit, 2020, p. 21). For example, they offer their members advice and legal support on social law issues and represent the interests of patients and recipients of state care, including those insured under SHI, at the political level (Busse et al., 2017, p. 56).

Health-related self-help services can complement professional approaches to healthcare in a variety of effective ways and strengthen the resources of chronically ill and disabled people and their families. Self-help groups are based on the voluntary association of people with chronic diseases or disabilities and their relatives. Typical is the regular and self-determined exchange of affected persons in groups to improve the personal quality of life and to strengthen the affected person's competences by jointly dealing with the disease. The groups are characterized by a high level of self-initiative and personal responsibility. In accordance with § 20h SGB V, the SHI supports and promotes the structures and activities of health-related self-help through immaterial, infrastructural, and financial assistance. Thereby, the use of both analog and digital services and applications is supported on an equal footing (GKV-Spitzenverband, 2022, p. 6).

³ Translated from German.

The costs for the health treatments of statutorily insured persons are covered by their SHI fund. The structure of the SHI system in Germany today is a result of the historical evolution. Initially, people had to insure themselves in a health insurance that represented their occupational group, which led to various fund types and no freedom of choice. Nowadays, the old structures are mostly broken up and since 1996, people can with a few exceptions choose freely which SHI fund they choose. Nevertheless, the separation into fund types therefore is still present today. (Schölkopf & Pressel, 2015, p. 54).

Due to mergers, the number of statutory health insurances decreased from 130 in 2015 (Schölkopf & Pressel, 2015, p. 54) to 94 in 2025 (GKV-Spitzenverband, 2025). The introduction of the free right to choose a health insurance led to a stronger competition for insured people. As statutory health insurances are public corporations that are not allowed to make profits, they can mainly contrast from their competitors by more attractive contribution rates, special care programs or optional benefits (Busse et al., 2013, p. 24).

The legal order of the SHI is to preserve and promote the health of their customers through the whole treatment process from prevention and acute medical care to rehabilitation. The SHI shall maintain the health of the insured, restore it in the event of illness and generally improve their state of health (Bundesministerium für Gesundheit, 2020, p. 24). The service catalog of the SHI is regulated in the German social code (SGB) and therefore gives all SHI funds the same basis for action. The social code is divided up into four service areas: services for the prevention of illnesses (§§ 20-24b SGB V), services for the early detection of illnesses (§§ 25-25 SGB V), services for the treatment of diseases (§§ 27-43b SGB V) and sick pay (§§ 44-51 SGB V).

As already explained, the German healthcare system is specifically characterized by a kind of multiple control. While the federal government is responsible for framework legislation. The self-governing partners, which mainly are the health insurance funds and the healthcare professionals have the task of implementing the statutory requirements (Schölkopf & Pressel, 2015, p. 54).

2.2. THE IMPACT OF MEGATRENDS ON THE GERMAN SHI SYSTEM

2.2.1. Megatrends, Challenges, and Solutions in the Healthcare System

Due to their extensive impact on all areas of society, the healthcare system is also subject to the influence of megatrends. The most common megatrends, globalization, digitalization, and demographic change, are challenging the system, its financial stability and proven structures (Petersen & Steiner, 2019, p. 1). Therefore, the health system urgently needs to implement strategies to improve its efficiency (PricewaterhouseCoopers, 2021, p. 9). Digitalization itself is seen as the central key to increasing efficiency. At the same time, changing patient needs, primarily due to social trends such as individualization and a stronger focus on health, are putting further pressure on the system. Shaping the digital transformation in the healthcare system in such a way that the needs of patients of the future are met or even exceeded poses major challenges for the healthcare system (Stummeyer & Behm, 2023, p. 43).

By firstly taking a look at the megatrend of demographic change, it becomes clear that it is having a huge impact on the German population to be cared for. Improved living conditions and medical progress have led to a continuously higher life expectancy. Over the last 100 years, life expectancy in Germany has increased by 30 years and it will still rise in the future (Schaeffer et al., 2020, p. 17). However, the number of births is low. On average, around 190.000 more people die in Germany each year than are born. Only the high immigration has prevented the population from shrinking so far (Vereinigung der Bayerischen Wirtschaft e. V., 2018, p. 22). The average age of the German population will rise massively by 2035, so that in about one decade almost one third will be at an age where healthcare costs naturally rise significantly. Besides the rising expenditures, the SHI system is confronted with declining revenues. The structure of contributors is shifting, with more and more retirees facing a smaller number of working people, resulting in a drop in the volume of contributions (Vereinigung der Bayerischen Wirtschaft e. V., 2018, p. 27).

By taking a closer look to the development of people's life expectancy, another challenge in relation to socioeconomic inequality becomes evident. For example, the life expectancy of the poorest 20% of the population is ten years lower than

that of the richest 20%. Low socioeconomic status is associated with poorer health and with a higher incidence of chronic diseases. This also affects the efficiency of care in the event of illness. The health care of the well-off population groups is significantly more efficient than that of the poorer ones. In this context, special attention should also be paid to the cultural diversification of society due to globalization. Germany has a growing population of around 17 million people with an immigrant background, whose different languages, levels of education, perceptions of health and related lifestyles also clash in the healthcare system. There are major problems in finding the right access to care, communicating with medical staff, and understanding the information conveyed. A major task for the future will be to reduce these health inequalities (Schaeffer et al., 2020, p. 19 f).

In addition to life expectancy, a change in the spectrum of diseases in society is also having an impact on the healthcare system. Non-communicable diseases which are mostly chronic and lifestyle-related are becoming increasingly common. These include diabetes, hypertension, musculoskeletal disorders, and mental illnesses. Due to the long-term and intersectoral need for therapy, these diseases are accompanied by enormous financial and especially organizational challenges for the rather sectoral healthcare system (Vereinigung der Bayerischen Wirtschaft e. V., 2018, p. 23). Medical and technological progress can on the one hand provide an answer to this. First, it is linked to new treatment methods and improved patient care. New medications and individualized therapies can be tailored more individually to the patient and increase efficiency reserves. On the other hand, considerable cost increases are also to be expected because the new methods are generally significantly more expensive. In order to keep the healthcare system affordable, the costs and benefits of these therapies must be weighed against each other again and again (Vereinigung der Bayerischen Wirtschaft e. V., 2018, p. 24).

In addition to the costs, an increase in diagnostic and therapeutic possibilities also means an increase in complexity due to increasing differentiation and specialization in the healthcare system. Although the new technologies have increased the efficiency of the healthcare system, problems such as the multiplicity of instances, fragmentation and lack of clarity have become more important. For patients, it has become even more difficult to discover access to the healthcare system via the right point of contact (Schaeffer et al., 2020, p. 18).

Another demographic challenge is the shortage of skilled workers in the healthcare sector. Calculations show that as the pace of demographic change increases, a gap of 165.000 physicians and 800.000 non-physician specialists is assumed for 2030. (Vereinigung der Bayerischen Wirtschaft e. V., 2018, p. 24). Numerous factors lead to another, structural problem in this context. Especially rural regions and even catchment areas around metropolitan regions will suffer from poorer healthcare. This does not only affect the supply with doctors close to home, but also the supply of care facilities and smaller hospitals (Burkhart & Huesmann-Koecke, 2018, p. 13). Especially due to the megatrend of urbanization, young physicians without families are choosing metropolitan regions for patient care. This trend is reversed only in the later years of their careers. The so-called shortage of rural physicians is therefore a harsh reality for many people living away from metropolitan regions. (Burkhart & Huesmann-Koecke, 2018, p. 20). Furthermore, the social trends like individualization are leading to a further thinning out of family and informal networks, which often provide care and thereby relieve the burden on the healthcare system. A greater urban-rural divide is also making the provision of comprehensive medical care in rural areas more complex and expensive (Burkhart & Huesmann-Koecke, 2018, p. 19).

Financing the healthcare system is a huge challenge today. In addition to advances in medical technology, expensive legislative projects, and general increases in the cost of healthcare services in particular have led to rising expenditure in the SHI system in recent years. Despite the rising number of insured persons, increasing contribution income cannot compensate for this development, resulting in an increasing gap between income and expenditure (Baas et al., 2025, p. 23). In addition to the challenges mentioned, the digital transformation is confronting the healthcare sector with disruptive changes, as in other industries. It is already happening today and will still continue to massively change the way prevention and treatment are handled in the future (Stummeyer & Behm, 2023, p. 43).

Digitalization is having a great impact on existing structures and processes in the healthcare sector. Digital infrastructures have fundamentally changed communication and information options and are still today having a disruptive effect on familiar products, processes, working environments and business models (Bohnet-Joschko, 2023, p. 57). Thereby, the increasing speed of transformation

makes technological advancement a force of change. Furthermore, technologies such as artificial intelligence (AI) or big data analytics tend to have the potential to take over tasks of human employees, even in rather sophisticated roles (Linthorst & De Waal, 2020, p. 5). New players such as IT companies and start-ups are entering the market, patients are becoming carriers of valuable information and have changed needs, SHI funds have to take an active role and doctors are increasingly offering digital health services. (T. Müller et al., 2022, p. 86). Another point is, that digitalization has become an enabler for new healthcare services such as electronic patient records or telemedical services which fundamentally change the communication between patients and stakeholders in the SHI system (Mortsiefer et al., 2017, p. 266). Activities that required physical movements and special equipment a few years ago are now carried out using small mobile devices. Communication via video services and messengers, anamnesis and diagnostics supported by AI as well as electronic prescriptions are just a fraction of the fields of application of digital transformation in the healthcare sector (Stummeyer & Behm, 2023, p. 44). With the help of AI, for example, there is far-reaching potential to improve the quality of treatment, reduce waiting times and optimize costs (Glauner, 2022, p. 150).

These changes, some of which are disruptive, bring with them both opportunities and challenges. Over the last years, German politics accelerated a lot of digitalization projects in the healthcare sector after a long period of perceived standstill. However, it still must also be taken into account that digitalization will continue to put additional pressure on the financial situation of the SHI system. (Niedermann & Martin, 2020, p. 85). The total costs can hardly be estimated. In 2019, for example, expenditures of 450 million euros could be directly allocated to digitalization in the healthcare sector, primarily for the electronic health card and the telematics infrastructure (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 151).

The outlined developments are leading to changes in the core business of SHI funds. Especially due to the described megatrends, well-known processes as well as customer expectations are changing. For example, medical treatments, the reimbursement of services and the management of contracts are becoming increasingly automated. Digital self-service options are increasingly replacing standard interac-

tions with insured persons, which is what they are demanding. Since comprehensive digital processes have already found their way into the everyday lives of people, insured persons are becoming increasingly familiar with them, and young insured persons in particular expect the services of a SHI fund to be integrated in a digital ecosystem (Kade-Lamprecht, 2017, p. 91 ff). In addition, large international corporations such as Amazon and Google, which are starting to develop digital health products, pose a particular threat to health insurers and satisfy needs that insured persons did not even know they had until then. The danger for German SHI funds is that they will be reduced to the role of the payer and lose importance as a player in the health management of their policyholders (Kaetsch & Pifczyk, 2022, p. 64).

However, the changes can also be used by SHI funds to develop new business models with a stronger focus on the individual needs of their insureds. With the help of context-sensitive, personalized offers they can help their customers to navigate through possible therapy paths. By this, the individual can noticeably be supported in his personal situation and receive care that is tailored to him (Demmler et al., 2017, p. 73). Even if the digitalization of the German healthcare system is not the sole responsibility of the SHI, they are central players with contact points to all important stakeholders, from patients to doctors to politicians. As a result, they are uniquely positioned to help set the step of digitalization as pacemakers (Egle, 2021).

Another central stakeholder that is mainly affected by the influence of megatrends are healthcare professionals. On the one hand, current developments are changing organizational workflows and care processes in practice as a result of advancing digitalization and for example the connection to the telematics infrastructure and its applications. Medical-technical progress also brings relevant changes for healthcare professionals. On the other hand, changing patient requirements also have an impact on healthcare professionals, which affects for example skills, self-management, and expectations in the digital field (Beese et al., 2025, p. 26).

Digital networking and the associated conversion of practice processes involves a great deal of effort for the majority of healthcare professionals. Many paper-based processes, such as issuing prescriptions and certificates of incapacity for work, will be handled digitally in future. Information between doctors is already today shared digitally rather than by doctor's letter, and documents sent to patients

will be stored in the electronic health record. New communication options, independent of time and place, enable new models for practicing medicine from home or part-time. Diagnosis and therapy suggestions will be AI-based in the future and support medical knowledge. This can also be used for image diagnosis. Doctors will then be able to focus more on more demanding and interventional tasks (Juffernbruch, 2017, p. 56). Still few practices have the technical expertise to master this digital transformation and it has to be purchased externally from IT providers. For this reason, many doctors still feel hindered in their day-to-day work and do not exclusively experience the added value of digitalization (M. Albrecht et al., 2024, p. 6 f). The basic prerequisite for increased acceptance of digitalization is the adequate qualification of healthcare professionals, especially doctors and nurses. This acquisition of skills requires a fundamental and active engagement with the core issues of digital transformation and the skills and attitudes required for this (T. Müller et al., 2022, p. 90). In future, the requirements will also have to be increasingly taken into account in the vocational training of healthcare professionals (Juffernbruch, 2017, p. 58).

Digitalization also brings challenges in contact with patients. Due to the internet, patients are increasingly obtaining information about their complaints in advance and want to be more involved in the treatment process. At the same time, however, there are also patients who are not sufficiently familiar with digital tools and for whom doctors need to provide more information in order to ensure good healthcare. Healthcare professionals need a kind of digital empathy with which they can engage with their patients, take their views seriously and explain things clearly: both why they probably disagree with Internet information and why it is still a good idea to take advantage of digital healthcare services. There is a fine line between letting go of tried-and-tested analogue processes and actively using the new tools to raise patient awareness (Hertle, 2017, p. 11 f).

2.2.2. Impact of Megatrends and Challenges on Insured People

The influence of megatrends is also leading to changes for insured people in a healthcare system. Digitalization is establishing new information possibilities, processes, and tools in everyday life that can also be found in the healthcare sector.

Especially on-demand offerings, which enable the comprehensive availability of individualized products and services, are shaping everyday life and are reflected in society's service expectations. In the healthcare sector, patients also will increasingly want individualized offerings, that are more and more digital. In line with the thought of customer centricity, insured persons expect to be placed at the center of healthcare activities (Stummeyer & Behm, 2023, p. 45 f).

Health itself is a megatrend and is equivalent to a high quality of life in all areas of life. An increasingly all-encompassing health awareness defines the individual lifestyle as a goal in life. Especially after the coronavirus pandemic, society has developed an increasingly holistic view of health. The complex interactions that lead to health are increasingly better understood and considered. In particular, the mental consequences of the pandemic for society, politics and the economy have made clear that health is more than ever a task for society as a whole. The pursuit of self-efficacy is also motivating people more than ever to take their health into their own hands (Mühlhausen, 2024, p. 11)

Sport and healthy eating, leisure and wellness are becoming increasingly important. The megatrend of individualization is closely linked to this. The opportunity for self-realization and the desire for individuality are becoming increasingly important in society. More and more people are striving to shape their lives according to their own ideas, take alternative paths and focus on themselves. These values are also reflected in the way we deal with our own health and lifestyle. With the help of apps, fitness wristbands and other wearables, users can monitor their health independently, keep an eye on important bodily functions such as pulse or cardiovascular activity and react in a targeted manner in the event of abnormalities (Burkhart & Huesmann-Koecke, 2018, p. 19; Hertle, 2017, p. 10 f). Current health trends such as epigenetic phenomena and nutrition or climate-related health consequences are other relevant health topics that people are more concerned with today than ever before.

Individual attention to one's own health, influenced by personal conditions and life circumstances, is greater today than ever before. This has also changed the traditional patient journey through the healthcare system. Instead of going to the doctor first when they have health questions, many people turn to the internet first. Additionally, wearables and apps provide detailed information on individual

health status. On this basis, patients have often collected a lot of information on their health status before consulting medical professionals. While diagnosis and treatment recommendations used to be widely accepted, the picture today is increasingly complex: patients switch between different sources of information and opinions in their decision-making processes. This change makes the patient journey more challenging for everyone involved. The passive patient is becoming a responsible partner who independently obtains information, takes responsibility for their own health, and demands co-determination. They want to be informed about treatment options and alternatives and meet the doctor on an equal footing. (Burkhart & Huesmann-Koecke, 2018, p. 19; Hertle, 2017, p. 10 f).

The increased use of online portals to search for medical information is a key trend within digitalization. About half of Germans (49%) use the internet to find out about their own state of health. It is remarkable that age hardly plays a role here. More than half (53%) of the young generation aged 18 to 29 and 54% of 50 to 59-year-olds search for medical information on the Internet. Only 60-year-olds (and older) are less versed, although this age group also has a fairly high user rate of 41% (Burkhart & Huesmann-Koecke, 2018, p. 24). Today, the internet can be seen as the first information point for many patients with health issues (Burkhart & Huesmann-Koecke, 2018, p. 26). One reason for this is that digital solutions, even if they have not yet fully arrived in the healthcare sector, have already become a matter of course in patients' everyday lives in other contexts. In a study, 96% of respondents stated that they often use a smartphone, 89% do their banking online and 63% buy things online (Amelung et al., 2020, p. 22). The fundamental affinity for digital solutions has an influence on the acceptance of digital technologies in other sectors such as healthcare. For example, health apps in particular are used more frequently by people who are fundamentally digitally affine (64%) than by patients who have a low digital affinity (26%, Amelung et al., 2020, p. 26). AI is also playing an increasingly important role in the information and communication behavior of the German population. Just under one in five (18%) have already used ChatGPT, for example, with 43% stating that they use the tool as a search engine and to research information (Dathe et al., 2024, p. 33). In addition, the COVID-19 pandemic has also helped to accelerate the use of technology in the healthcare context. In times when the risk of infection had to be minimized, telemedicine and

digital health services have helped to ensure people's access to healthcare (Whitelaw et al., 2020, p. e438).

Digitalization, but also the trends towards better health and individualization, bring opportunities for the patient role and the strengthening of the patients' role. For example, increasing personal responsibility will enable them to gain a better overview of their own state of health. It is already easy for patients to monitor their own vital signs from home. At the same time, increasing personal responsibility can also lead to patients being overwhelmed and raise more questions than answers (Burkhart & Huesmann-Koecke, 2018, p. 19 f). In the course of digitalization and all the advantages that the further development of technologies brings with it, it is important not to forget the individual person with their skills, which must also be developed accordingly. The increasing amount of health information available, particularly via digital channels, also means that patients are increasingly meeting information that is individually relevant to them. Here, it is important to select relevant and trustworthy sources to be able to make the right health decisions. In terms of information literacy, only 58% of Germans can recognize dubious news and only 51% are able to check the accuracy of information. Another challenge is disinformation, which 62% of the population have come into contact with at some point (Dathe et al., 2024, p. 33).

The increase in available information will permanently change care and communication processes. Despite existing challenges regarding the validity of information, the previous asymmetry of information between doctors and patients is tending to be reduced and there is an opportunity to create new possibilities for joint decision-making and greater involvement of patients in medical decision-making processes. This development is also described as "patient empowerment" and aims to improve the patient's position through shared information, active participation, and the opportunity to be involved in decision-making processes. At an overarching level, patient empowerment is intended to help patients to shape their health-related lives as independently as possible (Jorzig & Sarangi, 2020, p. 97). However, patients will always remain medical laypersons and will continue to be dependent on the expertise of their doctors. Together with the self-image of pa-

tients as "customers of the healthcare system", the patient focus is shifting to patient-oriented processes, which healthcare stakeholders must meet in the long term (Stummeyer & Behm, 2023, p. 50).

However, in order to bring this image of a digitally transformed and participatory healthcare system to reality and to achieve the urgently needed improvements in care, patients must above all have the skills to meet these new requirements (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 553). Without proper handling of digital health information and applications, social inequalities, overuse, underuse and misuse could increase, contrary to the actual intention of digitalization (Wyatt, 2018, p. 3). In addition, the digital affinity of the population differs immensely depending on age and generation alone. Accordingly, while trends and the development towards more digitalization can be observed in society, they do not apply equally to every individual. To illustrate this, a distinction can be made between three groups. Firstly, there is a traditional group that has very little digital affinity due to its age and preferences. Secondly, there is the group of "digital immigrants" who have largely grown up without digital tools and services but have established contact with them at a later stage in their lives and are now well versed in the digital world. The third group are the "digital natives", who were digitally socialized at an early age and use the corresponding services as a matter of course. Although the patients of the future will predominantly belong to the latter group, there are also a number of differences in terms of digital affinity and skills here as well as in the other two groups (Stummeyer & Behm, 2023, p. 46). In addition to age, social determinants include education level, social status and chronic diseases, which means that these population groups must be given special attention (Sambasivan et al., 2021).

Due to the required skills and the heterogeneous digital affinity, digital health information and services can simultaneously represent both an opportunity and a barrier in the digitally transformed healthcare system (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 570). All groups of people, including those with a low socio-economic status, must be able to participate in the digital transformation and benefit equally from digital services. If this is not the case, there is a risk of a digital divide in the population, which is accompanied by profound differences in access to and use of digital services

(Levin-Zamir, 2023, p. 146). The three dimensions of the digital divide must be considered here. At a primary level, it is important to avoid a lack of access to technology and the internet. At secondary level, differences in the use of digital technologies must be taken into account. At the tertiary level, it must be taken into account that the different abilities to use digital technologies lead to different health outcomes (T. Müller et al., 2022, p. 94).

New skills requirements are not only today relevant as a result of the digitalization efforts in the healthcare sector in recent years. Technological progress means that patients will also need to have the corresponding digitally associated skills in the healthcare sector in the future. The example of AI clearly shows that technologies will continue to find their way into healthcare. Corresponding algorithms and imaging procedures are already being used in diagnostic procedures today and are leading to AI-assisted diagnoses by doctors leading to significantly better results than diagnoses by doctors alone (Pham, 2021, p. 9). In the future, however, AI-based results might also become more relevant in the patient's home, where they will require a correspondingly competent approach to tools and services, but also to AI-based recommendations, even with cultural sensitivity in multiple languages (Biswas, 2023, p. 868 f). In the future, voice assistants such as Amazon's Alexa or Apple's Siri will be able to recognize neurological or mental illnesses at an early stage. Even if the majority of the population may still be sceptical about these developments today, they will become the new normal for future generations (Stummeyer & Behm, 2023, p. 49).

2.2.3. Interim Conclusion: New Competences are Needed in the Healthcare System

With its historically evolved structure and strict regulation, the German healthcare system is undergoing change. Global megatrends such as health, individualization, demographic change, advances in medical technology and digitalization are having a massive impact on established processes. For years, expenditure in the SHI system has been increasing at a higher rate than income. This makes it necessary to continuously increase efficiency to keep the system economically stable and efficient.

Digitalization itself is considered to have far-reaching potential in this context. Despite various developments, and particularly the creation of a legal framework for digital transformation in recent years, the status quo in Germany is still in need of improvement. The digital transformation brings with it a variety of challenges for all stakeholders in the healthcare system, including the insured people. Health information and services are increasingly freely, and, above all, digitally available, and new forms of treatment and communication are replacing old processes. When it comes to digitalization, the focus is often on technical connectivity. However, it is a multi-layered, complex social phenomenon in which technical and social changes go hand in hand. In addition to introducing technologies, the people who are to use them must also be trained and qualified. (Samerski & Müller, 2019a, p. 36 f). This development is being accelerated in particular by AI, which is taking the ability to assess the trustworthiness of digital information to a new level (Abel & McQueen, 2020, p. 1612).

In this context, SHI funds are asked to focus more on the increasingly digital needs of their policyholders if they do not want to lose importance in view of the increasing digitalization of their core business processes. Doctors need to digitize their practice processes and build up the relevant skills in this field. And before all, insured people must not be forgotten in this transformation. They are assuming greater personal responsibility for their own health and the role image is increasingly shifting towards a self-determined insured person who is included in decisions and actively involved in treatment. This requires the appropriate skills, which ideally need to extend across all levels of society. Furthermore, only empowered players in the healthcare sector can contribute to a successful digital transformation. The concept of dHL attempts to find an answer to the skills required by insured persons in a digitally transformed healthcare system and will therefore be presented in detail in the next step.

III – DIGITAL HEALTH LITERACY AND ITS STATUS QUO IN THE GERMAN HEALTHCARE SYSTEM

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3.1. THE CONCEPT OF DIGITAL HEALTH LITERACY

3.1.1. Basic Terms and Concepts in the Context of Digital Health Literacy

Health information and services are increasingly available online due to digitalization as a megatrend. Over the years, the internet became the largest health information source for people. One positive effect of this is the rapid availability and high topicality of information (Flaig et al., 2020, p. 320 f; Heinemann, 2021, p. 75). Nevertheless, it has to be taken into account that online health information is unregulated territory and not much more than some basic web programming skills are needed to launch information on the internet (Zhang et al., 2015, p. 2071). The challenge for people is therefore to assess the quality and credibility of online information in order to be able to use it effectively for their own health decisions (Diviani et al., 2016, p. 1023). Nowadays, health knowledge is freely accessible and can be obtained from a wide variety of sources such as websites, blogs, forums, and social media. Well-prepared, evidence-based health information can provide people with helpful recommendations for action. In Germany, the "Good Practice Health Information" describes standards to produce evidence-based information from research to publication. A key aspect of quality is that creators present and publish their methods and processes transparently (Koch, 2017, p. 57). Despite some authors take into account these standards, there are also less reliable sources that are based on implicit knowledge, experience reports, self-reports and individual opinions (Zhang et al., 2015, p. 2072). Furthermore, authors and sources of health information are often not easy to identify and search results are influenced by search engine rankings. Commercial providers and Wikipedia entries often appear among the first hits, which are then chosen by the searchers. As search engines build the start point of research for most people, they ultimately have a significant influence on the information used (Koch, 2017, p. 57). Dealing with digital health

information therefore places new demands on its users. The appropriate use of digital health information and services also requires special skills from users. In the secondary healthcare market for example, there is a wide range of health apps that are used by the population to support the medical treatment process. However, assessing the quality of these applications is a major challenge and can have far-reaching consequences (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, p. 296). The skills and knowledge needed in the context of digitalization in the healthcare sector are unified in the concept of dHL.

The concept emerged at the end of the 1990s in response to technological progress in the healthcare sector. Initially, the term "eHealth literacy" (eHL) was used as a conceptual term. eHL focused on the use of electronic technologies in various areas of healthcare. With the rapid expansion of digital information sources, there was a paradigm shift. The term eHL was increasingly replaced by "digital health literacy". This development reflects the growing importance and diversity of digital health information, which goes beyond the internet and now also includes mobile health applications and AI. Both eHL and dHL are repeatedly associated with the concept of general health literacy (Dratva et al., 2024, p. 2). For a better understanding of the concept, its origins and further development, the relevant basic terms and conceptual connections with eHealth, literacy and health literacy are therefore explained below.

The initially coined term "eHealth literacy" consists of the two terms "eHealth" and "literacy". eHealth is the abbreviation for electronic health and is defined in diverse ways. This is partly due to the rapid development of technological innovations in the healthcare sector and the resulting expansion of the possibilities that eHealth brings with it. At the beginning of the 2000s, eHealth was primarily used to describe the digitalization of established processes and structures such as electronic patient records. However, the definition has since been expanded to include other aspects such as patient care, research and training (Jorzig & Sarangi, 2020, p. 95 f). The BMG defines eHealth as "applications [...] that use the possibilities offered by modern, digital information and communication technologies (ICT) to support the treatment and care of patients" (Federal Ministry of Health, 2024). Despite the lack of uniformity in the definitions, eHealth aims to increase patients'

health literacy by providing them with better information about illnesses and treatment options. eHealth thus contributes to patient empowerment (Jorzig & Sarangi, 2020, p. 96).

The term "literacy" is defined by UNESCO as follows: "Beyond its conventional concept as a set of reading, writing and counting skills, literacy is now understood as a means of identification, understanding, interpretation, creation, and communication in an increasingly digital, text-mediated, information-rich and fast-changing world. Literacy is a continuum of learning and proficiency in reading, writing, and using numbers throughout life and is part of a larger set of skills, which include digital skills, media literacy, education for sustainable development and global citizenship as well as job-specific skills. Literacy skills themselves are expanding and evolving as people engage more and more with information and learning through digital technology" (Unesco, 2024).

The word itself comes from the end of the 19th century and describes the reading and writing skills made necessary by industrialization. Today's literacy concepts mainly deal with three aspects of communicative skills of individuals in relation to new media: (1) technical-practical handling skills (e.g. pen and paper as a writing tool, dealing with technologies and media), (2) primary-interpretative comprehension skills (e.g. understanding of symbols, grammar, non-alphabetic and multimedia media) and (3) secondary-interpretative and critical skills, knowledge and understanding (e.g. understanding of meaning and context, reflection). Regarding literacy, there are different concepts that place different emphasis on these aspects. Examples include digital literacy, media literacy and information literacy (Swertz & Fessler, 2010, p. 2). A basic distinction can therefore be made between "tool literacies", which include in particular skills in the technical handling of new media, and "literacies of representation", which focus on understanding and critically questioning information in its respective social context (Tyner, 1998, p. 92). In contrast to "knowledge", literacy refers to the ability to solve problems in a specific subject area and to apply certain things (Langkafel, 2021, p. 19).

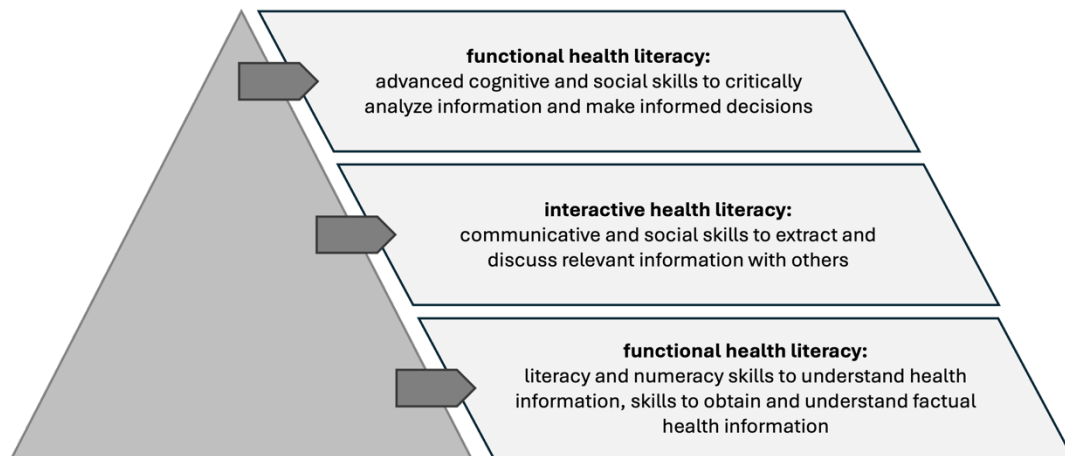
The eHealth Literacy concept primarily focused on the use of electronic technologies in healthcare, whereas DHL is to be understood more broadly and refers

to the ability to use health-related information from a wide variety of digital information sources such as the Internet or AI (Dratva et al., 2024, p. 2). Further explanations on the conceptual understanding of dHL follow in chapter 3.1.2.

DHL and eHL have strong overlaps with general health literacy and are often associated with it. Therefore, a brief look at this concept follows below. The conceptual understanding of health literacy is characterized by a variety of interpretations with different theoretical focuses (Malloy-Weir et al., 2016, p. 347). A review found that there is no uniform definition of health literacy in studies, but that the term is often related to the respective research objective (Mackert et al., 2015, p. 1162). A definition widely used in Europe comes from Sørensen et al. (2012, p. 3): "Health literacy is linked to literacy and entails people's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course". This understanding of health literacy focuses on the individual's competent handling of health information and describes that a variety of cognitive and social skills must be present to act in a health-competent manner. The concept is closely linked to the public health approach and health promotion and understands health literacy more broadly as an essential condition for the participation and empowerment of patients in the healthcare system (Nutbeam, 2008, p. 2074). Health literacy is seen as a way of optimizing patients' self-management, of enabling them to navigate the healthcare system with confidence and of getting into contact with healthcare professionals. A well-developed health literacy enables patients to take responsibility for their own health, but also that of relatives, for example, and to make self-determined health-related decisions. Conversely, this also means that less well-developed health literacy increases the actual risk of becoming ill or not finding the right health treatment (Heinemann, 2021, p. 73 f).

This broad understanding of health literacy also emphasizes that, in addition to knowledge, motivation and comprehensive skills are required for individuals to deal with health information. Based on the understanding of general literacy, three types of individual health literacy can be distinguished according to Nutbeam (2008), which complement each other and are presented in Figure 4.

Figure 4: Three types of health literacy



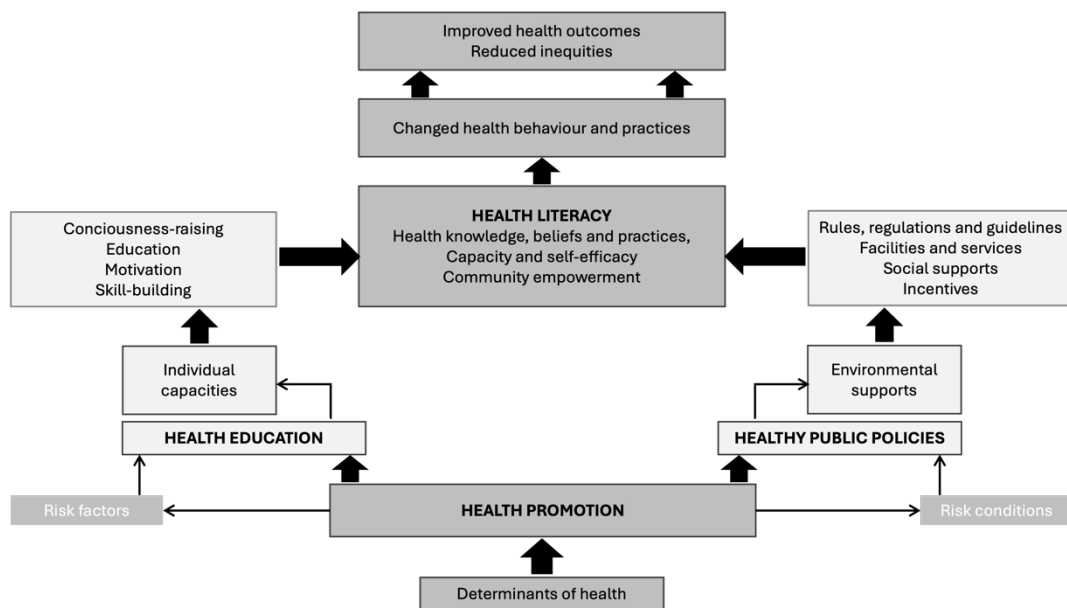
Note: Adapted from Nutbeam (2008), p. 2075.

Functional health literacy refers to general reading and writing skills that are necessary for a general understanding of health information. In addition, interactive health literacy includes skills that enable individuals to apply health information to a variety of situations and to ultimately use them properly for their own health. Critical health literacy requires advanced skills to critically engage with health information and choices, which are used to make informed decisions and increase control over one's own health (Nutbeam, 2008, p. 2075).

Health literacy is not only an interplay between different cognitive and social skills but is also highly context-dependent and can be influenced by various demographic and socio-cultural variables. Since dealing with health information and making health-related decisions requires recourse to different skills depending on the underlying situation, health literacy is always the product of context-specific requirements and individual prerequisites (Bertschi et al., 2019, p. 281). The quality and accessibility of health information (Bremer et al., 2021, p. 2) or the ability of

doctors to cooperate (Jordan, 2023) also have a strong external influence on individual health literacy. The relational character and the development of health literacy are illustrated in Figure 5.

Figure 5: The development of health literacy



Note: Adapted from World Health Organization (2012), p. 17.

The sub-competencies of health literacy are shaped both by education and by health-political conditions. Through health education, the skills of the individual are strengthened through consciousness-raising, educational, motivational, and skill-building measures. Politics can contribute to the promotion of health literacy by creating an environment that encourages behavioral change. By influencing these factors, both intrinsic and extrinsic, sustainable changes can be achieved in the health status of individuals and, beyond that, in society as a whole (World Health Organization, 2012, p. 17).

To improve health literacy, measures can therefore be geared towards the skills of individuals. However, a more comprehensive approach additionally requires suitable organizational structures and the provision of resources for health literacy (Eichhorn, 2022, p. 70). Organizational health literacy is also an important approach in this context, as it deals with how organizations enable individuals to find, understand and use health-related information and services in order to make health-related decisions and take action (Santana et al., 2021, p. 259). The organizations meant here are not only located in the healthcare system, but also in the general living environments such as schools, as it is assumed that these also have the potential to promote health literacy (World Health Organization, 2021, p. 6).

By promoting health literacy, people are empowered to make decisions regarding their own health and to participate in health-promoting measures. At best, this strengthens individual health and also improves the framework conditions for health (World Health Organization, 2021b, p. 7). In order to give relevance to this scope, the WHO named the promotion of health literacy as one of three central priorities in the area of health promotion at the 9th Global Conference for Health Promotion in Shanghai (World Health Organization, 2017).

3.1.2. Conceptual Understanding of Digital Health Literacy

The first discussions about the concept of dHL date back to the late 1990s and, in the wake of advances in information technology, primarily revolved around the "use of electronic technologies in healthcare, healthcare provision and public health" (Eysenbach, 2001)⁴. One of the first and most influential definitions of dHL comes from Norman and Skinner, who laid an important milestone with their research in 2006. At that time, the term "eHealth literacy" still dominated the discourse, but this evolved to the term and conceptual understanding of "digital health literacy" in the course of the expansion of digital communication options (Dratva et al., 2024, p. 2). Norman and Skinner defined eHL "as the ability to seek, find,

⁴ Translated from German.

understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (Norman & Skinner, 2006, p. 2). This approach transfers the concept of health literacy to the digital age. As a result, dHL becomes a form of health literacy that can also deal with digital information sources and thus focuses primarily on the new format of information transfer (Samerski & Müller, 2019, p. 43). Newer concepts of dHL increasingly consider the active role of the population as prosumers of information, which has been made possible by the development of the World Wide Web and social media. This is because digital information in particular is no longer just consumed, but also created and made available independently. In addition, a digital exchange takes place in which people inform and communicate with each other. In addition, the understanding of dHL has evolved over time to the effect that the individual skills of dHL must always be considered in relation to systemic framework conditions and social factors (Dratva et al., 2024, p. 2).

In 2014 for example, Gilstad provided a new definition of eHL considering context-specific and communicative competences that must be taken into account in an eHL concept. From her point of view, the bodily experience of a health challenge, the procedural literacy to handle technology, contextual and cultural literacy and communication skills are fundamental elements of being eHealth literate (Gilstad, 2014, p. 5): "an eHealth literate person must be able to read and write, interpret and communicate health information relevant for her in the given situation and given cultural context. Moreover, she must be able to apply the accessible technological tools. Society must facilitate for promoting eHealth literacy for all citizens" (Gilstad, 2014, p. 9). eHL is therefore defined as "the ability to identify and define a health problem, to communicate, seek, understand, appraise and apply eHealth information and welfare technologies in the cultural, social and situational frame and to use the knowledge critically in order to solve the health problem" (Gilstad, 2014, p. 8). With this new understanding of eHL, the lily model was extended to a socio-cultural and situational context for the first time. Furthermore, the definition does not only refer to the adequate use of digital health information but also to the use of digital technologies.

Another further development of the eHL concept was published in 2015 by Bautista. He understands eHL is a major driver of health and extends the goal of

being eHealth literate to positive health outcomes and an increased quality of life: "eHealth literacy involves the interplay of individual and social factors in the use of digital technologies to search, acquire, comprehend, appraise, communicate and apply health information in all contexts of healthcare with the goal of maintaining or improving the quality of life throughout the lifespan" (Robert Bautista, 2015, p. 43).

In 2017, Griebel et al. provided another definition by a synthesis of various published definitions. "eHealth literacy includes a dynamic and context-specific set of individual and social factors, as well as consideration of technological constraints in the use of digital technologies to search, acquire, comprehend, appraise, communicate, apply and create health information in all contexts of healthcare with the goal of maintaining or improving the quality of life throughout the lifespan" (Griebel et al., 2017, p. 17). In contrast to the previous definition, this definition also includes the production of information and generally focuses strongly on health information. Compared to Gilstad's definition, health technologies are not part of the execution. However, the aim of eHL is also to improve health status and quality of life. Contextual factors and technological constraints are also taken into account.

In the German context, Samerski and Müller have provided a comprehensive definition of dHL. The main difference of this definition compared to the ones before is mainly the broader context considered as well as the differentiated definition of targets of a high dHL:

"Digital health literacy is the ability to use digital technologies in a self-determined way for the purpose of maintaining, restoring or improving health. It enables patients and users to find, understand and evaluate health information, protect, or release health-related personal data as required, assess the functionality, results, and consequences of digital health applications, weigh up the advantages and disadvantages and act accordingly.

Digital health literacy enables organizations to make a transparent digital policy public, to guarantee high information quality and data security and to specifically consider and promote the digital health literacy of patients and insured persons (in the sense of corporate digital responsibility).

Digital health literacy arises from the interaction of individual skills and socio-technological conditions. It includes awareness of the ethical, legal and social implications for both individuals and organizations and enables them to shape digital change in a way that promotes health.” (Samerski & Müller, 2019b, p. 49)⁵

The definition links dHL with the discussed change in the patient role and focuses on self-determination as the primary objective of dHL. According to their understanding, the digital eco system that patients are part of does not only request special competences that sum up as dHL but also reflective abilities, e. g. when it comes to the management and interpretation of one's own digital health data, questions of data security or social and ethical implications of digital technologies. It is therefore no longer enough to simply strive for the dissemination of digital technologies by increasing dHL. Rather, dHL should be seen in a broader context to use the full potential of digital transformation. The main goals of being digitally health literate should be that people get enabled to use and to trust digital health services, to act as self-determined and empowered as possible and to actively take part in the digital transformation of the healthcare system.

Self-determination and patient empowerment can be seen as essential pillars of a modern healthcare system (Samerski & Müller, 2019, p. 43). In Germany, these principles are even legally legitimated (e. g. § 1 SGB V). Samerski & Müller conclude that dHL must be understood as more than just the sum of health literacy and digital literacy. Samerski and Müller see dHL as both an opportunity and a prerequisite for successful digital transformation in the healthcare sector. The digital transformation requires patients to increasingly act as co-producers of their own health. In this context, they see dHL as an independent competence and emergent learning field. According to their definition, the conscious and self-determined use of digital health services and a high level of patient sovereignty will be the highest good of a high dHL (Samerski & Müller, 2019, p. 49). Self-determination is dependent on the skills of the individual, but also on the technical and social environment in which the individual finds themselves. DHL is therefore a relational

⁵ Translated from German.

concept that views digital skills as the result of the interaction between people, technology, and their social and material context. According to their understanding, digital skills emerge in socio-technical systems that are characterized by reciprocal influences between users, technical instruments and their environment (Samerski & Müller, 2018, p. 36; 2019a, p. 46). Available alternatives and voluntariness must be made possible, for example, through appropriate regulations (Mertz et al., 2016, p. 24 f).

Another facet of dHL highlighted by Samerski & Müller is organizational dHL. In line with the understanding of dHL as a relational concept, healthcare organizations also play a major role in promoting dHL in their interactions with patients. Digitally health literate organizations are characterized, for example, by the availability of human resources for digital transformation, a binding digital policy for customers and employees, transparent and secure data processing and the involvement of end users in the development of their products and services (Samerski & Müller, 2019a, p. 46 f).

Another definition of dHL was proposed by Kolpatzik et al. (2020). They distinguish between two levels of dHL, general and specific dHL:

"General digital health literacy encompasses individual, social and technical skills and resources that are important for searching, finding, understanding, evaluating and using digitally available health information. It is a dynamic concept that is closely linked to the lifelong learning and empowerment approach. Digital health literacy takes into account the continuous development of digital technologies. It should enable citizens to increase their self-efficacy through the use of digital health applications and to lead a self-determined life with a high quality of life.

Specific digital health literacy includes dimensions such as computer literacy (computer-related competence), data literacy (data competence), privacy literacy (data protection competence), traditional literacy (reading and writing competence), media literacy (media-related competence), navigation literacy (search and find competence), information literacy (information competence) and health literacy (health competence). These dimensions are each to be applied to the dynamic context of

health, the healthcare system and society as a whole. The respective specific competencies enable citizens to protect their privacy, increase data security and maintain and improve their health and well-being based on reliable information." (Kolpatzik et al., 2020, p. 6)⁶

Kolpatzik et al. (2020) also do not understand dHL as an isolated concept, but rather describe eight different dimensions that dHL includes on the specific level. DHL should enable patients to make optimal use of digital health applications and digital health information. It is a key qualification for being able to actively participate in the digital transformation of the healthcare system as a digitally sovereign and empowered patient (Kolpatzik et al., 2020, p. 20). At this point, a conceptual similarity to general health literacy becomes clear. In addition, dHL is also understood as a relational competence that depends on both the individual's skills and the socio-technical framework conditions. Both conditions interact to determine an individual's motivation and ability to actively engage with digital health services (Kolpatzik et al., 2020, p. 22).

The discussion whether dHL should be defined and conceptualized as a specific competence or whether it should be seen as part of general health literacy and the corresponding concept has become an increasingly important part of scientific discourse in recent years (Dratva et al., 2024, p. 2). Two other more recent definitions, for example, not only draw a clear conceptual reference to general health literacy, but also build the definition of dHL on the definition of general health literacy according to Sørensen et al. (2012, p. 3).⁷ For example, a German Council of Experts understands dHL as "the ability, knowledge and motivation to use digital technologies in a self-determined manner in the areas of health promotion, prevention and disease management. This also includes being able to recognize and weigh

⁶ Translated from German.

⁷ The definition of health literacy according to Sørensen et al. (2012, p. 3) is as follows: "Health literacy is linked to literacy and entails people's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course". See also chapter 3.1.1.

up the potential health risks of using digital services. Digital health literacy enables citizens, including healthcare professionals, to find, understand, evaluate and use digital health information and applications in order to make informed decisions" (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, p. 266 f). With its definition, the Council aims to focus on the objective of dHL to strengthen patient self-determination. A high level of dHL contributes to informed decisions that can reduce inappropriate healthcare provision. In addition, it sees not only health information but also digital health services as an important component of digital healthcare (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, p. 267). Dratva et al. (2024, p. 3) also base their definition on the definition of health literacy according to Sørensen et al. (2012, p. 3)⁸ and understand dHL as "the ability to deal with health-related digital information and information opportunities [...], which is shaped by structural conditions and the availability of (technical and other) resources"⁹. They argue that dHL should be seen as part of general health literacy and the corresponding concept. The reasons they give for this are that digital information sources and services can already be seen as the new normal today and will continue to shape healthcare in the future. In addition, dHL could be integrated into the concept of health literacy with specific skills such as computer or data protection literacy. Furthermore, a conceptual split should be avoided (Dratva et al., 2024, p. 3).

Overall, it is clear that a variety of different definitions and understandings of dHL exist in practice and also in the German context (Ulbrich & Matusiewicz, 2024, p. 239 f). Over time, the conceptual understanding has been expanded. While eHL or dHL initially primarily encompassed the skills involved in searching for and using digital health information, factors influencing dHL and objectives have

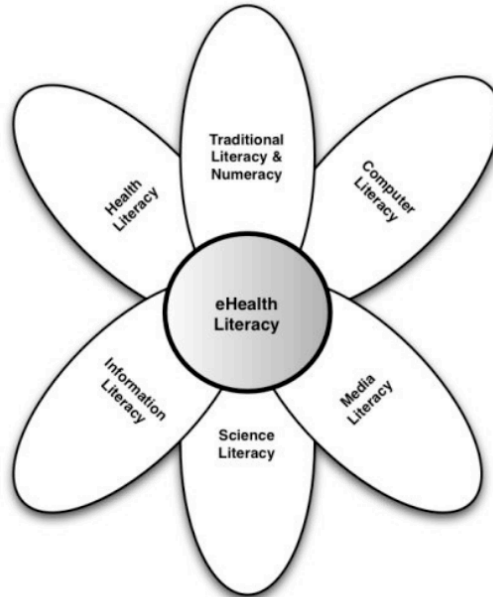
⁸ The definition of health literacy according to Sørensen et al. (2012, p. 3) is as follows: "Health literacy is linked to literacy and entails people's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course". See also chapter 3.1.1.

⁹ Translated from German.

been added to the definition approaches over the years. Furthermore, especially in recent years the conceptual reference to general health literacy has been brought into focus. As explained by Kolpatzik et al. (2020) and Samerski & Müller (2018, 2019), eHL has evolved to dHL, is closely related to the changing patient image in the healthcare system and is to be seen as an essential prerequisite for patient empowerment (Samerski & Müller, 2018, p. 106 f). Furthermore, dHL is an ability that is realized in particular in the interaction between people and technology and depends individually and significantly on systemic framework conditions and influencing factors (Kolpatzik et al., 2020, p. 20 f).

3.1.3. Theoretical Models for Digital Health Literacy

Figure 6: *eHealth literacy lily model*



Note: Adapted from Norman & Skinner (2006), p. 3.

According to Norman and Skinner, eHL is a special kind of literacy that consists of different literacy skills in the context of eHealth promotion and care. The so-called lily model (Figure 6) consists of six core literacies that sum up to eHL: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy. As the model shows, eHL consists of both analytic and context-specific skills. Table 1 describes the components of the lily model according to Norman & Skinner (2006, p. 5 f)

Table 1: Literacy-components of the Lily-Model.

	Literacy	Description
Analytic skills	Traditional literacy	Basic literacy skills like reading, understanding texts, speak and write a language coherently
	Media literacy	Meta-cognitive reflexion strategies about media content and its origin, distribution, and reception
	Information literacy	competencies to develop a search-strategy to find information on a specific topic, to identify relevant knowledge and results
Context-specific skills	Computer literacy	Abilities to flexibly adapt to new technologies and software as well as the access to eHealth-resources and their beneficial use
	Scientific literacy	Understanding of objectives, methods, and limits of research.
	Health literacy	Skills that are required to interact with the health system in order to ensure a proper selfcare

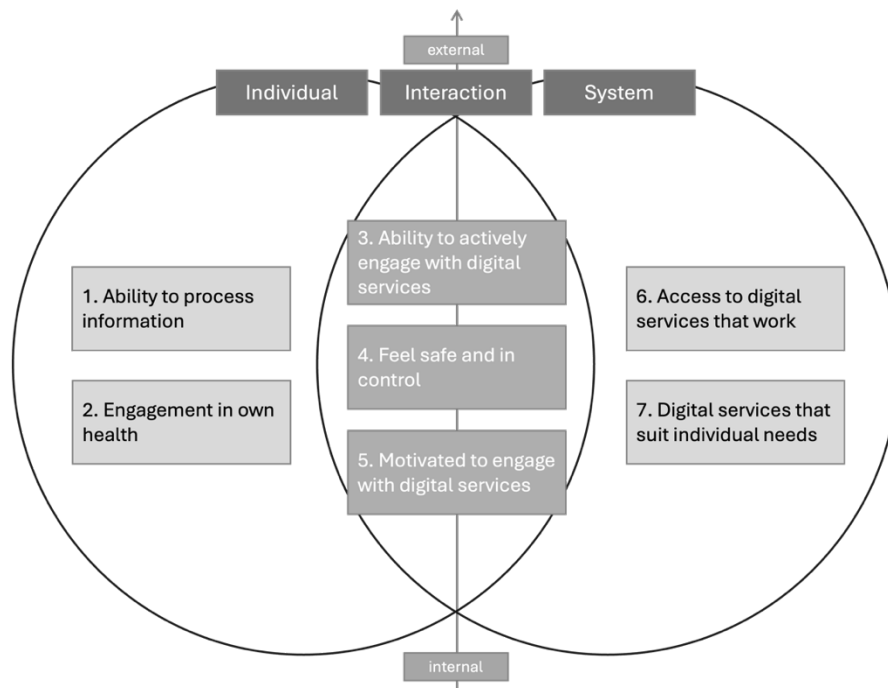
Note: Adapted from Bertschi et al., 2019, p. 282; Norman & Skinner, 2006, p. 5 f.

The analytic skills (traditional, media and information literacy) are applicable to a wide range of topics with no special context needed. In contrast to this, context-specific skills (computer, scientific and health literacy) depend on individual situations, for example is computer literacy strongly dependent to the device

used. When it comes to the use of health resources, both types of literacy are needed (Norman & Skinner, 2006, p. 2). According to Norman & Skinner, eHL is not a static but developable competence by personal and technological development. The main goal of being eHealth literate for people is to become empowered and to fully participate in health decisions informed by eHealth technologies: "The key is to reach a level of fluency at which one can achieve working knowledge of the particular language (or skill), enough to function at a level conducive to achieving health goals. Knowledge, information, and media forms are context-specific, and context dictates what skills and skill levels are required to access health resources" (Norman & Skinner, 2006, p. 8). Norman and Skinner were the first ones who gave insights to the skills needed when information technology is used to promote patient empowerment and health decisions (Norman & Skinner, 2006, p. 8). Over the time, their definition and the lily model has probably become the most famous concept of dHL. Nevertheless, the concept is claimed to be outdated today and has been verified by numerous authors. The most common criticism is that the model focuses too much on the individual and ignores other influencing factors (Bittlingmayer et al., 2020, p. 179).

Another comprehensive model for dHL was developed by Norgaard et al. (2015). The so-called eHL framework (eHLF) captures the resources and skills that individuals need to effectively use and benefit from digital health information and applications. The key development compared to the lily model is that, in addition to the individual skills required, the characteristics of the systemic environment and their interaction are also considered. The model provided for the first time a deeper understanding of the relationship between users and (digital) healthcare systems and thus a framework for improving digital healthcare services (Norgaard et al., 2015, p. 537). The eHLF consists of seven dimensions, which are shown in Figure 7.

Figure 7: The eHealth literacy framework



Note: Adapted from Norgaard et al., 2015, p. 533.

The eHLF shows that individual skills on the one hand and systemic conditions on the other have an influence on the degree of dHL of each individual. The model is based on two axes: from individually shaped areas to system-dependent areas on the horizontal axis and from observable actions to more internal concepts and feelings on the vertical axis. The first two areas, so the ability to process information and the commitment to one's own health, mainly depend on the competences of the individual and are therefore located on the left side. In contrast, access to digital services and the ability of the system to take individual needs into account are primarily dependent on the characteristics of the surrounding healthcare system. These are therefore located on the systemic side. In the interaction, individual skills and systemic prerequisites jointly influence the ability to actively engage with digital health-related services and the motivation to use them. If both factors are

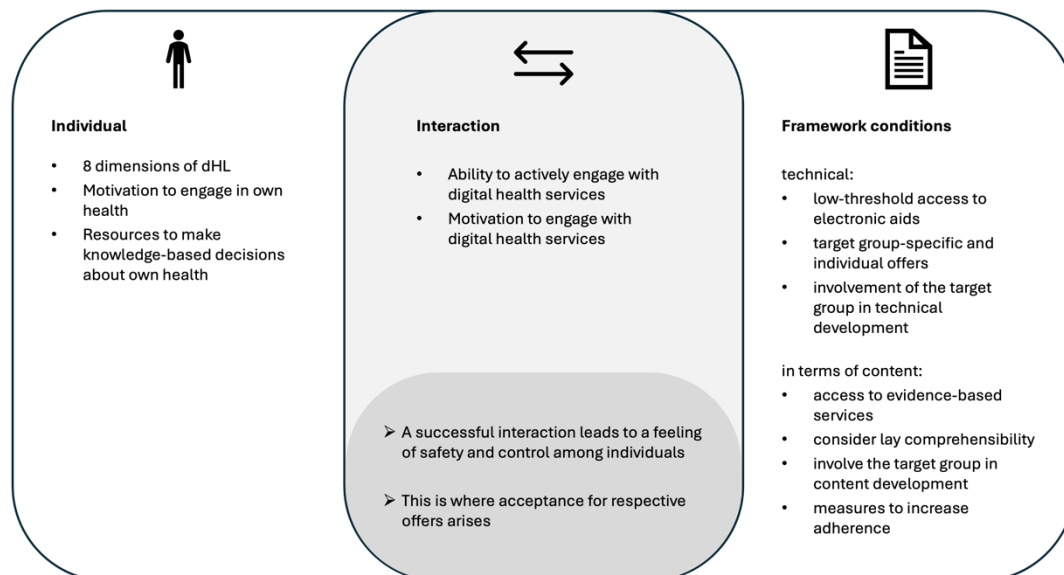
well developed, they complement each other positively, which promotes a sense of security and control, strengthens patient sovereignty and ultimately leads to greater acceptance of the respective services (Norgaard et al., 2015, p. 533).

The eHLF has been further developed by the work of Kolpatzik et al. (2020). Based on the eHLF, they investigated how dHL can be increased. The skills of the individual and the general framework conditions were identified as starting points here. A change in the latter was considered as especially promising (Kolpatzik et al., 2020, p. 21). Compared to the eHLF, the systemic framework conditions that are necessary for the successful promotion of dHL were specified. Figure 8 shows the adapted model for increasing dHL.

The framework conditions can be divided into technical and content-related aspects. From a technical perspective, it is important that digital health services are easily accessible. They should be tailored to the individual needs of the respective target group. An essential prerequisite for the successful development of such services is the active involvement of the target group in the technical development. The content of the offers must be based on scientific evidence and their effectiveness should be proven. The content should also be designed in such a way that it can be understood by laypersons, whereby the target group should also be actively involved in the development process. In addition, measures to promote adherence are crucial (Kolpatzik et al., 2020, p. 21).

At an individual level, Kolpatzik et al. (2020, p. 21) see three factors as essential for successfully increasing dHL. Firstly, the skills associated with dHL (here: computer literacy, data literacy, privacy literacy, traditional literacy, media literacy, health literacy, navigation literacy, information literacy) should be well developed. In addition, the motivation to engage for one's own health and the ability to make knowledge-based decisions for the own health are relevant. The interplay of individual skills and framework conditions influences the degree of dHL of the individual. It determines the ability and motivation to engage with digital health services. If both individual skills and framework conditions are well developed, a feeling of security and control arises and patient sovereignty is strengthened, which also leads to greater acceptance of health services (Kolpatzik et al., 2020, p. 21 f).

Figure 8: Further development of the eHLF as a model to strengthen dHL



Note: Adapted from Kolpatzik et al. (2020).

3.1.4. Measuring Instruments of Digital Health Literacy

Over the years, dHL has been measured among various populations and in different ways (Yang et al., 2022, p. 19 f). The first scientifically validated instrument for measuring the dHL of individuals was presented by Norman & Skinner (2006b; Dratva et al., 2024, p. 3). The eHealth Literacy Scale (eHEALS) consists of 8 items and is essentially based on the six literacies from the lily model (Norman & Skinner, 2006b). The individual level of dHL is measured via a self-assessment of the eight items. Using a five-point Likert scale, respondents indicate how easy it is for them to find and evaluate health information on the Internet. The individual items are shown in Table 2. eHEALS has been translated into many languages, validated in studies and is used in a wide variety of settings (Bertschi et al., 2019, p.

282). In German-speaking countries, eHEALS is also used either in the original version or the German translation as a standard instrument for measuring dHL in scientific studies (Ulbrich & Matusiewicz, 2024, p. 240).

Despite the widespread use of the measurement instrument, the scale is often criticized. One weakness, for example, is that the competence assessment of the eight items is based on a self-assessment by the respondents. This means that respondents are asked about their perceived difficulties in dealing with digital health information without checking whether these are caused by their own level of competence or the respective context. In addition, it is often criticized that the scale is no longer up to date, as it focuses strongly on searching for health information on the Internet and leaves out other competencies that belong to a more developed conceptual understanding of dHL, such as critical and interactive dHL competencies (Bertschi et al., 2019, p. 283). The complexity of the concept of dHL is therefore hardly adequately represented by eHEALS. Nevertheless, the eHEALS questionnaire is still considered to be an adequate instrument for measuring dHL and is therefore used accordingly (Bittlingmayer et al., 2020, p. 181 f).

Table 2: Items of the eHEALS scale

No.	Item
1	I know how to find helpful health resources on the Internet
2	I know how to use the Internet to answer my questions about health
3	I know what health resources are available on the Internet
4	I know where to find helpful health resources on the Internet
5	I know how to use the health information I find on the Internet to help me
6	I have the skills I need to evaluate the health resources I find on the Internet
7	I can tell high quality health resources from low quality health resources on the Internet
8	I feel confident in using information from the Internet to make health decisions

Note: Adapted from Norman and Skinner (2006b).

Over the years, numerous other instruments have been established to measure dHL, including more and more areas of dHL competence. In a review by Lee et al. (2021, p. 4) seven different measurement instruments for dHL were identified. Many of them take into account the criticism inherent in eHEALS and also include Health 2.0 competencies, digital communication competencies or data protection-related competencies (Dratva et al., 2024, p. 4). Overall, however, it is also clear that the measurement instruments are based on a different conceptual understanding and can also be used for different target groups (Lee et al., 2021, p. 5). As the measurement of dHL is not an objective of this research project, a brief overview of the most common measurement instruments for dHL in Table 3 shall suffice to illustrate the existing diversity.

Table 3: Overview about existing measurement instruments of dHL, their conceptual basis and intended use.

Instrument	Authors	Theoretical/ conceptual framework	Intended use
eHEALS	Norman & Skinner, 2006b	Six components of the lily model: traditional, computer, information, health, media, and science literacy	General estimation of consumer eHealth-related skills
PRE-HIT	Koopman et al., 2014	Goes beyond eHEALS to measure readiness to use internet resources for health concerns	Assessment of both skills and motivations and concerns of using online health information
e-HLS	Seçkin et al., 2016	eHL is based on the concept of health literacy	Assessment of the degree to which people are able to use eHealth information in an informed way

Instrument	Authors	Theoretical/ conceptual framework	Intended use
eHEALS-E	Petrič et al., 2017	Adds items that were deduced from the definition of the eHEALS concept	Investigation of eHealth literacy among different types of users
DHLI	van der Vaart & Drossaert, 2017	Concept of dHL was developed based on research of actual performance tests	Assessment of both Health 1.0 and Health 2.0 skills
eHLA	Karnoe et al., 2018	Concept of eHL is based on the lily model in combination with the eHL framework	Screening purposes
eHLQ	Kayser et al., 2018	Seven dimensions of the eHL framework	Support of development, implementation, and evaluation of effective digital health interventions
TeHLI	Paige et al., 2019	eHL is based on an own definition	Measurement of perceived skills considering understanding, exchanging, evaluating, and applying digital health information

Note: Adapted from Lee et al., 2021.

As with eHEALS, it should be noted that the measurement instruments listed are based on a self-assessment by the respondents and therefore only have limited objectivity and validity (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 583). Due to the large number of different measurement instruments with different conceptual foundations, it is also difficult to compare measurement results with each other and to create a uniform and meaningful

data basis for measuring dHL in different target groups or even the entire population of a country. However, this is seen as a necessary prerequisite for a viable and sustainable strengthening of dHL (Dratva et al., 2024, p. 4).

3.2. DIGITAL HEALTH LITERACY IN THE GERMAN SHI SYSTEM

3.2.1. Importance, Legal Basis, and Status Quo of Digital Health Literacy in the SHI System

The advancing digitalization of the healthcare sector presents both opportunities and risks for healthcare professionals as well as insured people. Comprehensive procedural changes, new treatment options and communication channels are being introduced. Digital processes are helping to position the healthcare system for the future in light of the many challenges it faces and to support the increased participation of patients in health-related decision-making processes, called shared decision-making (Matusiewicz et al., 2019, p. 109). A high level of dHL is also a key prerequisite for a successful digital transformation in the German SHI system. Specifically, it is needed to enable insured persons in the system to use digital health information and services in a self-determined manner with regard to their own health and to be able to answer data protection issues and recognize and weigh up the health risks of using these services (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, p. 269).

In practice, low-quality, incorrect, or interest-driven health information on the internet is a problem. It can usually be made available at low cost, is available in an almost endless variety and is hardly subject to any quality standards, making it difficult for people to select reliable health information. In addition, there is a wide range of health and medical apps, particularly on the secondary healthcare market, whose quality is also difficult for insured persons to assess, and which are often used separately from the usual treatment processes in the healthcare system. In addition, diagnostic apps can unsettle patients with a low level of dHL and encourage overuse, which in turn leads to economic consequences and counteracts

the potential for increasing efficiency through digitalization. Damage can also occur if visits to the doctor are delayed due to incorrect assessments by an app (Wyatt, 2018, p. 3). There are currently no specific studies that measure the exact economic damage.

A high level of dHL is furthermore essential in order to promote digitalization in the German healthcare system, for example by enabling insured persons to successfully use the developing digital infrastructure. Active use and maintenance of the electronic patient file can increase both communication between doctors and insured persons and the involvement of insured persons in the treatment process through greater transparency. The effective use of digital health applications that can be prescribed by doctors in Germany also stands and falls with a well-developed dHL (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, p. 297). On a higher level, a well-developed dHL helps to ensure equal opportunities for the population in terms of participation in the healthcare system. Digital technologies can both support the treatment process and represent a barrier if the necessary user skills are lacking. In addition to the availability of digital services, it is also important to consider the uptake and skills required to use the services (Cornejo Müller et al., 2020, p. 189).

The relevance of high dHL for successful digital transformation in the healthcare sector was also recognized by German legislation and taken into account in the Digital Healthcare Act (DVG) in 2019. § 20k SGB V mandates the SHI-funds to offer their insured people services to promote dHL. Specifically, the text of the law states:

"§ 20k: Promotion of digital health literacy

(1) In its articles of association, the health insurance funds shall provide services to promote the self-determined, health-oriented use of digital or telemedical applications and procedures by the insured persons. The benefits are intended to provide the skills required for the use of digital or telemedical applications and procedures. The health insurance fund shall base this on the specifications of the National Association of Statutory Health Insurance Funds in accordance with paragraph 2.

(2) The National Association of Statutory Health Insurance Funds shall, with the involvement of independent medical, psychological, nursing, information technology

and social science expertise, regulate the details of needs-based objectives, target groups and the content, methodology and quality of the services in accordance with paragraph 1.

(3) The National Association of Statutory Health Insurance Funds shall report to the Federal Ministry of Health every two years, for the first time by December 31, 2021, on how and to what extent its members provide services to insured persons in accordance with paragraph 1. For this purpose, the National Association of Statutory Health Insurance Funds shall determine the statistical information to be transmitted by its members on the reimbursed services as well as the type and scope of transmission.” (fifth German social code, § 20k)¹⁰

According to the law, the SHI companies have to offer their insured people services that aim to promote skills in the use of digital and telemedical applications and procedures. The specific implementation, including the objectives, target groups, methodology and quality of the services offered, is to be specified in a guideline issued by the National Association of Statutory Health Insurance Funds (GKV-SV). The association is also obliged to report on the implementation status of § 20k SGB V to the BMG every two years. For a more precise understanding of the support services to be offered, it is therefore necessary to examine the contents of the specifying guideline of the Association.

The GKV-SV has developed its own definition of dHL and defines it as a "specific form of health literacy [...] that encompasses the ability to find, understand, assess/evaluate, and apply health-relevant information in relation to digital applications and digital information services. The concept of digital health literacy takes into account the special features and continuous development of digital technologies" (GKV-Spitzenverband, 2020, p. 1)¹¹. The definition thus establishes a link between dHL and general health literacy and, in addition to digital information services, also includes digital applications and technological progress. In accordance with the legal mandate, the directive also defines the objectives, target groups,

¹⁰ Translated from German.

¹¹ Translated from German.

content, methods, and quality of services to promote dHL. The funding measures are intended to achieve three central objectives:

1. Insured persons should be informed and enabled to use digital healthcare services and decide for themselves whether they want to use digital services as part of their healthcare.
2. Digital health services should take into account user-specific aspects and data protection issues.
3. A high level of dHL is intended to increase equal opportunities for insured persons, as the appropriate use of digital health applications can increase health-related self-efficacy.

Measures to promote general digital skills are explicitly excluded from the support measures for dHL, as this is explicitly seen as a task for society as a whole and not for the health insurance funds (GKV-Spitzenverband, 2020, p. 1 f). Regarding the target groups of support measures for dHL, the association has determined that, in principle, all insured persons should be offered the services, but that priority should be given to groups of people with an increased need for support. This refers in particular to people with reduced health opportunities and low dHL (GKV-Spitzenverband, 2020, p. 2).

The GKV-SV has defined an orientation framework for possible topics for the content of the support measures. The services offered are intended in particular to improve "navigation when searching for and finding information on digital health applications [...] that can be expected to increase digital health literacy" (GKV-Spitzenverband, 2020, p. 2)¹². This may relate to the following content:

- Information on digital applications such as health apps, telemedical services, digital prevention services or electronic patient records
- Information on data protection issues in the healthcare sector

¹² Translated from German.

- Information on health-competent organizations in the healthcare sector
- Digital information on general health topics

The services can be developed and provided by the SHI funds themselves, but also by cooperating third parties. It is not allowed to offer services that teach digital skills without a specific reference to health or that contain product advertising (GKV-Spitzenverband, 2020, p. 2 f). In addition, the services must meet certain methodological and qualitative requirements. Attention must be paid to the target group and competence-oriented design of the services, which can be achieved, for example, by involving the respective target group in the development process of a service. With regard to the respective competence level of the insured persons, it should also be taken into account that digital formats are not suitable to promote dHL in all target groups. Technological progress also requires a regular review and further development of support measures. A service is of high quality if it can contribute to strengthening dHL in the respective target group. The GKV-SV has also defined the following criteria as quality requirements to be met:

- The objective and target group of the measure are defined
- Comprehensible methodological approach
- Expected target achievement is set out
- Easier access for disadvantaged target groups
- Possibility for insured persons to receive individual and easy-to-understand support with comprehension questions
- Neutral presentation of the features and limitations of digital offerings that are referred to as part of the services
- Transparent presentation of the author, publisher and financier of a service (GKV-Spitzenverband, 2020, p. 3 f)

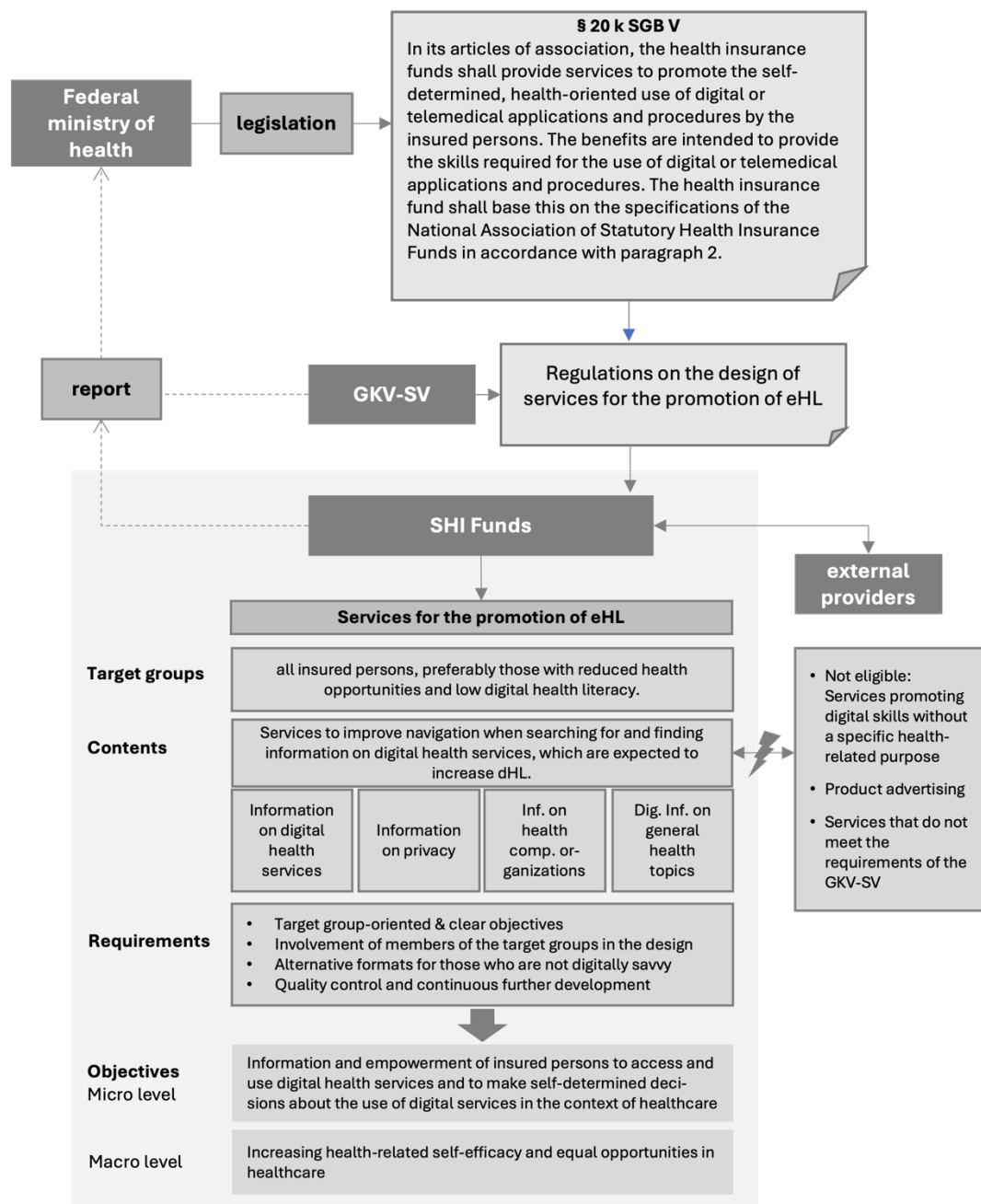
Figure 9 shows the regulations and legally defined actors for the promotion of dHL of insured persons in the German SHI system. At the statutory level, three

actors are currently primarily responsible for promoting dHL. The BMG and the legislation set out the basic framework in § 20k SGB V and define the SHI funds and the GKV-SV as the main actors responsible for promoting the dHL of insured persons. The GKV-SV plays a specifying role and defines the content of the support measures to be offered, which must then be implemented by the SHI funds. Addressing the topic of dHL is therefore particularly relevant for SHI funds, not only because of the rapidly advancing digitalization in the healthcare sector and the associated competence requirements, but also because of the clear legal mandate. With the introduction of § 20k SGB V, the SHI funds have thus also become a kind of education provider for the dynamic field of dHL, which at first glance does not necessarily correspond to the traditional role of health insurance (Merz et al., 2022, p. 5). However, there are several arguments in favor of placing this task with the SHI funds. Firstly, SHI funds can benefit from the insured persons who can make self-determined health decisions based on digital health information or who use digital health applications appropriately. This can have a positive impact on diagnosis and the course of treatment, and resources can be used efficiently.

In addition, the promotion of health literacy and personal responsibility is recorded in the German Social Code (§ 1 (1) sentences 1 and 2 SGB V)¹³. In the age of digitalization, this must be adapted to the digital space (Merz et al., 2022, p. 5 f). Several studies conclude that digitalization in the healthcare sector must be accompanied by a comprehensive build-up of skills among insured persons in order to develop its full potential (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 610). Although this capacity building should be seen as a task for society as a whole SHI companies play a central role as the main point of contact for healthcare issues and are jointly responsible for the success of the digital transformation in the healthcare sector (Merz et al., 2022, p. 6). However, there is no legal obligation for other stakeholders to promote dHL, neither within the healthcare system nor in other policy areas such as the education system.

¹³ The paragraph states that SHI companies have the task of maintaining, improving, or restoring the health of the insured persons, what also includes the promotion of the individual health competence and personal responsibility. Further information on the tasks and organization of the SHI companies can be found in chapter 2.1.2.

Figure 9: Legally defined stakeholders and regulations for the promotion of dHL in the German SHI system



Note: Author's representation based on § 20k SGB V.

According to the GKV-SV report on the measures taken by the SHI funds to promote dHL, it became clear in 2021 that only 28% of SHI funds had made specific offers to their insured persons (GKV-Spitzenverband, 2021, p. 10). Despite the legal mandate, it was therefore not yet possible to achieve nationwide provision of support measures for dHL in the first two years after the introduction of the DVG.

Two years later, Scherenberg & Preuß (2023) examined the websites and YouTube channels of the SHI funds to find out to what extent § 20k SGB V had been implemented at that time. As a result, they found that a total of 44 out of 97 health insurance funds (45.5%) provided offers to promote dHL on their homepage or YouTube channel. 16.5% (16 out of 97) of the SHI companies provided offers on their websites and 42.9% (41 out of 97) on their video channel.

However, the offerings are usually isolated media that are not linked to other content and often do not cover all the required competence areas of dHL. Furthermore, the learning content is not tailored to the user's individual level of knowledge that could be assessed by a subjective test in advance. Learning success checks are also rarely used to consolidate the knowledge gained (Scherenberg & Preuß, 2023, p. 63 f). Overall, there is still room for improvement in the implementation of offerings. This relates primarily to the presentation of the added value of high dHL, the variety of methods used, simplified access to services and ensuring comprehensibility for all target groups to be addressed (Scherenberg & Preuß, 2023, p. 65).

In the second report of the GKV-SV from 2024, 80% of health insurance funds stated that they offer services to promote dHL. These services mainly relate to information on telemedicine services (electronic patient record, electronic prescription), selecting and using digital health services and searching for and finding digital health information (GKV-Spitzenverband, 2024, p. 4 f). So, interventions to promote dHL have predominantly focused on providing information and individual-centered approaches to strengthen certain skills. Although these approaches make an important contribution, they do not take sufficient account of the social, cultural, and economic factors that also contribute significantly to the development of dHL. In some studies, the influence of these contextual factors is even considered to be more important than individual skills development. Against this background, a stronger link between individual-oriented interventions and relationship-oriented measures is called for. A more integrative approach can help to better address the

complexity of the subject area and facilitate access to digital technologies in the healthcare sector. Measures to promote dHL should therefore not be designed according to the "one size fits all" principle, but must take into account both individual and systemic framework conditions (Bertschi et al., 2019, p. 285).

Although the legal mandate to promote dHL in the German SHI system in § 20k SGB V has so far focused exclusively on the SHI funds, the National Action Plan for Health Literacy is a civil society initiative by the Alliance for Health Literacy to increase the awareness for a high health literacy. Following the international model, a group of scientists came together to initially develop recommendations for action to strengthen the general health literacy of the German population. The recommendations were then incorporated into the National Action Plan in order to highlight the relevance of the topic and increase the willingness of politicians and stakeholders in the healthcare system to take action. In addition, the plan is intended to enable a systematic approach to the efficient promotion of health literacy based on well-founded results and with the involvement of all key players in the alliance (Schaeffer et al., 2021, p. 906). The plan specifically pursues the approach of including other stakeholders from other areas of society. The aim is to improve the health literacy of the population through the joint commitment of politics, science and practice (Schaeffer et al., 2020, p. 11).

Within the expert group, relevant core elements of the action plan were first defined and then discussed in workshops with relevant stakeholders in the healthcare sector. The results were then incorporated into the further development of the action plan. The action plan is divided into four areas of action and fifteen corresponding recommendations to strengthen health literacy. The areas of action do not only relate to measures to strengthen individual health literacy, but also to strengthen the systemic framework conditions and organizational health literacy (Schaeffer et al., 2021, p. 907). Figure 10 visualizes the structure of the plan and its content. The promotion of health literacy (HL) focuses on four key areas. The first area emphasizes integrating HL into all aspects of everyday life, including education, work, nutrition, media, and community activities. The second area targets the healthcare system, aiming to establish HL as a standard across all its sectors. This includes simplifying navigation, improving transparency, enhancing information, and fostering greater participation. The third area addresses living with chronic

illness, focusing on providing adequate support for those affected and their families. The goal is to improve disease management, self-care, and the ability to cope with everyday challenges. Finally, the fourth area highlights the need for expanding HL research. This involves regularly measuring the population's HL, examining individual, societal, and organizational factors, and developing evidence-based interventions (Schaeffer et al., 2021, p. 910).

Figure 10: Action fields and recommendations of the German National Action Plan Health Literacy



Note: Adapted from Schaeffer et al., 2021, p. 911.

For the implementation, the recommendations include concrete proposals, key actors, and examples. The action plan concludes with five guiding principles:

reducing social and health inequalities, addressing both individual and structural aspects of HL, encouraging participation, leveraging digitalization, and promoting HL collaboratively across all societal sectors (Schaeffer et al., 2021, p. 911). The inclusion of all relevant stakeholders and the establishment of a cooperation network to strengthen the topic and to achieve sustainable effects were highlighted as positive experiences of the National Action Plan on Health Literacy. At the same time, however, it was also noted that the expert network is currently focused only on the healthcare sector. In the future, other policy areas such as the education system and digitalization experts should also be integrated (Schaeffer et al., 2021, p. 912).

Due to the increasing dissemination of health information via digital media, the experts of the National Action Plan have developed four proposals in a strategy paper to facilitate the handling of health information in the media. Among other things, these relate to spread digital offerings to promote health literacy and to closely link the promotion of health literacy with the promotion of media skills (Hurrelmann et al., 2019, p. 3 f). The fourth recommendation of the National Action Plan to facilitate the use of health information in the media explicitly includes the proposal to create transparency about the range and quality of digital health applications. In this context, healthcare professionals should be enabled to pass on quality-assured digital health information to their patients (Schaeffer et al., 2020, p. 36).

To strengthen the role of the self-determined patient, a national health portal¹⁴ was launched in September 2020. The portal is intended to provide quality and evidence-based health knowledge on diseases, treatment options and the healthcare system itself (Bundesministerium für Gesundheit, 2020, p. 46). Even if a national health portal cannot fulfill the claim of strengthening the dHL of insured persons alone, it can be seen as an access point for trustworthy digital health information. The portal is also suitable as a supplement to the personal provision of information by healthcare stakeholders and can therefore be used as an integrative component of information for insured persons (Strotbaum, 2018, p. 11).

¹⁴ The National Health Portal is available at <https://gesund.bund.de/>.

3.2.2. Current Status of Digital Health Literacy Among the German Population

Digital media have become an everyday companion for people. This also applies to health information. The internet and social media have played a significant role in accessing health-related information for years (Park & Kwon, 2018). The German population also obtains information online, particularly on the topics of lifestyle, health professionals, vaccinations, pharmaceutical products and testimonials on health issues (Alvarez-Galvez et al., 2020, p. 329). Although more and more people have access to the digital world, a certain respect for digital possibilities among the population becomes clear. Resilience to digital change, namely the ability to keep pace with its developments, has declined in recent years. This is reflected on the one hand in the fact that the positive and optimistic basic attitude towards digital change has decreased and on the other hand in the fact that only just under half of the population has the necessary basic digital skills. This trend is exacerbated in particular by the high speed and increasing complexity of technological developments, as shown by the example of AI (Dathe et al., 2024, p. 10).

Adapted to the healthcare sector, there is also a tension between the increasing possibilities offered by digital technologies and the digital readiness of the German population. From the multitude of available digital health information, it is necessary to select and assess the individually required information, for which a high level of dHL is required (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 614). Over the years, more and more studies have been conducted on the state of dHL in the German population or subgroups. The research objectives of the individual studies varied, as did the measurement instruments used, which should be considered when comparing the study results. Nevertheless, similar results can be seen. For example, a low level of dHL is consistently found in the population or the corresponding subgroups studied, particularly with regard to the assessment and use of digital health information for their own health decisions (Ulbrich & Matusiewicz, 2024, p. 240).

The first nationally representative study on the status quo of dHL among the German population was conducted by Kolpatzik et al. in 2020. This involved an anonymous online survey of 8,500 participants using the DHLI questionnaire supplemented by questions on health status and health-related media use. The study

takes into account seven perspectives of dHL and considers, for example, operational skills, navigation skills, the creation of own content and the assessment of the reliability and relevance of information (Kolpatzik et al., 2020, p. 9). The individual level of dHL was translated into a score system between 1 and 4 by determining the mean value (MV). The dHL score then indicates whether the individual dHL is low, moderate, high or very high (Kolpatzik et al., 2020, p. 11). Overall, it was found that just under half of the respondents had low (28.1%) or moderate (24.3%) dHL. Socio-demographic characteristics have a minor influence on the dHL score. For example, the proportion of people with a low dHL increases slightly with age. Women also have a slightly better dHL score than men and people with a migration background perform slightly worse than those without. The higher the level of education was, the higher tends to be the dHL. The lower a person's income is, the lower is their dHL score. However, there is a clear correlation between health and dHL. Of the people who stated that they have a low health status, 60.3% had limited dHL, compared to 40.6% in the group with a very good health status. People with chronic illnesses also have a poorer dHL, whereby this effect increases with the number of chronic illnesses (Kolpatzik et al., 2020, p. 13 ff).

Respondents had the greatest difficulties in the search for digital health information, in assessing the reliability and in determining its individual relevance. Specifically, respondents found it difficult to select from the large amount of information available or to find exactly the information they were looking for (Kolpatzik et al., 2020, p. 14 ff). Websites with health information were used by just under half of respondents once a month or less. 12% did not use the internet at all to search for health information. In contrast, health-related digital technologies, and applications such as smartwatches or health apps are more widespread: 24.2% of respondents use them daily and 15.3% use them at least once a week. Just under 20% of respondents do not use these technologies at all and around a quarter (26.3%) do not own any digital tools (Kolpatzik et al., 2020, p. 19). The data therefore shows that around half of the German population has problems dealing with digital health information and applications. The wide range of information available on the internet is overwhelming for the majority of respondents so that they face challenges when it comes to assessing the reliability of information and using it for their own health. Data protection issues or general orientation on the Internet are also often

associated with problems. As digitalization progresses, the study highlights the risk that citizens will no longer be able to keep up with the new requirements (Kolpatzik et al., 2020, p. 20).

The most comprehensive study on the state of dHL in the German population is the Health Literacy Survey Germany (HLS-GER 2). Over 2,000 Germans took part in a personal survey. Following the first Health Literacy Survey Germany (HLS-GER) in 2014, a follow-up study was published in 2021, which also collected data on dHL for the first time. The HLS-GER 2 is part of the international Health Literacy Survey (HLS19) of the WHO Action Network on Measuring Population and Organizational Health Literacy (M-POHL; Schaeffer et al., 2023, p. 3). An additional survey was conducted in fall 2020 to enable comparisons before and during the coronavirus pandemic (Schaeffer et al., 2023, p. 3). To measure dHL, the HLS₁₉-DIGI questionnaire was used. The questionnaire was newly developed as part of the HLS19 with the significant involvement of a German team and consists of eight items that record subjective difficulties in dealing with digital health information.

This study also revealed that dHL among the German population is low. Around three quarters of respondents have a low dHL and have great difficulty using digital information for themselves. Particular problems were also identified here in the assessment of the trustworthiness and neutrality of digital information and in the use of digital information options on health topics. A closer look at the study results shows that this applies in particular to older people from 65 years on (86.0%) and people with a low level of education (86.7%). Regarding the use of digital information media, it is clear that not everyone is using them yet. For example, around 35.6% of the population never use health-related websites. Digital devices are not used by 68.5% of the population and 79% do not use health apps (Schaeffer et al., 2023, p. 11). A supplementary study on the health literacy of people with a migration background in Germany (HLS-MIG) also collected the first data on the health literacy of this population group. Here, too, it was found that over two thirds of the groups have a low dHL, although the dHL is slightly higher compared to the general population. However, the influence of the social gradients of older age, lower level of education, presence of a chronic illness and lower social status, which are associated with a lower dHL, is congruent (Berens et al., 2022, p. 50). The mi-

gration groups also experience particular difficulties in assessing the trustworthiness of digital health information and in finding and using individually relevant information to solve their own health problem (Berens et al., 2022, p. 57).

Since the coronavirus pandemic, dHL has improved slightly, especially in younger age groups, but overall there is an urgent need for action to improve dHL, especially compared to other countries (Schaeffer et al., 2023, p. 9). The HLS2-GER also collected data on general health literacy in the German population. Although this is slightly better, with around 58.8% of Germans about half of the population has low health literacy. Here, too, is a socially unequal distribution: people with a low level of education, low social status, older age or chronic illness and long-term health problems have poorer health literacy on average. Younger people increasingly also have problems dealing with health information. With regard to the consequences of a low health literacy, it was found that this is associated with unhealthy behaviors such as less exercise, poorer nutrition, more frequent sick days and more intensive use of the healthcare system (Schaeffer et al., 2023, p. 9).

In addition to the two studies presented here, measurements of dHL have been carried out repeatedly in smaller subgroups of the German population in recent years. Table 4 provides an overview of the research approaches and results.

Table 4: Overview about research findings considering dHL in various sub-groups of the German population

Author (year)	Study population	Objectives	Measurement of dHL	Results
Knitza et al. (2020)	Patients with rheumatoid arthritis, psoriatic arthritis and axial spondyloarthritis (n=193)	Exploring dHL, mobile health usage, preferences, and barriers in a sample of patients with rheumatic diseases	eHEALS	Mean dHL was low and correlated positively with younger age, app use, belief in benefit of using medical apps and current internet use to obtain health information.

Author (year)	Study population	Objectives	Measurement of dHL	Results
Atmann et al., 2021	Adults with asthma (n=129)	Investigation of health literacy and dHL among asthma patients (trained and untrained) using questions from eHEALS (for dHL)	eHEALS	Problematic level of dHL in both trained and untrained group. Trained patients did not benefit from asthma education considering dHL.
Dadaczynski et al., 2021	University students ≥ 18 years (n=14.916)	Investigation of university students' dHL and web-based information-seeking behaviors during the early stages of the COVID-19 pandemic in Germany	DHLI	dHL is well developed in university students but a significant share of students has difficulties in evaluating information. Significant sociodemographic differences were found regarding gender.
Dadaczynski et al., 2022	pupils of 8th and 9th grade in Hesse (n=490)	Measurement of dHL in adolescence and associations with health behavior indicators	DHLI	Up to 37.5% of pupils enclosed face difficulties handling digital health information. Sociodemographic differences were found considering gender and social status. Low dHL is associated with less health-conscious behavior.

Note: own presentation based on Ulbrich & Matusiewicz, 2024, p. 238.

Overall, despite different measurement instruments, study settings and time periods, similar results can be identified regarding poorly developed dHL in the German population. In addition, research has found that dHL is closely related to individual socio-demographic characteristics (Dratva et al., 2024, p. 4) and health

endpoints (Bertschi et al., 2019, p. 283 f). In Germany, dHL is still low despite there were positive developments after the COVID-19 pandemic. The socially unequal distribution of dHL and the associated disadvantages for vulnerable population groups in terms of health status, health behavior and health risks are particularly noteworthy. In order to avoid a digital divide in the population, to ensure equal digital opportunities in the healthcare system and to not establish new social gradients or risk factors, special attention must be paid to vulnerable groups (Dratva et al., 2024, p. 5).

3.2.3. Criticism and Areas for Optimization

The implementation of support measures for dHL in Germany has been criticized on several points and there is a need for optimization. The points of criticism identified within the literature research are presented below.

Conceptional Understanding

At a conceptual level, there are many different views on how dHL is understood in the German context. This is reflected, among other things, in the large number of definitions and conceptual approaches used, but also in the discussion about the competences included in dHL and the interaction with general health literacy (Ulbrich & Matusiewicz, 2024, p. 239 f). As already explained, there is also a heterogeneous understanding of competences and responsibilities (Samerski & Müller, 2019b, p. 49). The empirical evidence suggests that dHL should be seen as closely linked to general health literacy, that means that the conceptual separation should be overcome and appropriate synergies exploited (Dratva et al., 2024, p. 2). At the same time, however, dHL must also be understood as an emergent, independent competence, as it is more than "health literacy plus digital literacy" as an essential prerequisite for successful digital transformation in the healthcare sector (Samerski & Müller, 2019b, p. 49).

Lack of a Holistic Approach

Another point of criticism is that the SHI funds and the individual itself have the main responsibility for the promotion of dHL in the German SHI system. § 20k SGB V focuses less on the contextual framework of dHL and neglects the relational understanding that has become established in recent years. It is therefore necessary to involve other stakeholders and society as a whole and to improve conditions in the SHI system in order to achieve effective promotion of dHL (De Gani & Berger, 2021, p. 49). The healthcare system should be designed in such a way that the insured can become and act more digitally health literate. This could be achieved above all by establishing simple, informative and user-friendly structures (Schmidt-Kaehler et al., 2019, p. 4). As already presented in their relational model for increasing dHL, Kolpatzik et al. (2020) also argue that the promotion of dHL should be seen in a broader context.¹⁵ In addition to the individual skills of the insured persons, they see the general framework conditions in a healthcare system as an important starting point for increasing the dHL of the insured persons. Accordingly, a high dHL can arise in particular when individual skills interact with systemic conditions such as access to digital information and services (Levin-Zamir, 2023, p. 147). How exactly these framework conditions should be designed in the German SHI system has not yet been further researched (Ulbrich & Matusiewicz, 2024, p. 240). Although there are ideas for promoting DHL, these are more like individual pieces of a puzzle that need to be put together to form a coherent whole.

Based on the research findings on the current status of dHL among the population in Germany, it becomes clear that the difficulties in dealing with digital health information and services cannot be clearly assigned to the healthcare sector alone. For example, there are general problems in recognizing economic interests in information offerings, assessing data protection issues, and navigating the Internet. Some authors therefore call for the promotion of dHL to be considered more as a task for society as a whole, which should also be taken into account in other policy areas. This approach is often described as a health in all policies (HiaP) approach, that is intended to illustrate the need for cross-departmental action at the political level. In particular, the promotion of dHL is seen as an educational task

¹⁵ See chapter 3.1.2.

that could already be integrated into the school context (Grütters, 2021, p. 65 f; Kolpatzik et al., 2020, p. 20).

In its 2021 report, a Council of Experts on Healthcare Development also suggested that dHL should be promoted beginning with the entry into general education, similar to the recommendation of the National Action Plan for health literacy (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, 643). Over the last years, more and more digital elements have been included in school curricula, for example through the so-called "education in the digital world" strategy, which could be followed by the promotion of dHL. In addition to promoting individual skills among pupils, attention should also be paid to creating the necessary infrastructural framework conditions and promoting corresponding skills among teaching staff (Bittlingmayer et al., 2020, p. 182 f).

Lack of Responsibilities

The health insurance funds are currently the only players that are legally obliged to promote the dHL of their policyholders. In addition, insured persons have a certain amount of personal responsibility to develop the necessary skills. Other players of the healthcare system or other institutions with contact to patients and insured persons have not yet been obliged by law to actively take part in the promotion of dHL, unless literature attributes them an important role as well. The World Health Organization (WHO) for example emphasizes the major role of doctors in medical information and education because of a deep bond of trust to their patients (World Health Organization, 2019, p. 61). As a result, studies recommend understanding the challenge of improving dHL as a task for the whole of society that can only be solved by a structured, well-founded approach that integrates all relevant actors in the meaning of a holistic, interdisciplinary concept (Aulenkamp et al., 2020, p. 79; Kolpatzik et al., 2020, p. 20).

Inadequate Support Measures

The report by the GKV-SV and supplementary studies show that the implementation of § 20k SGB V in Germany has been rather slow-moving. For example, there are no comprehensive and broadly effective programs to strengthen dHL that

cover all relevant facets of competence. This finding stands in contrast to the high relevance of the topic and the poor study results on the status of dHL among the German population (Schaeffer, Berens, et al., 2021; Scherenberg & Preuß, 2023). Educational interventions are seen as an essential means of strengthening the population's dHL and ultimately enabling them to critically evaluate health information and health applications (Steckelberg et al., 2009). Training measures could be tested as part of projects which, if successful, could be transferred to regular implementation. There are currently no concrete approaches or special structures for this or for long-term funding (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, p. 287).

Further points of criticism arise with regard to the specific design of support measures. Studies show that the German population faces particular challenges in searching health information and selecting decision-relevant information through critical evaluation. In addition, dHL differs in different target groups according to socio-demographic factors such as educational status, age, and gender. The support measures currently do not specifically address the differences in the sub-target groups. At this point, targeted promotion of dHL in vulnerable groups is recommended in order to avoid reinforcing health inequalities (Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen, 2021, p. 297). For example, research suggests that interventions to improve digital health skills in older adults are particularly effective when the focus is on self-efficacy (Pourrazavi et al., 2020, p. 6). Today, support measures are primarily designed according to the one size fits all principle and hardly take into account different levels of knowledge. A more diverse approach is missing. As limited reading, writing and language skills can make it difficult to access online health information, a variety of formats such as audio, video and graphics should be used to reach as many insured persons as possible and provide them with suitable offers (Bertschi et al., 2019, p. 286).

A so-called digital divide would not only be critical in terms of health disadvantages. The divide should also be avoided as a matter of urgency from an ethical perspective. Health, and therefore increasingly also digital health, is a fundamental human right. A digital health literacy divide, which is reflected in the population's different levels of competence in dealing with and using digital medicine and healthcare services, would therefore also be normatively problematic (Heinemann,

2021, p. 72). In addition to different levels of competence, it must also be ensured that all insured persons have equal access to digital media and health technologies. Only in this way can digital information and services contribute to keeping people healthy (Levin-Zamir & Bertschi, 2018, p. 12).

Support measures to strengthen dHL have focused in particular on information material and educational videos (GKV-Spitzenverband, 2024, p. 4; Scherenberg & Preuß, 2023, p. 62). In addition to the provision of global training materials, extensive potential for imparting skills is also seen in individual contact to insured people in the form of information, education, and advice. Even though this is a statutory task of the SHI system, personal contacts are rarely used in practice to raise dHL issues. Instead, insured persons are left to web portals and thus again depend heavily on the individual's ability to obtain information (Knieps, 2017, p. 86). Targeted guidance from caregivers such as family members can also lead to higher dHL among individuals (Bertschi et al., 2019, p. 286).

In order to generally design support measures in such a way that they meet the individual needs of insured persons and take into account target group-specific characteristics, several studies recommend the involvement of insured persons in the design and development of measures, but also of digital technologies in the healthcare system. The involvement of healthcare professionals is also considered helpful, as they are important multipliers for advice and the use of digital services (T. Müller et al., 2022, p. 94).

Lack of Quality Standards

Another point of criticism of the implementation of support measures for dHL relates to the fact that there are only very unspecific quality requirements for the support measures offered by the health insurance funds in accordance with § 20k SGB V. The guideline of the GKV-SV states that the quality of the services offered is to be measured by whether their use leads to a strengthening of the dHL of the defined target group. However, there are no more specific conceptual and content-related quality requirements. Especially due to the fact that vulnerable groups of insured persons in particular should benefit from the measures, a more precise definition of the quality specifications would be justified. Merz et al. (2022)

have developed a proposal for quality criteria for the value-oriented selection and evaluation of support services for dHL in the German SHI system. In addition to the requirements specified by the GKV-SV, they have defined content-related criteria based on the six values of safety, privacy, self-determination, justice, democracy, and sustainability. In future, this value-based approach could help to make the quality of educational offers for dHL verifiable on the basis of standardized criteria, to identify particularly suitable offers and to make them accessible to a broad mass (Merz et al., 2022, p. 8 f).

Lack of Data and Research Funding

Another key problem is the lack of a uniform database at population level. Firstly, there are only a few studies that deal with the measurement of dHL in the German population. Secondly, these studies use different measurement instruments for dHL, which limits the comparability of the results (Ulbrich & Matusiewicz, 2024, p. 240). A common database is necessary in order to plan, implement and evaluate measures in a targeted manner. At the same time, there is a lack of financial resources required for high-quality research (Dratva et al., 2024, p. 6). In addition, further research is needed on the impact of low dHL on access to and use of digital healthcare services and on health-related outcomes (T. Müller et al., 2022, p. 94).

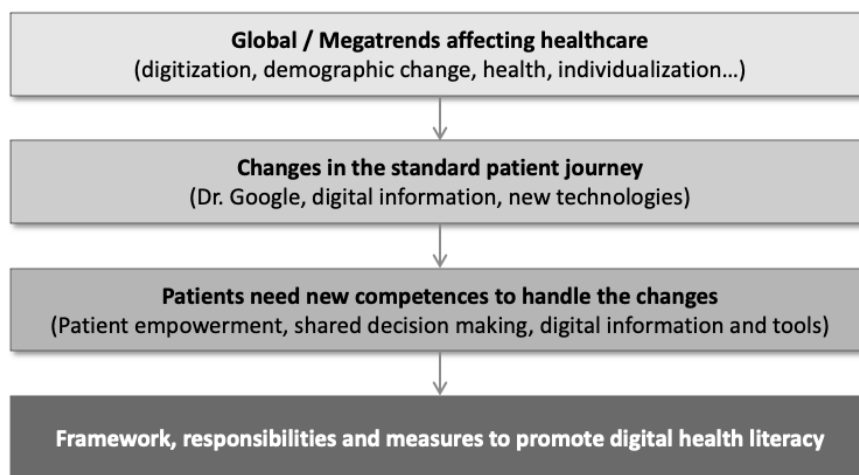
The points of criticism make it clear that, despite the great importance of dHL for the successful digital transformation of the healthcare system, there is still a considerable need for action to effectively implement the support measures and improve the dHL of the German population. To make the promotion of dHL more sustainable, further comprehensive studies with standardized measurement methods as well as a stronger adaptation and further development of the concept to German conditions are necessary. Further research is also needed to find out which approaches are suitable for different target groups. In doing so, dHL should be considered in a holistic framework. The framework conditions and responsibilities need to be further developed. The involvement of additional stakeholders in the healthcare system is also particularly important (Ulbrich & Matusiewicz, 2024, p. 240).

IV – EMPIRICAL RESEARCH DESIGN OF THE DELPHI STUDY

IV -EMPIRICAL RESEARCH DESIGN OF THE DELPHI STUDY

4.1. METHODOLOGICAL JUSTIFICATION AND RESEARCH PROCESS

Figure 11: Derivation of the research question



Note: Author's elaboration.

As outlined in the previous chapters and shown in Figure 11, the German healthcare system is facing a variety of challenges. Megatrends such as demographic change and the shortage of skilled workers mean that the system itself must become more efficient in order to continue to provide the population with adequate healthcare. In this context, digitalization is seen as the key to increasing efficiency, but it also brings with it a number of challenges. It also has an impact on insured persons in the German SHI system. Health information and services are increasingly available in digital form. The self-determined and health-promoting use of these services requires specific skills on the part of the insured, which are bundled in the dHL concept.

The focus of current research on dHL is particularly on its conceptual positioning as well as on measurement instruments and the status quo of the dHL of

the German population. Studies show that the dHL of the German population is low and that people with many points of contact with the healthcare system in particular have the most problems in using digital health information and services.¹⁶ However, a high dHL is needed to empower insured individuals in the healthcare system to make self-determined decisions based on digital health information and services. At a higher level, dHL is an essential prerequisite for the success of the digital transformation in healthcare (H. Müller, 2022, p. 114 f).

There is a fundamental consensus that dHL needs to be promoted in Germany and that the current promotion efforts are not sufficient. Key points of criticism identified in the literature review include a lack of uniform conceptual understanding, a lack of a holistic approach, the lack of inclusion of all relevant stakeholders in the SHI system and interventions that are not tailored to needs.¹⁷ Existing research on dHL in Germany mostly focusses on a high-level perspective or on interventions for small sub-groups of the population, which are only transferable to the German context to a limited extent. (Ulbrich & Matusiewicz, 2024, p. 238). How exactly dHL can be structured and promoted in the sense of a more holistic approach and in the concrete German SHI-context is not part of the current research. The concept of dHL needs to be more strongly adapted and further developed within the German context. More research is also necessary to identify effective interventions for different target groups and the active involvement of other stakeholders. A more holistic view of dHL that includes the need for improvements in framework conditions as well as on the individual level is essential.

The aim of this study is therefore to develop recommendations for action for the design of framework conditions, responsibilities, and measures for the promotion of dHL of people with statutory health insurance in Germany. The recommendations for action shall help to raise awareness of the need to promote special skills

¹⁶ Studies such as the HLS-2-GER show that around 75% of the German population have a low dHL. 86% of each chronically ill and elderly people have a low dHL. Most problems occur in assessing trustworthiness and neutrality of digital information (Schaeffer, Gille, et al., 2023). Further study results are presented in chapter 3.2.2.

¹⁷ See chapter 3.2.3.

in an increasingly digitally transformed healthcare system and at the same time provide initial scientifically sound implications for improving the status quo.

Therefore, the research question is:

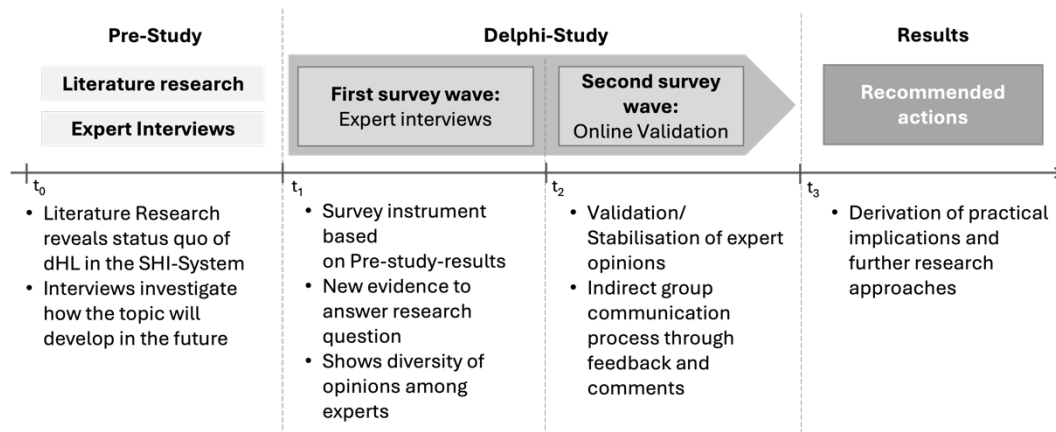
"How must framework conditions, responsibilities, and measures for the successful promotion of dHL of statutorily insured people in Germany develop?"

In order to narrow down the field of research, the research question was focused on people with statutory health insurance in Germany and the context of the German SHI system. The reason for this is the explicit regulations of § 20k SGB V, which represents the starting point of the research and a delimited research framework. Around 88% of the German population is insured under the SHI system (Baas et al., 2025, p. 26). Due to the existing regulations in the SHI system, the focus was nevertheless placed on the delimited group.

The three areas underlying the research question, framework conditions, responsibilities, and measures, were further differentiated in order to further specify the field of research. In this study, framework conditions are understood to mean the conditions in the SHI system that must be in place in order to enable the successful promotion of dHL from a systemic perspective. This includes, for example, the conceptual concept of dHL or the objectives of the promotion. Responsibilities are understood as roles and tasks that must be assumed by the central actors in the SHI system for the successful promotion of dHL. Other actors besides the health insurance funds should be explicitly included in the study. Measures are understood to mean concrete support measures that should be offered to insured persons in the SHI system as benefits (e.g. in the form of services and products) to promote dHL. In addition, this also involves the design of benefits to promote dHL.

To answer the research question, a Delphi study will be set up to analyze how the framework conditions, responsibilities, and measures to promote dHL in Germany should develop so that those with statutory health insurance can navigate confidently in a digitally transformed healthcare system, make use of new digital treatment methods, and use digital information to make health-conscious decisions. The research design of the Delphi study follows the mixed methods approach and is shown in Figure 12.

Figure 12: Research design and objectives of the Delphi study



Note: Author's elaboration.

The survey design includes both qualitative and quantitative methods and combines various survey instruments. At time t_0 , the aim is to determine how the framework conditions, responsibilities and measures for the promotion of dHL are currently structured in Germany. This question will be investigated as part of a literature review. Guideline-based expert interviews with experts who are primarily researching the digital transformation in the healthcare system and the associated changes in competence requirements for patients will also be used to take a look at future developments in an increasingly digitalized healthcare system and the effects on patients as well as the resulting demands on framework conditions, responsibilities, and measures to promote dHL.

A type 3 Delphi study is then conducted as the main part of the empirical research design. Based on the findings of the first survey phase, the research question is first operationalized using the facet theory and a thesis paper on the areas of framework conditions, responsibilities, and measures to promote dHL is designed. This will be presented anonymously online to selected experts in two waves (t_1 , t_2). The participants are asked to evaluate the theses derived. Closed questions are used in particular. Using scales, respondents are asked to assess the necessity and

importance of the theses for the successful promotion of dHL and evaluate their likeliness of occurrence. Overall, the need for development in the areas of framework conditions, responsibilities and measures is thus specified. After the first wave, the responses are evaluated and returned to the participants as feedback in the second wave.

The two quantifying evaluation rounds are used, on the one hand, to check whether the theses derived can be accepted by the majority and, on the other hand, to give the participants the opportunity to reconsider their answers from the first round of the survey against the background of the overall answers given. However, the aim here is explicitly not to find consensus among the respondents, but rather to review how the promotion of dHL can be actively shaped in the future based on an initial group opinion. The aim is to gather a broad range of opinions from the experts. Based on the evaluation results, recommendations for action for the active design of future framework conditions, responsibilities, and measures to promote dHL will then be derived (t3).

4.2. BASICS OF THE DELPHI-METHODOLOGY

At its core, the Delphi methodology is a highly structured group communication process in which experts assess issues about which there is uncertain or incomplete knowledge. Using several waves, expert opinions are used to solve problems and anonymous feedback is obtained (Häder, 2019, p. 375). The Delphi method has its origins in mythology and goes back to the Oracle of Delphi. It was first used around 1948 to make predictions about dog and horse races and in the military to forecast attacks by enemy troops. The Delphi method then became more widely known and used from 1964, after it was developed by Gordon & Helmer-Hirschberg in a study to predict scientific and technological developments. Subsequently, the method spread rapidly, also in Germany, and the purposes for which it was used became ever broader. Since the beginning of the 1990s, there has been a strong increase in interest in the Delphi technique (Häder, 2014, p. 15 f). At the beginning of the 1990s, for example, so-called foresight studies were initially carried out to generate orientation knowledge on the increasingly complex technical progress. In 1993, a Delphi study on the development of science and technology

was carried out on behalf of the Federal Ministry of Education and Research, which was continued and further developed in the following years due to its high strategic relevance (Blind & Cuhls, 2001, p. 59). Delphi methods have also become widely established in health research in Germany. For example, Delphi studies have been used to identify new qualification requirements in the healthcare industry (Leinert et al., 2019) or recommendations for optimizing nutrition in kindergarten and elementary school (Niederberger et al., 2022) as well as to promote safety and health competence at work (Eickholt, 2019).

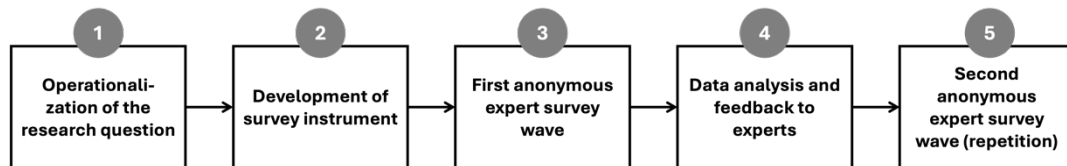
Today, the Delphi method is considered a standard procedure in futurology and for finding consensus (Niederberger, 2021, p. 871). The increasing use of Delphi surveys is due in particular to the increasing complexity and scope of decisions. Nowadays, it is hardly sufficient to consult individual experts to make decisions; instead, committees of experts can illuminate and include as many facets of an issue as possible (Häder & Häder, 2000, p. 12).

A generally recognized definition of the Delphi method does not exist due to a large number of different variants. Some authors focus on the group-dynamic characteristics of Delphi surveys, while others tend to emphasize content-related aspects such as the problem-solving character or dealing with uncertainty (Vorgrimler & Wübben, 2003, p. 764). Nevertheless, Cuhls (2019, p. 6) defined some central characteristics of Delphi studies:

- In terms of content, Delphi studies deal with issues about which there is uncertain or incomplete knowledge
- Due to the assessments made by experts, the Delphi process involves judgment processes under uncertainty
- The participating experts must be able to make competent judgments based on their knowledge and experience
- Self-fulfilling prophecies, which arise from the assessment of facts, can influence, or help shape the future in the present

Delphi studies make it possible to take a well-founded look into the future. Even if future developments cannot be predicted, they can be assessed and discussed in the present in order to define measures for or against their occurrence. The Delphi method is therefore not used to create a picture of the future, but rather a basis of information for deciding which measures to take for or against the occurrence of certain events (Blind & Cuhls, 2001, p. 58). In addition, Delphi studies are characterized by the fact that the knowledge of many is aggregated and diffuse knowledge is made available in a structured way (Cuhls, 2019, p. 17). The main advantages that Delphi studies enable an anonymous group discussion process without dominant individuals over a wide geographic dispersion (de Villiers et al., 2005, p. 642). The basic procedure for designing and conducting Delphi studies can be explained using five core steps, which are shown in Figure 13.

Figure 13: Five central steps of the Delphi methodology



Note: Adapted from Häder, 2019, p. 375

First, the question of the survey is operationalized. A standardized survey instrument is then developed and presented to a group of experts. The survey is anonymous and usually conducted by post or via the Internet. Once the first round of the survey has been evaluated, the results are reported back to the experts in the form of a statistical group response. At the same time, the survey is repeated using a largely identical instrument (Häder, 2019, p. 375).

Over time, a large number of variants of the Delphi survey have become established. These differ in particular with regard to the number and selection of experts, the number of survey waves, the design of the feedback and the termination criterion of the survey, which can be, for example, a consensus or the stability of

the answers received (Table 5). As a result, there are now four main types of Delphi surveys with different objectives.

Table 5: Comparison of Delphi-types

	Type 1: Aggregation of ideas	Type 2: Determination of facts	Type 3: Determination of expert opin- ions	Type 4: Consensus
objec- tive	collection of ideas to solve a problem	prediction of facts	determination and qualifica- tion of expert opinions	high degree of conformity among experts
result	variety of sug- gestions for solving a prob- lem	derivation of prognoses	derivation of interventions	consensus of expert opin- ions
choice of ex- perts	expert choice based on ex- pertise	hypotheses necessary to find experts, no formalized rules	total survey or deliberate se- lection of ex- perts	selection based on a defined frame
method	qualitative	qualitative and quantitative	qualitative and (mainly) quan- titative	Quantitative
ques- tion types	use of open questions	open and espe- cially closed questions	open and espe- cially closed questions	standardized rating only

Note: Adapted from Häder, 2014, p. 37.

A type 1 Delphi survey for the aggregation of ideas is used when different ideas and problem-solving approaches are to be obtained from experts. In contrast to the other Delphi types, the work here is purely qualitative and does not involve quantifying rounds of questioning. As a rule, this type of Delphi is carried out with only a few participants, who first express their views on a question in the form of an essay. The arguments are then edited and presented to the participants in the

second round of questioning. The qualitative survey is then repeated in order to collect further arguments. Pre-formulated answer categories are not used during the entire survey (Häder, 2019, p. 376). The methodological limitation of a Type 1 Delphi is that it only answers questions about the development of the future, but not about specific opportunities for shaping it (Gregersen, 2011, p. 30 f).

The Delphi method of type 2 aims to determine an uncertain situation as precisely as possible and thus serves to determine forecasts about future developments. This type reflects the original objective of the Delphi approach. The difficulty with type 2 Delphi, however, lies in self-fulfilling or self-destroying prophecies. An initially correct prediction can contribute to changing reality in a targeted manner and thus refute the prediction. Initially incorrect statements can also be confirmed retrospectively by corresponding actions (Häder, 2019, p. 376). Due to the determination of uncertain, unknown facts, the selection of the experts to be interviewed is a particularly difficult task. There are currently no explicit rules for the composition of the expert panel. The research team therefore has the particular task of utilizing as much leeway as possible in the search for and recruitment of experts. To localize the required expertise, as many assumptions as possible should be made and theoretically justified in order to recruit as many experts as possible to participate. However, it is important not to lose sight of the actual expertise of the experts. In the course of processing the survey, the experts then evaluate theses and answer open and closed questions (Häder, 2014, p. 107 ff).

Another objective of Delphi surveys is a type 3 Delphi to determine and qualify expert opinions. These can be used, for example, to generate recommendations for necessary interventions, to react to a foreseeable problem or to draw attention to undesirable developments (Häder, 2019, p. 376). In contrast to Delphis, which determine how the future will develop, the Type 3 Delphi focuses on communication about the future and the possibilities of actively shaping it (Cuhls, 2000, p. 7). In addition to purely qualitative Delphi studies, a quantifying evaluation is carried out. In this way, expert opinions can first be summarized and then checked for their majority validity (Häder, 2014, p. 33 f). When selecting the experts for the survey rounds, a high level of expertise in the subject area must be ensured. In the survey itself, the experts are presented with theses on which their own opinion is expressed by means of predefined answer options supplemented by open questions,

thus creating space for the experts' own suggestions (Gregersen, 2011, p. 30 f). Since the aim of the dissertation is to develop recommendations for action for the further development and proactive design of framework conditions, conditions, and measures for the promotion of dHL of people with statutory health insurance in Germany through the SHI system, a type 3 Delphi study (highlighted in green in Table 2) was conducted.

A final subdivision of the Delphi types can be found in the type 4 Delphi for generating consensus. This aims to achieve the highest possible degree of consensus among the respondents. For this purpose, the issue to be addressed must be pre-structured and operationalized as well as possible in order to guide the consensus process towards a specific question. A variety of conditions must therefore be defined in advance for a type 4 Delphi (Häder, 2014, p. 34). When a consensus is reached is defined individually, but usually using statistical measures for each item. For example, the percentage of experts who must agree with a certain item can be defined. Ideally, in a type 4 Delphi, experts are questioned until the defined consensus has been reached (Niederberger, 2021, p. 874 f). The experts interviewed can not only contribute their expertise to the survey, but also receive information in exchange with the other participants (Cuhls, 2000, p. 10)

Although the Delphi method has now established itself as a standard instrument, it also has certain inherent weaknesses as well as strengths that should be considered in the design process. The strengths of the method include above all the generation of forecasts, the structured and organized, yet flexible group communication process and the possibility of involving experts from different disciplines and views. The main weaknesses cited are the high level of participation required from the experts, the creation of a uniform understanding of the research subject and the risk of instrumentalization in the case of precarious and topical issues (Niederberger, 2021, 891). The informative value of results can be limited, particularly in the case of consensus-building procedures, if it is a compromise based on the lowest common denominator of the experts. The advantages of the procedure can therefore also become weaknesses. To prevent this, particular attention should be paid to accuracy in the design, implementation and evaluation of the Delphi study (Hung et al., 2008, p. 192). A key success factor in this context is the compo-

sition, scope, and recruitment of the expert group. However, this also poses a challenge, as there are hardly any formalized rules for the composition of the expert panel. Instead, the research team has to think very carefully about what expertise is required and how this is defined on the basis of characteristics. An undifferentiated selection of experts can ultimately lead to a false or less meaningful picture of opinions being collected (Chalmers & Armour, 2019, p. 730).

In addition to the classic Delphi method, there are other special forms that differ in terms of their survey situation, objectives and the knowledge gained. For example, argumentative Delphis are used to determine the qualitative justification of standardized judgments. In group Delphis, on the other hand, the anonymity of the experts surveyed is waived and a standardized questionnaire is answered in a personal exchange during workshops. Another form is the hybrid Delphi, which combines classic Delphi procedures with other methods of empirical research (Niederberger, 2021, p. 876 f). This approach goes back to Landeta et al. (2011), who brought together focus groups and the nominal group technique with Delphi methods. A focus group is a moderated discourse procedure for gathering initial information about an area of interest. Group discussions or interviews are conducted with participants in an informal and open atmosphere (Schulz, 2012, p. 9 f).

The nominal group technique aims to aggregate and structure expert opinions (Landeta et al., 2011, p. 1630). By combining different empirical methods, the limitations of one type of research can be compensated for by the strengths of another approach in line with the mixed methods approach. For example, focus groups and the nominal group technique can contribute creative ideas that might not have been introduced by a classic Delphi method due to the high degree of standardization (Niederberger & Renn, 2018, p. 21). It is possible to use the supplementary procedures both before and after the Delphi or to carry out only two of the three procedures (Landeta et al., 2011, p. 1632 f). In view of the advantages of the mixed methods approach, the Delphi study designed as part of the dissertation was based on the hybrid Delphi approach. Specifically, the Delphi survey was preceded by a qualitative preliminary study in the form of expert interviews. Methodologically, the interviews can be categorized as a focus group according to Landeta et al. (2011), as these also involve conducting interviews. Beyond this, however, no

group interviews or discussions were conducted, so that the procedure in the context of the dissertation deviates slightly from Landeta et al. In more recent publications such as Niederberger (2021), however, the empirical methods to be combined are defined more openly, so that the procedure can still be equated with a hybrid Delphi study.

4.3. PRE-STUDY: EXPERT INTERVIEWS

4.3.1. Methodical Approach

Besides the literature review, guided expert interviews were conducted as part of the pre-phase of the Delphi study. The purpose of the interviews was to ask experts about their opinions on the future design of framework conditions, responsibilities, and measures to promote dHL. By interviewing experts, the previously theory-based work was expanded to include a practical perspective. This makes it possible to identify possible developments in the field of dHL and to work out optimization potentials, challenges, and necessary prerequisites in connection with the promotion of dHL. The results from the interviews will be integrated into the Delphi survey. Accordingly, the views and ideas identified will be critically discussed as part of the research.

A total of 12 semi-structured expert interviews was conducted. The expert panel is made up of experts from the German healthcare sector who deal with the topic of dHL. The panel was balanced considering gender. Table 6 gives an overview about the sociodemographic data of the experts interviewed.

Table 6: Sociodemographic data of the experts interviewed

#	Gender	Profession	Date
EI1	female	Adult education center	May 22, 2023
EI2	female	Research	July 13, 2023
EI3	female	Research	July 14, 2023
EI4	female	Interest group health IT	July 31, 2023
EI5	male	Consultant digital health	July 10, 2023

#	Gender	Profession	Date
EI6	female	Interest group health IT	June 09, 2023
EI7	male	Interest group healthcare professionals	July 20, 2023
EI8	female	Social health insurance	July 19, 2023
EI9	male	Social health insurance	June 09, 2023
EI10	male	Social health insurance	June 02, 2023
EI11	female male	Social health insurance	June 27, 2023
EI12	male male	Social health insurance	June 16, 2023

Note: Author's elaboration.

In general, the interview was conducted with one interviewee; in two cases (E11, E12), two interviewees took part to fully cover the required expertise. Based on the literature research, an interview guideline was initially developed with five questions in three thematic blocks on the further development of framework conditions, responsibilities, and measures to promote dHL. In addition to the five main questions, follow-up questions were defined for the interviewer to be able to steer the interview in the direction intended by the research question. The guideline thus provided a framework for the order of the questions and ensured comparability of the interviews. At the same time, the semi-structured approach also makes it possible to ask additional or more in-depth questions (Döring & Bortz, 2016, p. 372).

The interview guide was checked with the help of a pretest. The aim of this was to determine the comprehensibility and completeness of the questions, the theoretical validity and the duration of the interview (Döring & Bortz, 2016, p. 372). As it is often not sufficient to use just one method to identify problems during the pretest, a multi-stage approach is recommended (Häder, 2019, p. 424). In the first step, an expert was consulted to assess the comprehensibility and structure of the questions. After an initial adaptation of the questionnaire, an observational pretest was then carried out in the second step.

The questionnaire was checked with three test persons who have expertise in the subject area. For this purpose, the survey was conducted via video conference under conditions that were as realistic as possible. Special attention was paid to difficulties and problems (Häder, 2019, p. 413). With the help of the participants feedback, one question was clarified and the order of two questions was reversed.

To conduct the expert interviews, the interviewees were given the main interview questions, general information about the research project and data protection information in advance. The interviews began with an opening phase in which the research project was introduced. Questions that had arisen in advance could also be clarified here. In the interview itself, the interviewees should speak for the most part and were only interrupted in extreme cases so that as many ideas and arguments as possible could be collected. To support this, the follow-up questions were introduced when suitable. Finally, the experts were able to raise aspects that had not yet been covered by the interview and unclear passages were clarified. The interviews were recorded using Zoom and then transcribed by the interviewer.¹⁸ The evaluation was then carried out using a qualitative content analysis according to Kuckartz & Rädiker (2022) and the software MAXQDA.

Qualitative content analysis is one of the general methods of qualitative data analysis, which can be used to analyze a wide range of data material and different content-related questions (Döring & Bortz, 2016, p. 601). Usually, it interprets verbal, textual or visual data material with regard to the research problem of an empirical study (Döring & Bortz, 2016, p. 599). It is an intermediate form of qualitative and quantitative methodology, since text material assigned to categories can also be further analyzed quantitatively, such as the category frequency in a text segment (Mayring, 2020, p. 497).

Philipp Mayring and his work "Qualitative Content Analysis: Basics and Techniques" are particularly important in connection with qualitative content analysis, as it has been widely used and is considered one of the standard works on qualitative content analysis. In general, however, there are different variants of qualitative content analysis and no methodological standard. (Schreier, 2014, par.

¹⁸ The Transcription Rules can be found in Appendix 1.

4). At its core, however, it is always about systematically analyzing the meaning of material requiring interpretation by assigning it to categories (Stamann et al., 2016, par. 5). Kuckartz/ Rädiker differentiate three basic methods of qualitative content analysis as presented in Table 7.

Table 7: Forms of qualitative content analysis

Content-structuring QCA	Evaluative QCA	Type-forming QCA
- Core method of QCA - Material is coded in several coding runs with deductively and/or inductively formed categories	- Data material is evaluated by the coders and coded with evaluative categories	- On top of content structuring or evaluative QCA - Aims for development of a typology

Note: Adapted from Kuckartz & Rädiker, 2022, p. 104.

All three variants have in common that they work in a category-based, systematic and summarizing manner (Kuckartz & Rädiker, 2022, p. 111). However, which of the three methods is the most suitable in each case depends on the individual research question and objective (Kuckartz & Rädiker, 2022, p. 110)

The aim of the expert interviews was to obtain an overview of experts' opinions on the future development of the promotion of dHL in Germany and the associated necessary further development of framework conditions, responsibilities, and measures. The experts' statements should also be used to generate theses for the subsequent Delphi survey, which is why the analysis should follow a structured manner. For this reason, the interviews are evaluated using content-structuring qualitative content analysis according to Kuckartz & Rädiker. This is characterized by a structured, seven-stage procedure, which is illustrated in Figure 14 and described below.

Figure 14: Seven steps of content-structuring qualitative content analysis



Note: Adapted from Kuckartz & Rädiker 2022, p. 132

At the beginning of the analysis, the initial text work is done. The text to be analyzed is read carefully and several times to grasp the subjective meaning. Important passages in the text are marked and the argumentation line is analyzed taking into account the research question. Additionally, a case summary with the essential findings is written for each interview. (Kuckartz & Rädiker, 2022, p. 119 ff). In the second step of the content-structuring qualitative content analysis, main thematic categories are developed. Main categories can generally be deduced directly from the key topics of the data collection. The interview guide can also provide an analytical structure, as it covers the main topics required to answer the research questions. Alternatively, categories can be developed inductively, directly from the material itself. Often, a combination of both approaches is suitable (Kuckartz & Rädiker, 2022, p. 138). After defining the main categories, a trial run

through approximately 10 to 25% of the data is recommended to test the applicability of the defined categories and make adjustments if necessary (Kuckartz & Rädiker, 2022, p. 133 f).

Within this analysis, the three main categories "political-social framework," "responsible actors," and "support measures" were derived deductively, while the two main categories "concept of digital health literacy" and "future vision" were developed inductively. The literature review and the interview guide both served as the basis for deriving the deductively developed categories. Following the formation of main categories and the verification of their practical relevance, the first coding process represents the third step in QCA. Relevant sections of the text material are identified and assigned to the appropriate category. Since a text section may contain multiple topics, it is also possible to code it under multiple categories. However, synonymous statements should only be coded once, as repeated statements are not relevant to capturing an overall opinion. (Kuckartz & Rädiker, 2022, p. 135). Regarding the size of a coding segment, it should be selected in such a way that its meaning remains clear even outside of the original context. (Kuckartz & Rädiker, 2022, p. 136). While analyzing the expert interviews, care was taken to code identical statements only once per case and to ensure that each coded segment conveyed a meaningful unit. At the same time, multiple codings per category were recorded within each interview if the statement differed in content from previous, already coded statements. This approach allowed capturing a broad range of expert opinions while avoiding redundant codings that would have the same impact on the results.

In the fourth step of content-structuring content analysis according to Kuckartz & Rädiker the main categories are differentiated into subcategories to increase the level of detail in the evaluation. For this, all text passages within a category are compiled in a table to inductively derive subcategories based on the material. The guiding question here is what insights are intended to be drawn from the analysis regarding the research question. Subcategories should be used sparingly and clearly defined to avoid miscoding (Kuckartz & Rädiker, 2022, p. 138 f)

After developing subcategories, the second coding process follows as the fifth step in content-structuring content analysis. Here, the entire text material, already

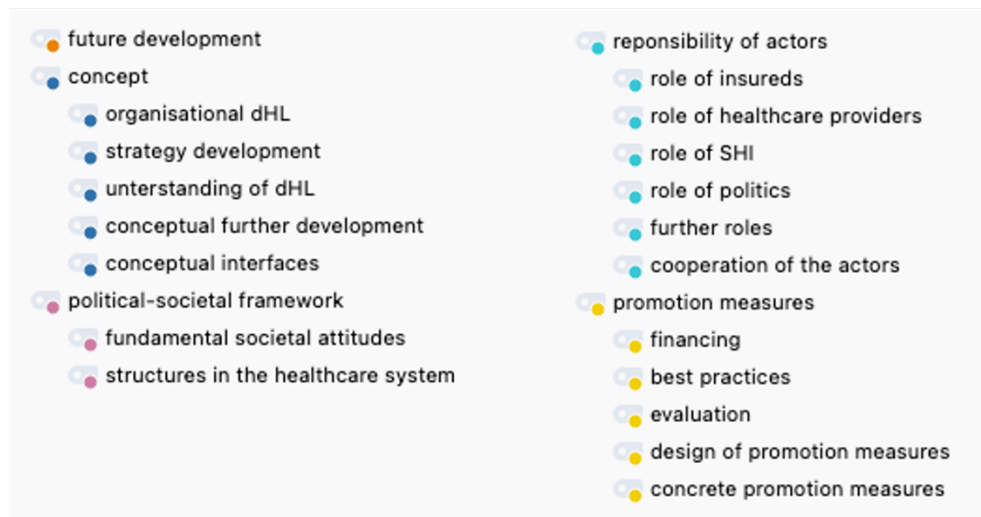
coded in the main categories, is reviewed again, and assigned to the new subcategories. For the phases four and five, a cyclical approach in phases is recommended. Thereby, subcategories are firstly derived from main categories and secondly applied. Afterwards, the work continues with the next main category (Kuckartz & Rädiker, 2022, p. 142). The division of the main categories into subcategories was carried out through work with the material. This differentiation resulted in a category system with five main categories and 18 subcategories. To ensure the quality of the coding process, a coding guide with code definitions, example codings, and instructions for coders was created throughout the entire coding process (Kuckartz & Rädiker, 2022, p. 66). In addition, some of the interviews were coded by a second person in order to test the reliability of the code system.

With the completion of the second coding process, the systematization and structuring of the material is initially finished, enabling the analysis to begin. In this context, visualizations, tabular overviews, case comparisons, or category-based analyses along the main categories are used (Kuckartz & Rädiker, 2022, p. 147). At the conclusion of the analysis, the results are consolidated and, if necessary, presented with the help of graphics and tables (Kuckartz & Rädiker, 2022, p. 154).

4.3.2. Results of the Expert Interviews

As part of the evaluation of the 12 expert interviews using qualitative content analysis with MAXQDA, a total of 382 codes were recorded in five main categories. The fully differentiated code system contains a total of 18 subcategories under the five main categories as shown in Figure 15.

Figure 15: Code system of the QCA with main- and sub-codes.

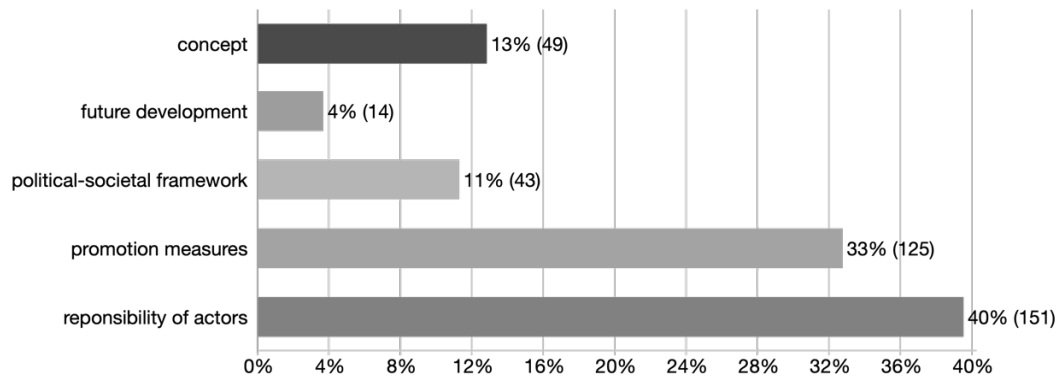


Note: Author's elaboration (screenshot from MAXQDA).

Based on the code frequencies per main category shown in Figure 16, it can already be determined in advance that the focus of the interviews was on the actors responsible for promoting dHL as well as on potential measures and their design. Multiple codes were recorded for each category per interview if the statement was not identical in content to previously made and already coded statements. On the one hand, this made it possible to collect a broad range of opinions from the experts and, on the other, to avoid redundant coding with the same effect on the result.

The results of the expert interviews are presented below according to the main categories of the interviews.

Figure 16: Number of codes per main category



Note: Author's elaboration.

Concept of Digital Health Literacy

As part of the explanations for the interview, the experts were given a definition of the term dHL as it is understood in the context of this work. The experts noted that, in addition to the definition used, there are many other definitions of the term and that there is no uniform understanding in the German healthcare system of what exactly dHL encompasses, which skills are included and how they can be successfully promoted. Rather, different shades of the term are used which makes a uniform discourse on the topic difficult. Depending on the scope of the concept, the focus and objectives of the support measures and the interfaces to other policy and competence fields vary. One expert therefore recommends developing a common definition of dHL for the SHI system by consensus: "I would like to emphasize once again that it is about a common definition. In the end, strengthening and deepening understanding is always a consensus process. There is no right or wrong, it simply has to be found by consensus. You can also develop it further." (EI10, pos. 14). It also became clear in the interviews that the experts' understanding of dHL had different shades and focuses. For example, some interviewees focused specifically on the promotion of skills in dealing with digital health information (EI2), while others focused more on the technical dimension and referred strongly to skills in dealing with digital health applications (EI6). Health

insurance fund representatives frequently referred to the legal mandate to promote dHL in accordance with § 20k SGB V. This must be kept in mind when it comes to the generation of recommendations for action in so far as the explanations are based on a different understanding of dHL. At the same time, however, many facets of dHL can be mapped, introduced into the discussion on a broad conceptual understanding, and validated as part of the Delphi study.

Three experts would like to see a stronger strategic focus on the concept of dHL for a holistic approach and the definition of common goals. For example, the integration in the BMG's digital strategy would be a good way to emphasize its central importance (EI2, EI6). At a conceptual level, it should also be taken into account that the content of dHL must always be adapted to technological developments in the healthcare sector. The concept should therefore always be developed further. For these reasons, one expert sees, for example, the aspect of the ability to use digital applications as an increasingly important part of dHL in the future, even though this does not yet receive the highest level of attention (EI3). Developments such as ChatGPT also show the challenge of quickly teaching skills for technologies that are only understood by experts due to their complexity (EI9, EI10). "If we were to recognize that there is a need, we now have Chat GPT, to my great surprise, yes, that does not change the commitment to digital health literacy, and we have already defined this before, that such developments should also be the subject of funding activities." (EI10, pos. 4). Overall, the experts emphasize that promoting dHL of insured persons must always go hand in hand with greater competence on the part of the organizations and stakeholders in the healthcare system and that a concept must accordingly also take into account support measures at this level (EI1, EI2, EI6).

Political-Societal Framework

With regard to the political and social framework conditions, the experts would like to see a further development of basic social attitudes as well as a further development of structures in the healthcare sector. On a political-social level, a change in the mindset of the German population is necessary for the successful promotion of dHL. The experts note a great deal of skepticism towards digital services, particularly in the healthcare sector. Even if digital processes are popular in

other contexts, such as travel or online shopping, there are major concerns about the reliability of information or the disclosure of sensitive health data and possible data protection mishaps, particularly in the healthcare sector. "You will do anything for health, you will accept anything. On the one hand - on the other, this contradiction again. On the other hand, people are particularly worried. People are more worried about their health data than their travel booking data, which is very understandable" (EI9, pos. 2). According to experts, people therefore find it particularly difficult to recognize the added value of digital services and to make use of them. It is therefore not possible to establish the extent to which digital services can contribute to solving existing healthcare problems. In essence, the insured persons are mostly concerned with their individual issues, such as not being able to find a free specialist appointment, where an app, for example, is not primarily seen as a solution (interview with GKV-SV). This shows a kind of vicious circle: on the one hand, insured persons lack the necessary dHL to be able to reliably assess digital information, make use of it and thus find solutions to individual health topics.

On the other hand, the status quo also shows that the relevance of a high dHL is not recognized and therefore tends not to be addressed. The experts are therefore convinced that a problem-centric mindset of the German population should be transformed into a social change that recognizes the opportunities of digitalization. "I think it's twofold: In Germany, there is generally a bit of skepticism towards technology, which has somehow crept in a bit. So perhaps we need to look at how we can communicate technology, openness, i.e. the added value that this solution brings, at a meta level." (EI6, pos. 6). In addition, the experts see a social tension between digital affinity and interest in health topics: according to them, young people tend to be more interested in digital topics but have less contact with health topics. Conversely, the older population tends to be more interested in health topics due to their own illnesses but has a lower digital affinity (EI4). This makes clear here that there are different target groups among the German population with regard to support measures for dHL. Across the board, the experts state that dHL can also be increased if the German population sheds the "white coat mentality" it has acquired over the years in the spirit of patient empowerment. This means that the individual becomes more concerned with its own health starting at a young age and questions medical decisions more closely (EI2, EI4, EI8, EI12).

Regarding the existing structures in the healthcare system, the experts see a strong connection with the promotion of dHL. To be digital health literate and then also to increase the competences of insured people, the existing digital structures should be further developed. In particular, the widespread use of electronic patient records is seen by some experts as a central element of a digital healthcare infrastructure. In addition, insured persons should widely access to digital health applications, e-prescriptions, and digital identities (EI1, EI6, EI12). "In my opinion, this digital ecosystem that is emerging is known more in a bubble and otherwise only as "doesn't work" in a wider public perception, as far as e-prescription and so on are concerned. I think a lot more educational work needs to be done." (EI6, pos. 4). As a technical basis, it must also be ensured that there is broad access to the Internet itself, which is not yet the case in all areas of Germany. From a structural perspective, one expert notes that, compared to other countries, the German healthcare system does not yet offer incentives for the use of digital information and applications for insured persons, as analog channels still exist in addition to digital ones and therefore continue to be the most common way (EI8).

Responsibilities of Actors in the SHI System

When asked about the responsibility for promoting the dHL of insured persons, in 11 of the 12 interviews, experts believe that SHI-companies are mainly responsible. In addition to the legal mandate, this is primarily justified by the direct contact to the insured persons. Furthermore, politics was named as a responsible party, as it has already today created the legal standard for the promotion of dHL. At the same time, however, in 11 of the 12 interviews, the experts also emphasized that the task must be seen more in terms of society as a whole and that, despite the current legal obligation only for SHI companies, other players must be involved. Especially the representatives of the SHI funds emphasize this aspect, whereas other respondents name the SHI funds as the first responsible party for promoting dHL. "So, as a health insurance fund, I think we like to be or see ourselves in the role of guides. That's fine, because you also have to ask yourself the question: when do you have to deal with the health insurance fund, and when do you want to deal with the health insurance fund? Mostly when you're ill. But we have to reach everyone with it, and now of course you can set up great prevention programs. That's

what we've done. (...) But in reality, we simply need more players in this role, because otherwise we won't reach everyone." (EI11, pos. 6). This indicates that the health insurance funds are well aware of their role but see other players as having a responsibility to promote dHL.

One health insurance fund representative has the opinion that the promotion of dHL should only be a service of the SHI system, or the health insurance funds to a limited extent. Due to the intersections with other policy areas, such as the educational system, the topic should rather be located there. DHL would not help to solve the real problems of the SHI system, such as the shortage of doctors and sectoral boundaries of care. "So, it is not plausible, let's say only to a limited extent, that the health insurance funds should now offer this 20k SGB V. You can kind of understand that. There is a certain analogy with preventive services. That's also in the corner, somewhere in the statutory system. These are all very desirable things, which is always difficult to assess in the discussion about non-insurance benefits: where does the task actually end? Where does it begin?" (EI9, pos. 4).

The following starting points for future tasks of the health insurance funds in Table 8 emerged from the expert interviews.

Table 8: Possible future tasks of SHI companies to promote dHL derived from the interviews

Task	Example quotation
Individual support for insured persons: advice and guidance at the respective point of contact	"I believe that a realistic mandate for the health insurance companies is actually linked to a specific need, such as "I have a certain acute illness or I have a chronic illness, I have a certain life event, such as my mother becoming in need of care". There is a point of contact, a touchpoint with the health insurance company, with the long-term care insurance company, and then we look at exactly what information the insured person needs and what digital support options are available?" (EI8, pos. 8)

Task	Example quotation
Offer training and information material: flyers, health magazines, etc.	"Why shouldn't a health insurance company make appropriate on-site contributions, presentations at its branch, for example, and offer them to the insured? I think you can also try to address this in writing, every health insurance company has a monthly or quarterly leaflet that is distributed, either in terms of content, how does something work?" (EI5, pos. 10)
Creating transparency: better presentation of own service portfolio with regard to digital healthcare offerings	"So, I think it's important that every patient and every insured person in Germany knows about the possibilities of digital healthcare solutions in the healthcare system, that they have the information at all, what solutions are available? (...) Well, I don't know exactly what the health insurance company offers, but they haven't reached me, even though I also have statutory health insurance." (EI6, pos. 2, 4)
Financing: of support measures, including those of other SHI stakeholders	"Some of these tasks have to be transferred to other healthcare professionals, who are then remunerated for them. So, nobody can do this on top, it's a huge educational task." (EI6, pos. 8)
Coordinator and orchestrator: bringing together the players in the SHI system to jointly promote dHL	"I believe that the integration, and integration also means the cohesion, interaction and discourse of the players must be intensified. And in my view, these are sufficient to develop the topic further, but we do not yet have this level of integration." (EI10, pos. 8)

Task	Example quotation
Topic occupants: Positioning as the main actor responsible for promoting dHL	"So, you also have to somehow align the entire communication concept of the health insurance funds. That doesn't mean that you can't voice any criticism, but that you have to look at what you are communicating to insureds and how you are communicating an active, creative role in favor of "We promote digital health literacy" (EI6, pos. 14)

Note: Author's elaboration.

As already outlined, the health insurance funds are also seen by the interviewees as having the main responsibility. In addition to health insurers and politicians, doctors and non-medical staff in the healthcare sector were also frequently mentioned to play an important role in the promotion of dHL. Therefore, the experts assume a further development of roles and responsibilities in the SHI system in order to provide insured persons with the best possible support. According to the experts, doctors also play an important role in promoting dHL, as they build up a special relationship of trust with the insured, advise them on health issues and play a key role in shaping their medical care. They therefore tend to play an important role in the distribution of digital care elements in the healthcare system. At the same time, however, the experts are also convinced that doctors cannot assume the main responsibility for promoting dHL of insured persons and should not get involved in training. They see the existing lack of time of the scarce resource of doctors as a limiting factor for this. "Especially when you ask the doctors' representatives, we quickly get into the discourse: We don't have time to look after our patients anyway. How am I supposed to provide digital information in the three minutes I have per patient as a family doctor? So, I don't think it will be possible in the short term to really give this to the doctors." (EI4, pos. 6).

The experts suggest that doctors play an integrative role in promoting dHL at the points of contact with the insured, for example by proactively pointing out reliable digital health information or incorporating digital health services such as video consultations, the electronic patient file or digital health applications into the provision of care. "I definitely see a responsibility on the part of doctors to ensure

that they use the options available in the system, the tools they have, so to speak, medicines, remedies, aids and digital therapies." (EI6, pos. 10). Possible further tasks emerged by the interviews are listed up in Table 9.

Table 9: Possible future tasks of doctors to promote dHL derived from the interviews.

Task	Example quotation
Intermediaries: proactive mediation of digital health offers to insured persons	"And what I already see them doing is acting as mediators, so that they can see when someone has a need, so that they know, okay, where they can direct them or where the patient can get more information." (EI1, pos. 8)
Promoting and demanding responsible and digitally health-literate insured persons in everyday treatment	"This self-confidence that people need, versus the white coat mentality, if you like, so. this feeling that "I am responsible for my own health, and I won't leave it to the doctors and physicians." (EI11, pos. 2)
Testimonial: Positive approach to digitalization topics regarding insured persons	"A positive view of the developments alone and also the possibility, or so to speak the objective, of making it easy for patients in the concrete implementation in actual practice" (EI12, pos. 4)
Digital practice: Supporting the digital infrastructure in the healthcare sector	"Of course, a certain amount of input must come from the doctors themselves, so that they say here, we also want to set up our practice digitally" (EI12, pos. 13)
Organizational dHL: promotion of own and employees dHL	"So of course, they have to deal with such issues themselves, what makes sense to prescribe. And how I can really create added value in the treatment." (EI4, pos. 14)

Note: Author's elaboration.

It was mentioned several times that doctors themselves need a high level of dHL in order to provide the best possible support to insured persons. In addition to the inclusion of these topics in the curriculum of medical studies and in the training of non-medical staff, training courses were named several times in this context. The experts also see a special role for the interest groups representing doctors, such as the associations or the Association of General Practitioners. These should take on the task of qualifying their members in the area of dHL. It is interesting that the interviewed stakeholder was not yet able to make a concrete statement about the responsibility of doctors with regard to the promotion of dHL. He could imagine doctors providing reliable digital health information but does not see them as having the main responsibility for promoting dHL. "I don't know to what extent digital health literacy, to what extent doctors should provide advice there. This is certainly still a topic for the future, and I don't see it as being in first place, so to speak. But it certainly plays a role in questions. Where can patients perhaps find reliable and good information about their concerns? I see doctors as having a certain amount of responsibility in this respect, and of course they already do this in their daily business" (EI7, pos. 12). He also sees the extent to which interest groups themselves can contribute to the promotion of dHL among doctors as a topic for the future. There are not yet any current measures in this regard. "Yes, that is certainly also a topic for the future, so to speak, dealing with digital applications in general. This has increased more and more in recent years, from video consultations to digital tools, applications and so on, it's developing and it's certainly also a process of dealing with it. We are also in a transition, so to speak, with doctors. Many of them are certainly older, they won't be as involved with it. But for the future, so to speak, I see a great need" (EI7, pos. 14).

In order to conserve physician resources, the experts also recommend that non-physician professional groups in the practice environment could be more involved in promoting dHL. For example, it would be conceivable to expand the skills of medical assistants or to create a new job description of a "digital support service" or "digital nurse" to advise insured persons on practice-related issues or guide them to the appropriate services. "However, it would be possible to offer a new job profile for a medical assistant, or whatever, in the practices, a kind of digital support service and say, in large GP practices or in medical care centers or even

in hospitals, we offer this with extra staff, with expertise that then helps, or also in pharmacies." (EI4, pos. 6).

According to the experts, policymakers play the role of a framework provider by defining which requirements health insurance funds should implement to promote dHL. In addition, in the socio-political sphere, politics should also take on a role as educator by supporting education on the subject of dHL through broad-based campaigns. The following tasks in Table 10 may according to the experts therefore possibly be tasks of politics:

Table 10: Possible future tasks of politics to promote dHL derived from the interviews

Task	Example quotation
Close monitoring of implementation: of support measures for dHL including sanctions in the event of non-compliance with legal mandates	"What I hear from 80% of health insurance companies is that as long as there are no penalties, as long as there are no sanctions or other motivations for the health insurance companies, but only paragraph 20k, not much will happen with 80%. 20% are intrinsically motivated and say, okay, we'll tackle the issue, also for the benefit of our policyholders. The others say it costs money. I don't actually have to do it, and I'll wait and see how the whole issue develops, and of course it can't be regulated by the health insurance companies alone by trying to motivate them, but it has to be communicated at a political level, I think simply in the direction of the health insurance companies, but also in the direction of other players." (EI5, pos. 2)
Definition and concretization of the requirements for the promotion of dHL in § 20k SGB V	"The legislator must provide the standardization, the framework. The legislator has the normative role." (EI10, pos. 12)

Task	Example quotation
Continuous further development of requirements for the promotion of dHL in §20k SGB V	"But there is, so to speak, the question that we had already asked ourselves at the beginning, about the task, about the legislation. These framework guidelines, which were relatively abstract, of course made sense at the time, but now the question is, where are the offers, what are the products and services?" (EI9, pos. 4)
Definition of further responsible actors for the promotion of dHL	"This really has to be done through legislation, just like the 20k, that politicians have simply said, you have to do this now, you have to do it, you are responsible for it now, you have to think about how you want to increase digital health literacy." (EI1, pos. 14)
Creating the structural basis for making digital healthcare services accessible to insured persons	"This puts us back in the role of ensuring that the products, i.e. the digital services, are good enough to benefit everyone. We are not yet there with electronic health record, partly with prescription, and with electronic prescription it works a little better, but still. This is where politics comes into play again, as it sets some of the requirements." (EI11, pos. 16)
Stronger strategic handling of the topic , e.g. by integrating it into the digital strategy of the BMG	"And that's why the digitalization strategy existed to a certain extent, because they said, okay, we have to somehow agree on a path and um also agree that we want to work on it proactively. It's just one thing that you have on paper, so to speak, and the other is what happens in practice." (EI6, pos. 6)
Establishment of information campaigns as a trustworthy body, e.g. via the BMG	"So, the dream scenario would of course be a corresponding national campaign to increase digital health literacy in all areas, but also with a focus on the insured." (EI4, pos. 10)

Task	Example quotation
Bringing together the players in the SHI system to promote dHL as part of jointly initiated measures	"So, what I thought was good about what you wrote in the introductory sentences is that it is a holistic task for society as a whole. I believe that focusing only on the statutory health insurance funds in general is the wrong approach. This must also be driven further out of politics." (EI5, pos. 2)

Note: Author's elaboration.

Besides SHI, doctors and politics, the experts recommend that further other stakeholders should be involved in promoting dHL. In particular, stakeholders with contact to insured persons were named as a possible addition. It would also make sense to anchor these responsibilities in legislation. The following stakeholders and responsibilities were mentioned:

- Self-help groups, adult education centers and patient organizations could contribute to the promotion of dHL through insurance-focused training and information materials.
- The Federal Center for Health Education (BzgA) or the new Federal Institute of Public Health should carry out large-scale campaigns on general dHL.
- Pharmacies could provide a local point of advice on dHL topics.
- Manufacturers of digital applications should take a stronger perspective from the perspective of the insured when developing digital applications and ensure policyholder-centered support.

The experts predominantly consider greater cooperation and collaboration between the various stakeholders as important. Corresponding to the conceptual understanding, they see it as essential that the involved actors agree on a common definition of dHL in order to be able to implement common goals and strengthen responsibilities and awareness. DHL can only be strengthened through the interaction of the various roles, with each actor playing its necessary part. One expert

noted that cooperation is important, but that it should not be intensified by the implementation of additional and bureaucratic committees. Rather, existing structures for coordination and cooperation should be used and enriched with the topic of dHL in order to achieve common goals efficiently. "The networking is actually there when I think about all the committees, meetings and exchanges. It's all incredibly complicated and happens very intensively. But the result is a bit of a delta" (EI11, item 23).

In addition to cooperation, processes in the SHI system should also be more closely interlinked. A digital health application should not only be financed by the SHI funds, but doctors must also proactively prescribe it and use it in everyday treatment, and manufacturers must ensure that patients understand the applications and recognize an added value through a user-friendly design. "If it is suitable for the patient, then, in my view, healthcare professionals must make full use of what is available to them. I think it's also clear that it's not possible to explain how the application works in an educational way in a brief consultation with a doctor. But this is also regulated by law, at least in the case of the DiGA. There is also a 24-hour support service from the manufacturers, which means that all technical information ends up with the manufacturers and not with the doctor" (EI6, pos. 10).

In addition to responsibilities in the healthcare sector, the experts also see a need for other policy areas to promote dHL of insured persons. The HiaP approach was linked to dHL on several occasions. This approach is a strategy pursued by the WHO to anchor health in all policy areas. It refers to interdepartmental and cross-policy cooperation and sees health as a task for society as a whole, not just for the healthcare system (Köckler & Geene, 2022). In particular, the experts see education policy and schools as relevant players in promoting dHL: for example, skills that are conducive to dHL could be taught at school from an early age. "So, people often talk about a health in all policies approach. We are currently very much concerned with the issues of sustainability, climate change and health, and that is a similar question to this one. What do we need in order to be able to develop this kind of general competence, this kind of key competence, everywhere, and I think that looking only at the healthcare system is not enough, we need to look at other policy areas. I would mention education policy, for example" (EI8, item 2).

The interviews also asked what role the insured persons themselves play in promoting their dHL. The experts' initial view is that insured persons have a fundamental personal responsibility for their health, a healthy life and therefore also for a high level of dHL. People's personal responsibility is a valuable asset and the prerequisite for self-determined action in the healthcare system. However, in order to achieve this personal responsibility, essential prerequisites must be met, which must be provided by the healthcare system rather than by the insured persons themselves. "Self-responsibility is right at the top, because it is also self-determination. But it has to be said that, of course, self-responsibility can only really be lived in our sense if you are informed, if you can weigh up the benefits and harms, if you know where to get information. (EI2, pos. 6).

In order to introduce insured persons to new topics such as dHL, they must be made aware of the benefits and necessity of a high level of dHL. "Can you force citizens to engage with it, no, not really. I think you really have to go through the transportation of the benefits and advantages to motivate them" (EI5, pos. 12).

Insured persons themselves therefore play a very important role in promoting their own dHL by taking personal responsibility for increasing it. At the same time, however, they are dependent on suitable framework conditions within and support from the system in order to recognize the necessity and benefits of dHL, for example. As outlined above, it is the task of the healthcare system, for example, to create the framework for digital structures, make them public and easily accessible and provide special support services. These must be aimed at specific target groups, in particular people who would be overwhelmed if they had to take full responsibility for their own dHL. "I think some of them are also well positioned. But there are also a lot of people who haven't dealt with it much and where I think you first have to push them a bit so that they are empowered to know their way around it." (EI1, pos. 8) At this point, it can be concluded that the promotion of dHL according to the experts cannot be based solely on educational support measures, but that the necessary conditions and framework conditions must also be created in the healthcare system in order to create an optimal support environment.

Promotion Measures

In the third and final thematic block of the expert interviews, the experts were asked which specific measures should be established to promote dHL. The experts mentioned a variety of possibilities and at the same time also defined guidelines for the design of these measures. As already emerged from the previous explanations, possible measures to promote dHL do not only concern the insureds in terms of educational measures, but also the structures of the SHI system itself. The specific measures to promote dHL can therefore be divided into these two areas, structural and educational measures. In the area of structural measures, the experts primarily mentioned measures that imply the further development of the SHI system for a better promotion of dHL. Educational measures in turn relate to specific measures to promote the dHL of insured persons individually.

Table 11 presents possible structural measures to improve the promotion of dHL in the German SHI system emerged from the expert interviews.

Table 11: Possible structural promotion measures derived from the interviews

Measure	Example quotation
Offer more cost-effective insurance tariffs that incentivize the use of digital health services	And that would also be important, that in future we perhaps create tariffs or models in which people are not punished, so to speak, for not using something, but rather incentivized, in order to still have enough resources to be able to treat those people who are unable to do so. So, it is important that we also try to achieve this in a structural form, and not just through legal requirements or this and that, but that the system also promotes the acquisition of digital health literacy." (EI11, pos. 9)

Measure	Example quotation
Establishment of remuneration structures for measures to promote dHL	"Some of these tasks have to be transferred to other healthcare professionals, who are then remunerated for them. So, nobody can do that on top, it's a huge educational task. Um, and I'm talking about pharmacies, for example, or something like that, if they provide some form of support, for example with activation, with a health ID or something like that, because it's simply low threshold on site, then of course this must be reflected in some form of remuneration." (EI6, pos. 8)
Establishment of structures for testing, evaluating, and implementing support measures	What are good offers for promoting digital health literacy, what are the five central, most important criteria and, correspondingly, how do we want to evaluate them? How do we measure the effects? How do we measure the benefits of these new services? These are tasks that we have to complete in order to make progress. (EI10, pos. 14)
Establishment of new job profiles	"However, it would be possible to offer a new job profile for a medical assistant, or whatever, in the practices, a kind of digital support service and say, in large GP practices or in medical care centres or even in hospitals, we offer this with extra staff, with expertise that then helps, or also in pharmacies."(EI4, pos. 6)
Establishment of health kiosks	If these health kiosks really were to exist, they would also be a good place to say, here, you can talk to them again about the advantages and disadvantages of this. (EI2, pos. 10)

Measure	Example quotation
Adaptation of study programs and training occupations for healthcare professionals to include dHL topics	That brings us to studies. There, of course, it's more about the health professionals that are involved. (EI4, pos. 12)

Note: Author's elaboration.

In the area of educational training measures, the SHI funds in particular described which measures are currently already being taken to promote dHL of insured persons. The approaches mentioned in the expert interviews are shown in Table 12.

Table 12: Current promotion measures named in the interviews

Measure	Description
Prevention programme " Durchblickt " ("see through")	Provision of teaching materials to promote the dHL of pupils, particularly with regard to the use of digital health information (EI11, pos. 25)
Trainings about electronic health record, electronic prescription	Training of older insured persons on digital infrastructure in the SHI system (EI11, pos. 25)
Reimbursement of services to promote dHL	Insured persons can take advantage of offers available on the market and the health insurance company reimburses the costs incurred on the basis of a statutory benefit (EI8, pos. 12)
Patient management in indication-related digital health applications	Telephone advice for Long Covid patients on the possible use of the Fimo app for fatigue symptoms (EI8, pos. 10)

Measure	Description
Project "Gesund digital: Fit für Apps und Internet" ("healthy digital: fit for apps and the internet")	Promoting the digital health literacy of vulnerable groups such as older people or people with chronic illnesses. Insured persons should be empowered to make self-determined use of digital services in the healthcare system through analog (e.g. flyers) and digital (e.g. websites) support (EI12, pos. 14)

Note: Author's elaboration.

The table shows only a very small section of the activities of the health insurance funds, which can be explained by the small number of health insurance fund representatives interviewed. In addition, existing support measures were not the focus of the interviews conducted and are therefore only of limited informative value. The examples reflect the results of the literature research. In line with the previous statements, the "Gesund digital" project is about the cooperation of SHI companies and hospitals to jointly promote the dHL of insured persons. In the "Durchblickt" project, the school setting was even used to promote dHL across all policy areas. However, both projects are measures of individual health insurance funds that have not yet been implemented across the board. In addition, a wide range of ideas were also mentioned in the interviews as to which measures could be used and optimized to promote dHL or how they could be designed in general. In several interviews (EI4, EI6, EI8, EI11), the idea of distributing the promotion of dHL among insured persons with the help of educational measures was raised to different levels of aggregation.

"In other words, I believe that a realistic mandate for health insurance companies is actually linked to a specific need, such as "I have a certain acute illness or I have a chronic illness, I have a certain life event, such as my mother becoming in need of care". There is a point of contact, a touchpoint with the health insurance fund, with the long-term care insurance fund, and then you have to look closely at what information the insured person needs, what digital support options are available, is the patient aware of the entire range of services and benefits? (...) But then the area of building up generalized digital health literacy is still missing and it

would be most effective if this really became more of a public health task, a public health issue." (EI8, item 8).

A general dHL needs to be developed according to experts, which can be achieved through general information campaigns, for example. Best practice examples mentioned in this context were the BMG's vaccination campaign in the wake of the coronavirus pandemic and the Bzga's Aids prevention campaign. "We always cite this "Don't give Aids a chance" campaign by the BZgA as a prime example, with poster advertising at every train station in Germany via cinema advertising, so that everyone really gets it in a funny, attractive offer, so that it is also appealing" (EI11, pos. 8). It is important that the information is made accessible to the masses and disseminated by a trustworthy organization. To reach as many people as possible, various channels from magazines, radio and television to social media should be used. In several interviews, the idea of positioning "the e-prescription before the news" (EI5, EI6) came up in this context. "The first step is to make this known, I recently heard someone who had put forward the idea of providing appropriate support "before the news"" (EI5, pos. 10).

Table 13 illustrates the various possible general and individual measures to promote dHL that were mentioned in the expert interviews.

Table 13: Possible educational promotion measures derived from the interviews

Measures to promote a general dHL	Measures to promote individual dHL
- Information campaigns - Podcasts - Websites - Videos - eLearning - "digital driver's license" - Navigation aids for insureds (e.g. to find contacts)	- Integrative advice at contact points to actors in the SHI system - On-site courses through SHI funds or adult learning - Establishment of local access points such as digital cafés - Integration of dHL in patient trainings (e. g. disease management programmes)

Note: Author's elaboration.

In terms of content, measures to promote dHL should always be designed in such a way that the insured persons themselves recognize the added value of both a high level of their own dHL and digital information and offers. Methods such as storytelling can be used for this (interview with digital health consultant). When designing the approaches, the heterogeneity of the insured persons in relation to the topic of dHL should be taken into account. Some policyholders are already well positioned, while others need more support (EI4). Therefore, the question of which target group is to be reached and how it can best be addressed should be answered for each approach.

For this purpose, it makes sense to use different communication channels in addition to offers in different languages. This means both analog and digital concepts. It can also be helpful to use analog "door openers" in digital structures. For example, flyers could refer to online training courses and thus build a bridge to the digital world. In certain target groups of insureds, experts believe that analog formats cannot be dispensed with at present. "So, the mixture of on-site and, of course, digital offers for the other target groups, that you somehow have a homepage where you can always find out how to activate the electronic health record. And that this is then as easily accessible as possible for the insured" (EI6, pos. 2). In the digital sector, some experts recommend using various formats and new social media such as TikTok to reach as many insured persons as possible (EI11). However, other experts assume that social media is not the right place to reach insured persons, as they do not primarily access information about their health and from their SHI fund here (EI8). Overall, promotional measures should be geared towards users and take their needs into account in order to be perceived as interesting. Two experts suggest involving policyholders directly in the development of support measures in the sense of co-creation in order to best meet their needs (EI2, EI6).

Some experts suggest that measures to promote dHL should also be based on existing examples of best practice. For example, the idea of telemedical insurance tariffs with lower premiums, which incentivize insured persons to use digital services, is already being implemented in Switzerland. "In Switzerland, for example, where there are telemedicine tariffs where you commit to using digital assistance models before you can physically go to the doctor in return for a reduction in your

contribution. So, in the end, that also helps. It sounds a bit like coercion, but sometimes you have to make people happy" (EI11, pos. 13). Setting approaches can be transferred from other projects in the healthcare sector. For example, one expert reports that in a project for the integration of migrants, so-called senior citizens' cafés were helpful as a door opener for increasing the understanding of health-related topics through mutual exchange (EI3). Such an environment could also be used for digital health topics. The experts also draw many lessons from the coronavirus pandemic with regard to measures to increase dHL. For example, the BMG's vaccination campaign was cited as a best practice example of a comprehensive and effective advertising campaign across all population groups (EI4). The Corona-Warn-App, which was new for everyone at the time, was a complete success thanks to the education of insured persons by local pharmacists. This could also be applied to digital healthcare issues (EI6). "And I think it worked particularly well with the Corona Warn app, for example, pharmacists were used as an analog touchpoint that is easily accessible for everyone, and very high download and user numbers were achieved as a result. Even among people who have not yet come into contact with digital health products, to take this as an example of how it could work for other launches that we are about to make or that are already underway. In other words, a mixture of on-site and, of course, digital services for other target groups, so that you somehow have a homepage where you can always find out how to activate the electronic health record. And that this is then as easily accessible as possible for the insured" (EI6, pos. 2).

In general, several experts suggest that the topic of dHL should always be integrated into the respective context and touchpoint of the insured person, utilizing existing structures in the healthcare system. For example, insured individuals who inquire with their SHI about applying for an individual health topic could be directly advised by staff on digital information and care services and informed about how to use these options (EI11). This way, the topic of dHL should be thought of integrative and become a natural part of the system rather than being treated as a special topic. Overall, the experts point out that it is still unclear which measures will truly achieve the goal of promoting dHL among the insured. While there are various ideas for specific measures, it remains to be seen if they are the right approaches. Therefore, both the courage to try new things and the development of evaluation concepts for these measures are crucial. One expert suggests

Finally, the experts emphasize the importance of considering the funding for services aimed at promoting dHL. If traditional healthcare professionals are to take on educational tasks in the future, or if new roles such as digital companions are to be established, these efforts must also be appropriately compensated (EI4, EI6). "Starting there and saying we'll put someone there to help is of course an option if you get the funding" (EI4, pos. 6). Figure 17 provides a summary of the experts' recommendations for designing measures to promote dHL. Larger words were mentioned more frequently than smaller ones.

A word cloud visualization of terms related to the research project. The most prominent words are "training", "project", "responsibility", "different", "arrange", "communication", "health services", "information", "self", "concrete", "trustworthy", "motivation", "user centrality", "network", "evaluation", "empower", "transparency", "campaign", "dynamic", "whole of society", "incentives", "setting", "together", "necessity", "consulting", "involve", "integrative", "contact person", "creativity".

Note: Author's representation.

Future development

In a final interview question, experts were asked how they envision the dHL of individuals with statutory health insurance in Germany in ten years. In ten of the twelve interviews, experts predicted a positive development, expecting dHL to be more advanced. Overall, experts largely agree that insured individuals' dHL must improve and is likely to develop positively. However, two lines of reasoning emerge regarding the causes of this positive development: one group of experts believes that dHL will increase because insured individuals will proactively engage with digital healthcare topics, utilize support measures, and view these as "self-evident requirements of the insureds towards health insurance funds and understood as self-evident offers by all health insurance funds to the insured" (EI10, pos. 18). The second group of experts, however, believes that dHL will improve because digital services will become an integral part of healthcare, compelling insured individuals to engage with these topics reactively, almost out of necessity, in order to continue participating in healthcare services: "because digitalization will have progressed accordingly by then and patients without such digital health literacy would no longer really be able to find their way around the healthcare system" (EI12, pos. 19). In this perspective, support measures are seen as having a lesser role in advancing dHL. Additionally, two experts offer a more critical outlook: one expert foresees improvements in dHL only within specific subgroups, while another emphasizes the importance of overcoming structural challenges in embedding this topic within the healthcare system as a prerequisite for any significant improvement: "It will only be subtly better, because we are finding it difficult to overcome the current interdependencies and structures, even though we are making every effort. But I hope that things will perhaps move faster after all" (EI11, pos. 28).

Key Findings

All in all, the expert interviews intend that to successfully promote dHL, not only individual skills must be strengthened, but also systematic framework conditions must be further developed. These areas must also interact more closely as part of a holistic approach. Similar to the eHealth literacy framework presented by Norgaard et al. (2015), it is essential that, along with the establishment of support

measures, the framework conditions and responsibilities within the SHI system align. This approach must consider the overall interaction between insured individuals and the SHI system. In terms of framework conditions, it is necessary to raise a stronger awareness of the opportunities that digitalization offers, helping to better communicate the benefits of digital healthcare. Furthermore, it is evident that the shift towards viewing patients as informed, autonomous individuals is closely linked to dHL. Experts see dHL as a prerequisite for insureds to act as autonomously as possible within the SHI system.

To promote dHL, experts also consider it essential for the structures within the SHI system to evolve. Here, a strong connection between systemic conditions and support measures is apparent. Digital structures should be further developed to make digital healthcare offerings a part of everyday care and enable their reliable use. To help insured individuals adopt these offerings, structural incentives, which are currently lacking, should be created. At present, insured individuals can still navigate the SHI system fairly well without using digital structures like electronic prescriptions. Additionally, the conceptual understanding of dHL within the German SHI system is a key framework condition. Only through shared goals, a unified definition, and continuous development of the concept additional responsibilities and measures for promotion can be derived.

At the stakeholder level, specific SHI actors and their roles in promoting dHL were defined based on the expert interviews. The role of health insurance funds, for example, which are seen as bearing significant responsibility for promoting dHL, can be described as a "navigator." This means they should actively inform insured individuals about digital health offerings at their various touchpoints and take on a proactive role in shaping support measures. It also became clear that, alongside health insurance funds, additional actors are needed to address this task. Each actor can contribute to enhancing individual dHL at their respective touchpoints along the insured individual's journey. Physicians and other healthcare professionals primarily play an advisory role, supporting digital treatment options, acting as positive advocates, and generally fostering the establishment of digital structures within their practices. Through targeted actions, such as counseling sessions, these actors can help improve an individual's dHL as individually needed, based on specific situations or health concerns. User- and target group orientation

are, again, two key concepts that should guide actions in order to achieve high acceptance among insured individuals.

In addition, politics plays a special role, as it does not only act as a regulator but is also expected to contribute to the development of general dHL and raise public awareness on the topic. In the area of general dHL, training and informational offerings could also be established to help promote dHL. In the interviews, a variety of approaches for potential roles and tasks of the different stakeholders were collected, which can be concretized and validated in the Delphi study.

Many points of criticism found in the literature were also confirmed in the interviews. In addition, further ideas were generated on how the promotion of dHL in Germany could be improved and made more comprehensive. Despite conflicting opinions in some cases, the general need to address the topic proactively and in the sense of a more holistic approach is evident. The interplay of framework conditions, responsibilities, and measures represents a central development in promoting dHL in Germany, as currently only health insurance funds are required to offer measures for promoting dHL. The structural aspect, however, is often overseen in discussions. The ideas and opinions from the expert interviews, along with the findings from the literature analysis, were further used to develop the Delphi survey. The study aims to bring together a comprehensive picture of the experts' opinions and serves as a starting point for practical recommendations for action. The corresponding conceptual steps are explained in the following chapters.

4.4. CONDUCTION OF THE DELPHI STUDY

4.4.1. General Procedure of the Conception

In general, the goal of an own empirical study can be achieved using various scientific methods. The aim of this study is to derive recommendations for promoting dHL among individuals with statutory health insurance in Germany. Since there is limited and uncertain knowledge on this topic, expert opinions are intended to substantiate this knowledge. Such insights can be gathered particularly through surveys. Similar to the Delphi survey are single-round expert interviews

or group discussions. All three methods enable the aggregation of expert opinions and the structuring of complex topics. Group discussions are particularly characterized by the spatial gathering of experts in one location. During these discussions, strong group dynamics can emerge, potentially leading to opinion leadership and group pressure regarding the responses given. Participants receive immediate feedback during the discussion process, which can stimulate cognitive processes. In expert interviews, however, respondents are typically interviewed individually and do not need to be in the same location.

This approach gathers individual responses that are not influenced by group dynamics. Generally, respondents do not receive feedback on their answers, so further cognitive processes are not specifically triggered. Compared to Delphi surveys, expert interviews and group discussions are often quicker to conduct, mainly because Delphi requires repeated survey rounds. However, the advantage of Delphi lies in its iterative feedback process, where experts can reconsider their responses in each round based on the overall results (Chalmers & Armour, 2019, p. 715 f). Anonymity in the Delphi method also reduces conformity pressure. Thus, compared to the other two methods, the Delphi technique enables both the elicitation and qualification of expert opinions, as it minimizes disruptive group influences while incorporating a feedback mechanism (Häder, 2014, p. 66). In line with the objective of this study, a Type 3 Delphi study was conducted to gather, qualify, and transform expert opinions into actionable recommendations.

The design of the Delphi study was based on findings from a prior literature review and qualitative expert interviews. Insights from the literature review contributed specifically to formulating theses on competency requirements within the SHI system and the conceptual understanding of dHL in Germany. The interviews helped generate theses on future changes in the framework conditions, responsibilities, and measures for promoting dHL. Together, the literature review provided a snapshot of the current state of dHL promotion in Germany, from which forward-looking theses could be defined based on interview findings. In planning the Delphi study, the approach proposed by Häder (2014) was taken into account. According to this model, designing a Delphi study involves fifteen central steps, which are presented in Table 14.

Table 14: Fifteen steps of conducting a Delphi study

No.	Step
1	Operationalization of the research question
2	Determination of the Delphi-type
3	Definition of the required expertise
4	Determination of the access mode to the participants
5	Definition of personal and financial resources
6	Development of the survey instrument
7	Planning of follow-up actions
8	Development of a pretest-strategy
9	(Preliminary) decision on number of survey waves
10	First survey wave
11	Monitoring of response/ fieldwork
12	Preparation of survey for the next wave
13	Repetition of survey wave
14	Presentation of results
15	Post-Delphi survey

Note: Adapted from Häder, 2014, p. 81 ff.

At the beginning of designing a Delphi study, (1) the research question is operationalized, which can be done through a qualitative survey or by the Delphi study's monitoring team. Operationalization systematically structures and makes the question measurable. Based on the study's research focus, (2) the type of Delphi survey is then selected. Here, it is also essential to consider whether the survey aims to reach a consensus. Next, (3) the necessary expertise for answering the research question is defined. Adequate time should be allocated to assembling an expert

pool, especially when addressing complex or diffuse issues. The structure of the expert panel can generally be derived from the study's research interest.

To (4) determine the mode of access to participants, various channels such as mailed questionnaires, online surveys, or personal interviews can be used. In terms of the study's framework, it is also important to consider (5) the resources available for the research project, including financial resources, personnel, time commitments, and tasks that can be delegated.

After these preliminary considerations, the actual design of the Delphi study begins. First, (6) a standardized data collection instrument, such as a thesis paper or questionnaire, is developed, with the theses or questions derived from the research question. To ensure a high response rate for the thesis paper, (7) follow-up actions are planned, and strategies for organizing and documenting responses are established. Next, the thesis paper undergoes (8) a pretest to ensure that it gathers the expected information. Conducting a pretest is considered good scientific practice in Delphi studies; if resource constraints prevent it, the entire survey should be reconsidered. Before launching the survey, (9) the planned number of survey rounds must be determined. Then, (10) the first survey wave is conducted. During the field phase, (11) responses are monitored and documented, while (12) preparations for the second survey wave can begin. This primarily involves adapting the thesis paper to incorporate feedback from the first round. Once this adjustment is complete, (13) the survey wave can be repeated as many times as necessary, followed by (14) the presentation of the results. Finally, for future study improvements, (15) a post-Delphi survey is recommended (Häder, 2014, p. 81 ff).

It should be noted that this work is part of a doctoral project, conducted independently, and therefore does not have a monitoring team available. Additionally, as of now, there is no plan to repeat the survey, which is why conceptual steps (5) Definition of personal and financial resources and (15) Post-Delphi survey will not be further considered in this study. The implementation of the remaining conceptual steps within the context of the present Delphi study will be detailed in the following chapters.

4.4.2. Specification of the Research Subject

To design the Delphi study effectively, the first step is to refine the research objective by clarifying the research question. Broad questions, such as how something may evolve in the future, tend to yield only general answers, and offer limited scope for deriving actionable recommendations. Therefore, general terms within the research question must first be theoretically grounded and more specifically defined. Additionally, it is important to determine which dimensions of the issue will be considered in the study and which will not. The goal of this refinement is to break down abstract matters, distinguishing essential elements from non-essential ones, to focus on the core aspects relevant to the research objectives (Häder, 2014, p. 92).

A recommended approach for this – particularly in the context of Delphi studies – is facet theory. A criticism of the Delphi methodology is the lack of rigor in its methodological guidelines. By structuring the research question using facet theory, this issue can be addressed (Häder, 2014, p. 96). The facet theory was developed by Guttman (1959) and is a methodology that allows the systematic integration of theoretical foundations, research planning, and data analysis of complex relationships (Hegenbart, 2019, p. 109). At a higher level, complex, interconnected behavioral and social science phenomena are addressed, rather than individual cases. Originally, facet theory was associated with the fields of education and psychology and has only gained greater significance in recent decades. For example, in the year 2000, 326 contributions to facet theory and its application were published, whereas in 1985, there were only two (Williams et al., 2010, p. 1). Facet theory helps in systematically formulating questions, analyzing answers in a structured way, and establishing connections between the characteristics of the questions and the collected data (Borg, 1996, p. 231).

The theory distinguishes between two forms of methodology. The first is exploratory factor analysis (EFA), which is used when the research focus is on generating opinions. As the name suggests, EFA is characterized by an exploratory approach. It involves investigating the topic to later derive precise hypotheses or questions for a survey. This implies that, at the beginning of the research, there are no expectations regarding the number or nature of the specific variables of the research question. In contrast, confirmatory factor analysis (CFA) aims to prove or

disprove predefined theoretical assumptions. Therefore, a theory or model is tested based on a set number of variables that have been defined a priori (Williams et al., 2010, p. 3).

Factor analysis serves eight objectives: (1) reducing the research question to its essential variables and (2) examining the structure and relationships of these variables. It also enables (3) the assessment of the one-dimensionality of the theoretical construct and (4) the construct validity of scales, tests, or instruments used. Additionally, it allows for (5) the development of an analytical framework for interpretation and (6) addressing the multicollinearity of two or more variables. Overall, factor analysis can be used to (7) develop theoretical constructs and (8) confirm or refute proposed theories (Williams et al., 2010, p. 2). Since the goal of the Delphi study is to gather and aggregate expert opinions on new competency requirements for insured individuals in the German SHI system and related measures to promote dHL, an EFA was conducted.

For this purpose, based on Borg (1986, p. 121 f), the research question was initially divided into three domains: Stimuli (S), Person (P), and Response (R). Here, (S) describes the set of stimuli, situations, and questions; (P) represents the set of individuals or respondents; and (R) denotes the range of responses or answers. These three domains interact with each other, as Borg (1986, p. 122) describes using the Cartesian product ($S \times P \rightarrow R$). This means that the encounter of a person p from (P) with a stimulus s from (S) leads to exactly one response in (R). Applied to the research interest of the Delphi study, this means the following: given the situation (S) in which digitalization leads to new digital health services and SHI-insured meeting new competency demands, the SHI system (P) as the respondent is tasked with adapting existing structures and support measures (R) and further developing the concept of dHL to best prepare its insured individuals for a digital health system and to actively shape this transformation process. This specification of the research question focuses the Delphi study particularly on the concept of dHL and the further development of support measures on both structural and educational levels. Additionally, it is essential to examine new competency requirements (S) and identify possible facets that may be represented in responses (R).

Facets form the foundation of facet theory and represent a set of different elements that describe attribute characteristics quantitatively or qualitatively

(Hegenbart, 2019, p. 111). Borg describes them as characteristics used "to distinguish the elements of a subject area into different types" (Borg, 1996, p. 231). Facets can, for instance, specify gender as "male" and "female" or categorize income into specific income classes. Besides individuals, facets can also be applied to test items, behaviors, experimental situations, or questions, thereby characterizing a type within a decomposed subject area. Research studies typically address only a few facets given the scope of the study, though in principle, the number of facets can be unlimited. Facets are visualized and contextualized using a "mapping sentence," which provides a structured framework to derive theses and questions for a survey (Borg, 1996, p. 231 f). For the Delphi study, four facets were formed based on the research question (Figure 18).

Figure 18: Facets of the research question



Note: Author's elaboration.

The first facet (F1) describes the various new competency requirements that SHI-insured individuals face as a result of digitalization in the SHI system. The second facet (F2) discusses the changing roles and responsibilities of key stakeholders within the SHI system to promote dHL. Facet 3 (F3) then addresses the conceptual understanding of dHL in the SHI system, emphasizing the need for a shared

understanding and unified goals to provide a framework for support measures. To derive specific recommendations for implementing these measures, the fourth facet (F4) was defined, focusing on both structural and educational interventions. The definition of these four facets is intended to encompass the research objectives of the Delphi study. The next step involves further specifying these facets by identifying key elements relevant to the study.

To further differentiate the research question and its facets, two options are available. Firstly, the monitoring team can take on the operationalization and, if needed, consult external experts or specialist committees for input. Alternatively, a qualitative round of interviews can be conducted to clarify and refine the problem statement (Häder, 2014, p. 82). In the case of the present Delphi study, in addition to the facet-theoretical examination of the problem statement, a qualitative round of interviews was conducted. Häder (2014, p. 121) recommends conducting such a preliminary round, also called a "zero round," to generate a broad spectrum of baseline statements that can subsequently be assessed using standardized survey methods. This approach also helps prevent a one-sided orientation in the research. Additionally, conducting a preliminary round is advisable if the operationalization of the problem statement is not carried out by a monitoring team. Since the Delphi study in this case is self-organized, the interviews serve to include expert opinions to validate and refine the initial situation. To further ensure the precision of the research question, it and all subsequent steps were regularly discussed and refined with research colleagues. Overall, through the interviews conducted in the Delphi study, a diverse range of opinions on the four defined facets was gathered, allowing further definition of the research question.

Regarding Facet 1 (F1) "New Competency Requirements," experts highlighted both the handling of digital health information and competencies needed for using digital health services. They also emphasized that patients are expected to take greater personal responsibility for their health. The experts noted that patient communication with SHI system actors is shifting due to digitalization, as in-person consultations are increasingly replaced by digital channels or asynchronous communication methods.

In the context of the second facet (F2) "Actors of the German SHI System," experts discussed the need for evolving job profiles and responsibilities within the

SHI system. All SHI system actors, based on their individual roles and points of contact with insured individuals, should contribute to promoting dHL. Additionally, experts called for new professional roles and actors specifically focused on this objective, highlighting the importance of interdisciplinary collaboration. For Facet 3 (F3) "Concept of dHL," experts identified the necessity of creating a shared understanding of dHL, establishing common goals, and continuously advancing and evaluating the concept within the SHI system. In the scope of the fourth facet (F4) "Promotion Measures," the focus was placed on structural and educational initiatives to support the promotion of dHL.

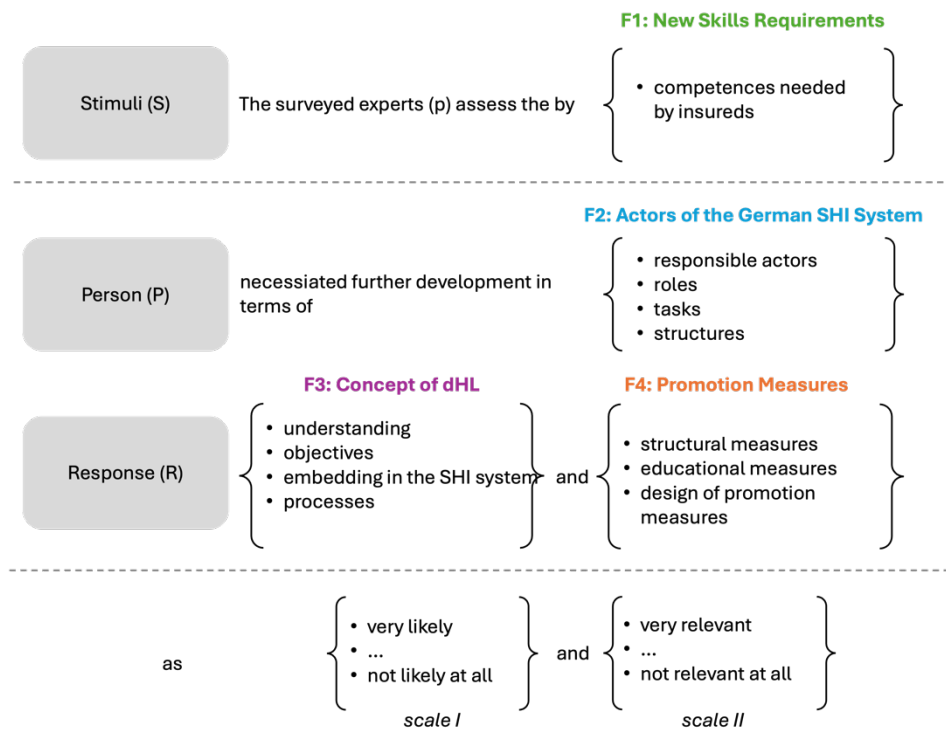
Using the interview results, the research problem was coded into the four facets. Finally, the structure of these facets, with their respective elements, is represented in a mapping sentence as proposed by Borg (1996, p. 232). Based on the mapping sentence, it is possible to construct the items for the thesis paper, as the relationships between the facets are reflected. The mapping sentence for the Delphi study is visualized in Figure 19.

The mapping sentence is the result of the further specification of the research question with the help of the facet theory. The sentence "The surveyed experts (p) assess the by (F1) "New skills requirements" necessitated further development in terms of (F2) "Actors of the German SHI system", the (F3) "concept of dHL" and the (F4) "promotion measures" forms the starting point and, at the same time, the framework for the further design of the Delphi study. With the help of the mapping sentence, initial considerations for the design of the survey can already be made. In particular, it will already be considered which scales will be used to empirically measure the items (Borg, 1996, p. 232). Furthermore, the figure illustrates the Cartesian product in a more differentiated form. The SHI system, as the recipient of responses (P), is represented in the Delphi study by its associated stakeholders with expertise in dHL. Since the goal of the Delphi study is to derive recommendations for promoting dHL among GKV-insured individuals, the experts are presented with theses to evaluate in terms of relevance and implementation probability.

These two scales can be identified in the mapping sentence and are used in the Delphi study. The digitalization of healthcare brings new competency requirements for SHI-insured individuals. In this context, various stimuli (S) necessitate

further development in promoting dHL. The mapping sentence serves as a framework to combine different stimuli (S) within the facets and ultimately make predictions and recommendations for the future development of dHL promotion. The experts assess the extent to which the SHI system will respond to these developments (R).

Figure 19: Mapping sentence



Note: Author's elaboration.

4.4.3. Choice of Experts

According to the approach proposed by Häder (2014), the next step after operationalizing the research question is the definition of the required knowledge to

address the research problem by the experts. Landeta et al. (2011, p. 1630) characterize this step as challenging: "it is not easy to locate them, they tend to have little time at their disposal, [...] they have needs and interests different from those of researchers, they tend to be hard to pin down in their answers, they may have fears, personal characteristics and assumed roles that limit their responses, and so forth". Since Delphi surveys generally do not involve the random selection of experts, as in conventional survey research, where the goal is to assess the opinions of all experts, this conceptual step must be conducted with particular care and structure (Häder, 2014, p. 97). In three key steps, the structure of the panel must first be defined, for which selection criteria must be established that divide the respondents into different participant groups. Traditionally, the professional background can be a suitable criterion. Next, the necessary number of respondents is determined. In the third step of expert selection, it is established how the participants' contact information will be obtained and how they will be approached to work on the thesis paper (Häder, 2014, p. 3). The application of these three steps within the framework of the present Delphi study will be described in detail below.

Structure of the Expert Group

To assemble the expert group for the Delphi survey, the required expert knowledge must first be identified. Ideally, a broad range of expert opinions should be gathered and considered (Niederberger, 2021, p. 880). When experts are officially designated as such, and the level of expertise required is determined depends largely on the subjective judgment of the monitoring team or the researcher. There is no methodological standard for this. As a result, it is often difficult in Delphi studies to define the total population of required expertise or to select experts based on a clearly defined overall population. Therefore, it is helpful to align the expert selection with the research goal. Based on the research goal, selection criteria can be defined, which will guide the selection of experts (Häder, 2000, p. 2 f). For transparency, it is essential to provide a sound justification and thorough documentation of the expert selection process (Häder, 2014, p. 112).

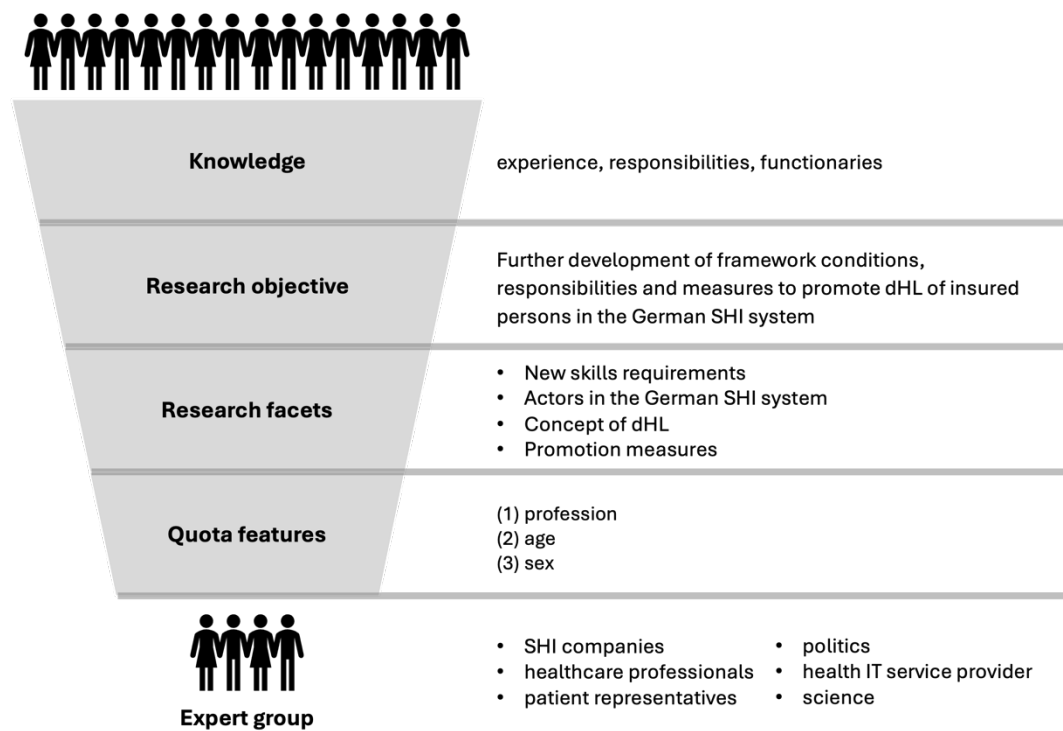
The selection is typically made knowledge-sociologically by attributing corresponding competencies. An expert is, therefore, someone who can demonstrate specific knowledge or experience in a particular subject area. This knowledge is

often reflected in some form of institutionalization (Niederberger, 2021, p. 879 f). This can include, for example, membership in an advisory board or an expert commission, holding a professorship (Bogner et al., 2014, p. 11), or publishing works in the relevant field of study (Niederberger, 2021, p. 880). Experts may also be decision-makers who are responsible for the research problem being addressed (Häder, 2014, p. 108). Furthermore, it is advisable to select individuals who have influence over the potential implementation of the study's findings (Duffield, 1993, p. 228). Thus, an expert is also defined by the connection between the research goal and their social representativeness (Bogner et al., 2014, p. 11).

In addition to selection criteria related to knowledge and experience in the research field, it is recommended to define quota characteristics, such as the professional field of activity. This is because, for example, an expert's professional background can have a strong influence on their responses. Experts who are actively working in the subject area being assessed may be more optimistic about its future than others (Häder, 2014, p. 98 ff). To avoid "overestimation bias," it is advisable to have a diverse composition of experts from different professional fields, such as business, academia, and others. Although a Delphi survey explicitly gathers expert opinions and cannot be considered representative, the use of quota characteristics helps prevent a one-sided focus in the research. Additionally, the age composition of the expert group can play a crucial role, as younger individuals often respond differently than older ones. Thought should also be given to the gender composition, as women are often underrepresented in surveys (Cuhls, 2019, p. 21). To ensure the quality of the expert selection, Delphi surveys often ask participants to self-assess their expertise in a specific field. In this process, respondents independently rate their level of expertise using a Likert scale (Cuhls, 2019, p. 20).

Figure 20 illustrates the selection process, with the underlying selection criteria, and the final composition of the expert group for the present Delphi study.

Figure 20: Choice of experts within the Delphi study



Note: Author's elaboration.

In the context of the present Delphi study, the required expertise was first located based on the research objective and the central themes of the study. The facets derived through the precision process using the facet theory were used as the basis, as they cover the research interest. In the second step, quota characteristics were defined to avoid a one-sided orientation of the research process and to reflect the diversity of opinions and competencies of the experts surveyed. Furthermore, this approach should allow for the analysis of the relationship between certain quota characteristics and a specific response behavior in the later evaluation. The quota characteristics refer to (1) profession, (2) age, and (3) gender.

Based on the research objective, the facets, and the quota characteristics, stakeholders in the context of the German healthcare system with expertise in the

area of dHL were defined as experts. Especially considering that the German SHI system was identified as a central reaction carrier in the context of the further development of frameworks, responsibilities, and measures to promote dHL, the participation of relevant actors is of high importance. The actors within the SHI system itself are those who, through their daily actions, can contribute to the implementation of the findings of the research. With regard to (1) profession, the SHI funds, and policymakers, due to their legal duties or decision-making power, play a key role in promoting dHL. Therefore, staff members from SHI funds and health policy professionals at the state and federal levels were invited to participate. To capture as many opinions as possible and to involve stakeholders with interfaces to the concept of dHL in the proactive development, other professional groups such as healthcare professionals, health IT manufacturers, and their respective associations were also included in the survey. Since the goal is to promote the dHL of GKV-insured individuals, patient representatives were also included. A direct survey of GKV-insured individuals was dismissed, as it was assumed that the insured themselves would not have sufficient expertise on the topic due to the novelty of the subject (Cuhls, 2019, p. 22). The panel is complemented by experts from academia who conduct research on the topic of dHL, and whose expertise in the field is therefore highly expected. In total, this results in a heterogeneous group of experts who can contribute both practical experiences and theoretical insights to the study. Additionally, through the diverse focal points of the participants, all facets of the Delphi survey can be covered, ensuring a comprehensive approach to the research question.

Even though demographic factors such as gender and age are not necessarily considered primary criteria for expert recruitment (Häder, 2014, p. 100), both attributes were surveyed in the context of this Delphi survey. This was done to make any potential influence of these factors on the survey results traceable. Regarding the topic of dHL, for example, it can be assumed that younger and older respondents may have differing levels of knowledge, attitudes, and experience. Younger respondents, in particular, have grown up with digital technologies and tend to be more familiar with digital health services (Dathe et al., 2024, p. 18). Therefore, the demographic factor (4) age was included as a quota criterion, ensuring that different age groups were addressed in the survey. In the survey itself, respondents' ages

were collected based on age groups to capture potential generational differences in experience with digital health tools.

Number of Needed Experts

There are different approaches and recommendations for determining the size of an expert panel. For instance, Cuhls et al. (1996, p. 13) suggest involving as many participants as possible to balance out individual biases and preconceptions. Since there is uncertainty about future events, the prognosis derived from a Delphi study can be improved in terms of its likeliness of occurrence. Cochran (1983) also states that larger panels can reduce the error-proneness of Delphi surveys. However, no consistent methodological approach for determining the size of the expert panel has emerged over the years.

Due to the lack of explicit rules, it is as already mentioned advised to closely align the selection of experts in a Delphi survey with the specific objectives of the study (Häder, 2014, p. 104) and to take into account the number of theses and topics (Cuhls, 2019, p. 22). Important factors influencing the determination of the expert group size also include expected response rates and panel mortality. Both are difficult to estimate in advance for Delphi surveys and are often closely related to the method of data collection. Postal surveys generally achieve higher response rates than online surveys, which is probably reasoned in the increasing prevalence of the latter. A response rate of 20% in the first round is considered realistic and serves as a reference point for determining the panel size. In the second round, the response rate for postal surveys is between 70% and 80%, with online surveys being slightly lower (Cuhls, 2009, p. 212 ff). The biggest challenge seems to be attracting participants for the Delphi survey in the first place. Experts who have participated in the first round are more likely to continue engaging in the subsequent rounds (Niederberger, 2021, p. 881).

In Delphi studies of type 3, the selection of experts is primarily carried out through a deliberate selection process (Häder, 2014, p. 101). This approach was applied in the present Delphi study, where experts in the healthcare sector with relevance to the topic of dHL were specifically recruited. The guiding principle was that the validity of the study increases with the number of participants. The number

of participants in a Delphi survey should also be large enough to allow for the intended analyses (Cuhls, 2019, p. 21). Therefore, when determining the panel size, consideration was given to the framework conditions and possibilities of a self-organized study, ensuring that the sample size was adequate for statistical analysis. The expected response rates specific to the method formed the basis for this determination.

For further planning, the population of study participants must be determined. This involves identifying all individuals who are eligible for participation based on predefined characteristics. Based on this, it is then decided whether a full survey (census) or a sample survey should be conducted. In a full survey, all members of the population are surveyed, whereas in a sample survey, only subsets of the population are included (Häder, 2000, p. 4). It must be considered that the responses gathered only relate to the included participants and cannot be used for inferential statistics, as this is a deliberate selection of experts and not a random sample (Häder, 2000, p. 7 f). In the case of knowledge and experience in the German SHI system with a focus on dHL, no population could be determined. Therefore, based on the described selection criteria, 79 experts were deliberately chosen for the Delphi survey.

Finding and Contacting Experts

Once the structure and required size of the expert group have been determined, the next step is to locate the experts in person to conduct the survey. For this, it is recommended to create a contact database in which all necessary information is documented (Häder, 2000, p. 9). The internet has made it easier to find contact details, but this step still requires considerable effort. In addition to internet searches, professional directories, databases, and membership lists can also be used (Cuhls, 2019, p. 21).

For the Delphi study, the contact information of the experts was obtained through internet research. This process was relatively straightforward, as most contact details were publicly available on websites or in membership directories. The internet search was based on the specific research area of the study and the defined selection criteria. In addition to the online search, publications on dHL were reviewed, and further experts were identified from these sources. Recommendations

from research colleagues were also assessed for their relevance. Social media networks, such as LinkedIn, were additionally utilized. All contact information was organized into a structured database to ensure clarity and to document the contacts made. The addresses of individuals who participated in the preliminary expert interviews were also included in the database, with prior consent obtained from all participants in the preliminary study.

In Delphi surveys, it is especially important to maintain high motivation among participants. This is due to the fact that they must complete multiple rounds of surveys, and there is generally an increasing number of surveys being conducted. It has been observed that participants are more likely to engage in surveys that they find personally relevant and interesting. Ensuring that the study aligns with their professional interests and expertise, and emphasizing the impact of their contributions, can help sustain experts' engagement throughout the survey process. Additionally, clear communication about the importance of their insights and the potential outcomes of the research can further enhance participation and commitment (Cuhls, 2019, p. 20). To achieve the highest possible response rate and ensure minimal barriers to participation, the participants were initially contacted via email to inform them about the Delphi study and request their participation. The emails included a personalized cover letter, details about the research topic, and an overview of the planned research process. At this stage of the contact, a transparent overview of the two Delphi rounds was provided. The focus was also on the benefits of participation. The relevance of the topic for the German healthcare system was emphasized, which implicitly highlighted the importance of the experts' input. The email also conveyed the opportunity for participants to contribute their expert knowledge, motivating them to help advance the development of the under-researched field of dHL. The responses from the experts varied. Of the 79 experts contacted, 21 responded and confirmed their participation in the survey. Two experts indicated that they could not participate due to time constraints or lack of expertise. However, alternative contacts were provided in these cases, and after verifying their suitability, they were also invited to participate, with all agreeing to join. After two weeks, a reminder email was sent to the experts who had not yet responded to the initial invitation. This resulted in the recruitment of 9 additional experts for the study. In total, the expert group consisted of 36 participants, yielding a response rate of 45.6%.

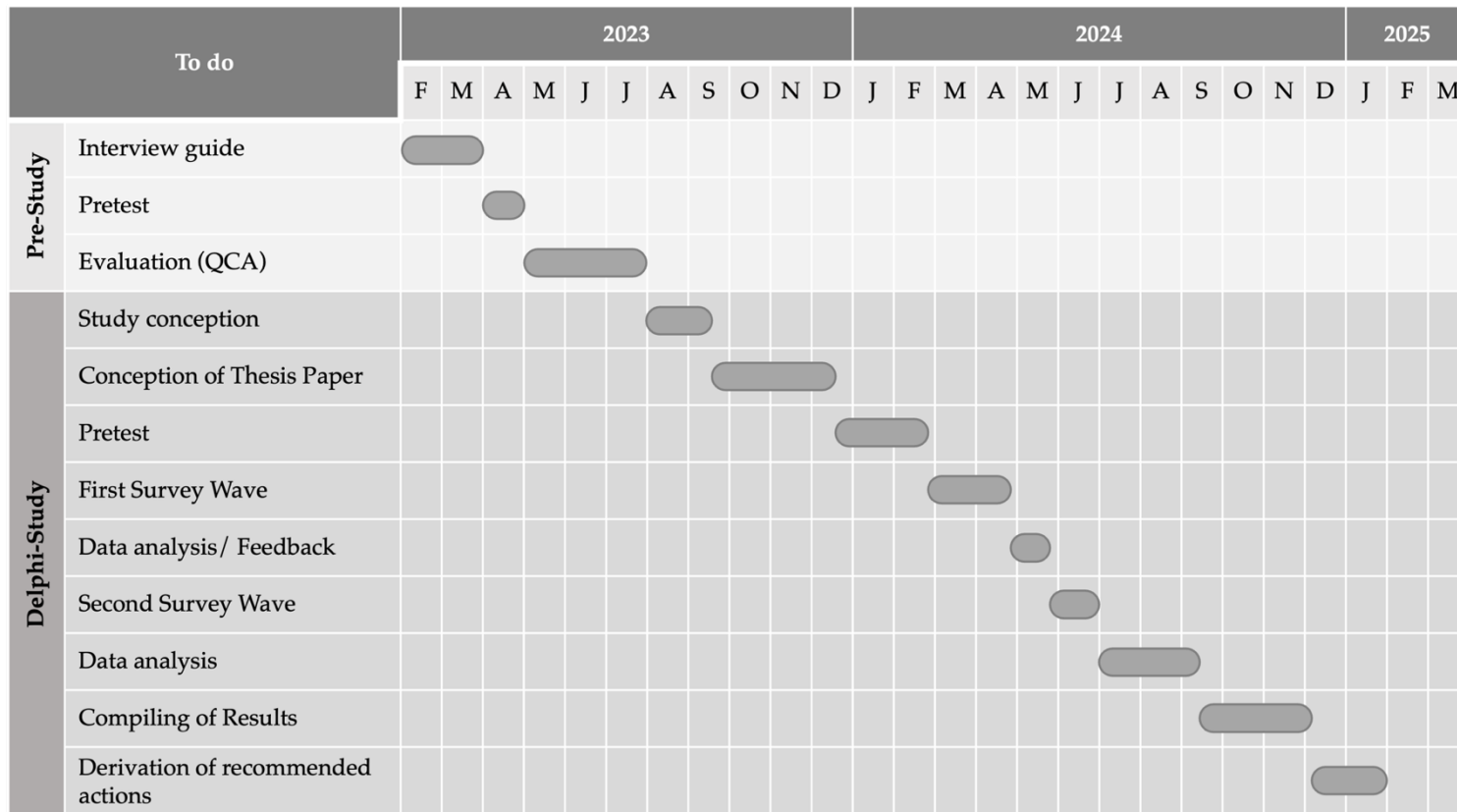
4.4.4. Conception of the Theses Paper and Implementation of the Delphi Study

After the research topic of the Delphi study was defined and the expert panel was assembled, the conceptualization and, ultimately, the execution of the Delphi study took place in parallel. During the planning phase, a Gantt chart (Figure 21) was created to structure the research process, outline key milestones of the project, and monitor the timeline. This Gantt chart provided a clear visual representation of the project schedule, helping to track the progress of each stage, allocate resources efficiently, and ensure that each milestone was met within the planned timeframe. It also served as a tool for maintaining oversight and adjusting timelines as needed to address any potential delays or changes in the project.

The approach to conceptualizing the Delphi study, as in the previous steps, was mainly guided by Häder (2014). The first step in the study's conceptualization was the development of the survey instrument. This instrument is considered the core of a Delphi survey, and although it generally follows the same requirements as standardized questionnaires, there are some specificities to consider (Niederberger, 2021, p. 881 f). One of the key features of Delphi surveys is the ability to conduct multiple rounds and provide feedback. Central to Delphi surveys are typically short, concise statements (theses) that the experts are asked to evaluate, which is why the term "thesis paper" is often used. In addition, open-ended questions are incorporated to gather more detailed responses and to allow the experts to elaborate on their views. These features are essential for generating comprehensive insights and refining the study's findings through iterative rounds (Cuhls, 2019, p. 19).

Although Häder (2014, p. 126) recommends postal mailing for questionnaires, an online survey was chosen for this study for several reasons. First, the available resources for postal surveys would have been more demanding, which made the online method more feasible. Additionally, while email addresses of the identified experts were typically easy to find, researching specific physical addresses proved to be more time-consuming and challenging. One of the main advantages of conducting an online survey is the faster delivery time compared to postal mail, which is subject to delays due to shipping and processing.

Figure 21: Gantt-Chart for the Delphi study



Note: Author's elaboration.

Another benefit is the direct availability of the data in electronic form, which can be readily exported for statistical analysis. This eliminates the time-consuming and error-prone step of manual data entry required in postal surveys. These considerations made the online survey method more efficient and suitable for this study. From a financial perspective, the online survey also offers significant advantages, as there are no postage costs for sending and receiving materials. This makes it a more cost-effective option compared to postal surveys, which incur expenses for printing, mailing, and return postage (Cuhls, 2019, p. 11). Online survey tools are sometimes even available for free, contributing to further financial savings. For the Delphi study, LimeSurvey was selected as the tool of choice, as it provides comprehensive features and complies with data protection regulations. A central aspect of Delphi surveys is ensuring the anonymity of the respondents, which was also prioritized in this study. This anonymity enhances both the credibility of the survey and the willingness of experts to participate, as it fosters a more open and honest exchange of opinions (Cuhls, 2009, p. 210). It was crucial for the survey tool to allow the conduction of anonymous surveys without collecting personal data such as names, email addresses, or IP addresses, which is a feature that LimeSurvey meets. By ensuring this level of anonymity, the study can maintain the confidentiality of the participants, thus encouraging more candid and unbiased responses.

A central challenge when designing online surveys is to design them in such a way that a high response rate is achieved and dropouts are avoided as far as possible (Häder, 2014, p. 127). It is therefore important to ensure a visually appealing presentation and good There are corresponding references to this in the literature, which were taken into account in the design of this Delphi study. The survey itself was preceded by a welcome page, which was intended to help create orientation and increase the motivation of the participants. In addition to the cover letter by e-mail, the procedure of the Delphi study was explained descriptively and visually, also with regard to the following survey round. Furthermore, processing instructions for the experts were noted on the welcome page, which included the structure of the thesis paper and specific instructions for completing it. In addition, the relevance of the topic and the experts' opportunity to help shape it were emphasized and information on data protection was provided.

When designing the thesis paper, it is advisable to structure the theses and questions into delimited subject areas and to use summarizing question blocks. With regard to the length of the thesis paper, a number of pages between twelve and sixteen has proven to be practicable. With longer surveys, it was observed that the response rate decreases due to the higher processing effort. However, there is no recommendation for an upper limit of theses and questions, as this should be individually tailored to the research objective (Häder, 2014, p. 128 f). As part of this Delphi study, the theses and questions to be addressed were divided into four thematic blocks based on the facets of the research question. At the beginning of each thematic block, the respective core content was briefly described. On the one hand, this subdivision was intended to provide transparency about the research process, while on the other hand the thematic blocks were also intended to act as milestones that had been reached and motivate the respondents to keep at it. To support this, a progress indicator was displayed (Döring & Bortz, 2016, p. 415).

For unanswered questions, a so-called gentle reminder is usually displayed before the respondent can answer the next question. The survey tool thus indicates missing answers, but the survey can still be continued unanswered after confirmation by the expert. This should ensure that the thesis paper is answered as completely as possible, even if individual items remain unanswered. The consideration was that mandatory questions might lead to the survey being terminated, even if experts had answered later questions. Therefore, only the socio-demographic data for the traceability of the panel structure and a personal ID of the respondent were marked as mandatory questions. A personal ID is used in Delphi surveys in order to combine the data from both survey waves and to be able to carry out a panel data analysis. This makes it possible to track the course of opinion formation across the survey waves (Häder, 2019, p. 127). It is not possible to trace the personal ID back to the individual expert, as the respondents themselves compile it from information that is only available to them. In the case of this survey, an individual combination of letters and numbers consisting of the first letter of the mother's first name and various dates of birth was requested. The personal ID therefore does not contradict the basic principle of anonymity in Delphi surveys.

The survey was concluded with a farewell page to confirm that the responses had been successfully submitted. In the second survey wave, the structure of the

thesis paper was largely retained, with the results of the first round being incorporated as feedback to the participants. For this purpose, visual highlighting and visualizations were used to the extent technically possible. A welcome and farewell page was also set up again to guide the participants through the survey in a structured manner.

Conception of the Thesis Paper

The content of Delphi surveys is usually derived from existing literature or preliminary surveys such as expert interviews or focus groups. Theses are generated from the results of the preliminary work and presented to the experts for standardized assessment. As part of this Delphi survey, the theses and questions for the thesis paper were derived on the basis of the facets of the research question and the results of the expert interviews. The interviews served to specify and structure the research subject of the paper and to collect content for the thesis paper. The qualitative content analysis and the facet-theoretical consideration of the research question made it possible to develop concrete theses and additional open questions. The four differentiated facets formed the framework for structuring the thesis paper. The basic structure of the thesis paper is shown in Figure 22.

The four thematic blocks were framed in the survey by a welcome page and a farewell page. At the beginning of the survey, the personal ID of the respondents was also determined in order to collate the survey results and understand changes in opinion. The socio-demographic characteristics of age, gender and professional field of activity were collected at the end of the survey, as they tend not to provide any particular incentive to complete the survey at the beginning (Häder, 2014, p. 128). The four thematic blocks comprise the content of the thesis paper. Topic blocks II to IV comprise the highest number of topics. This reflects the work's interest in developing recommendations for measures to promote dHL in the German SHI system. As described at the beginning, the term "measures" includes both structural and educational measures. In the sense of a holistic approach, framework conditions and responsibilities in the SHI system must also be further developed and understood as relevant measures. The theses should therefore take into account all aspects presented in connection with the theoretical framework of this work.

Figure 22: Structure of the thesis paper

Welcome Page / Data Protection Information	
Personal ID	
Theme Block I: New Skills Requirements	
• self-assessment of expertise	
• new skills requirements in the SHI-system	(10 theses)
• further skills requirements in the SHI-system	(1 question)
Theme Block II: Actors of the German SHI-system	
• self-assessment of expertise	
• changing job profiles in the SHI system	(3 theses)
• responsibilities of SHI companies	(6 theses)
• responsibilities of doctors	(6 theses)
• responsibilities of the politics	(8 theses)
• new roles and responsibilities in the SHI-system	(8 theses)
Theme Block III: Concept of dHL	
• self-assessment of expertise	
• understanding of dHL	(1 thesis)
• objectives of promoting dHL	(7 theses)
• interaction between SHI-system and insureds	(3 theses)
• the concept of dHL in the German SHI-system	(6 theses)
Theme Block IV: Promotion Measures	
• self-assessment of expertise	
• structural promotion measures	(9 theses)
• educational promotion measures	(8 theses)
• the future of dHL in Germany	(1 thesis)
Socio-demographic Data	
Farewell Page	

Note: Author's elaboration.

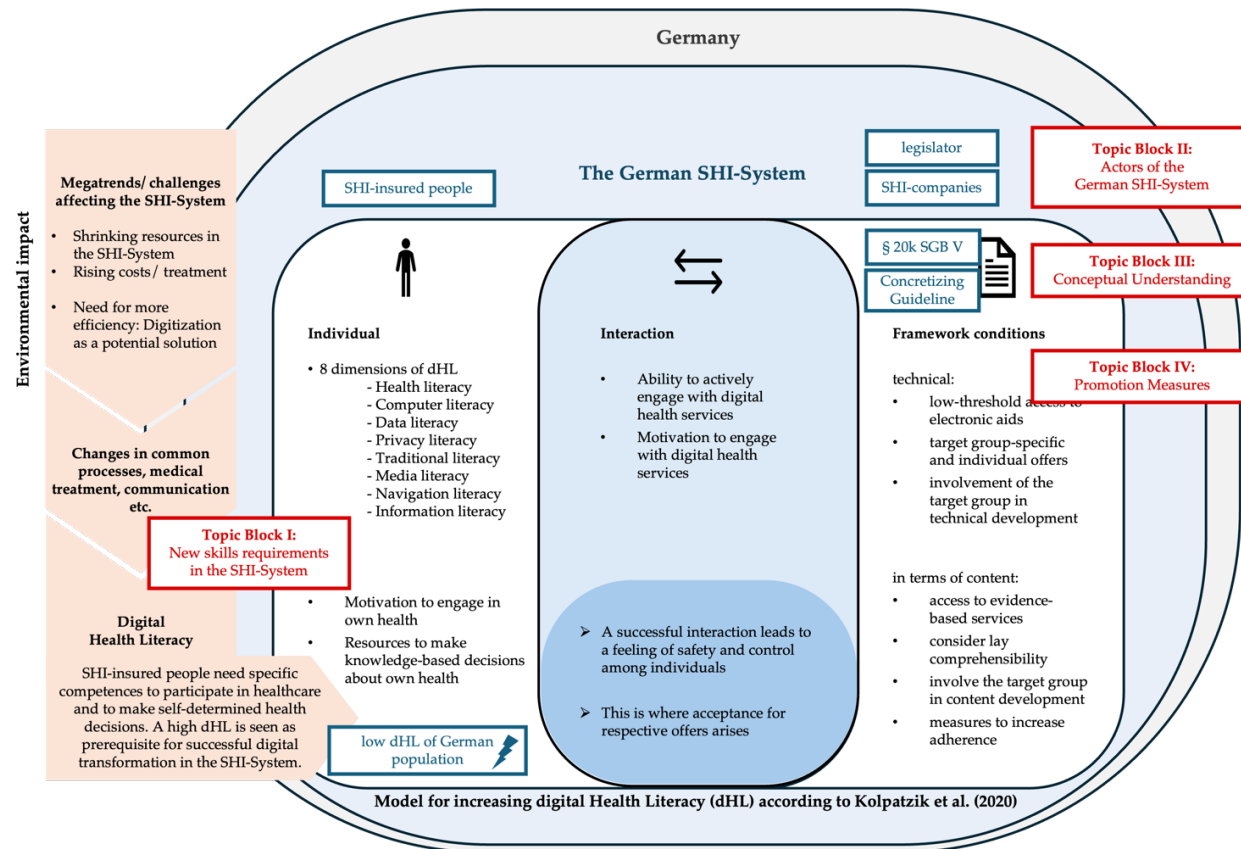
In order to illustrate the connection between the theoretical framework and the developed thematic blocks within the thesis paper, the blocks have been integrated in red in the theoretical framework as shown in Figure 23.

With the developed thematic blocks and their anchoring in the theoretical model, a basis was created for the concrete formulation of the theses and questions. The conception of the standardized thesis paper should be oriented towards the respective research interest and can include different types of questions. What Delphi surveys generally have in common is that they are very future-oriented, cover differentiated subject areas and require diverse expert knowledge to work on the research problem (Häder, 2014, p. 131). Over time, various perspectives have emerged from which theses are regularly assessed in Delphi surveys (Niederberger, 2021, p. 882):

- Desirability of a measure
- Agreement with a statement / scenario
- Relevance of a thesis for certain areas

The different perspectives in Delphi surveys make it possible to assess a wide variety of issues using predefined answer options. Scenarios, future developments and challenges or the general state of research can be dealt with in this way. Experts are asked to assess corresponding theses according to their necessity, probability of occurrence and feasibility. General agreement with theses can also be requested (Häder, 2014, p. 139). In addition, Delphi surveys can also ask about the time of implementation or the acceptance of measures. (Niederberger, 2021, p. 882 f). The exact types of questions to be used for the thesis paper should always be decided in consideration of the research objective and research design. There are no more specific guidelines or specifications (Häder, 2014, p. 130).

Figure 23: Connection between theoretical framework and Delphi study



Note: Author's elaboration.

Delphis typically uses similar assessment dimensions to answer the theses and questions (Albrecht et al., 2018, p. 644). Theses are predominantly formulated that require a rating from the experts, in which the answer is given on a Likert scale. Both unidimensional and multidimensional scales can be used. For example, the question about the desirability and probability of developments is common. Multidimensional assessments expand the analysis options and allow more in-depth conclusions to be drawn (Häder, 2014, p. 139). For example, it is possible to find out whether particularly relevant developments are considered feasible at all or, conversely, whether feasible measures are really important. Another common practice is the use of hybrid questions, in which the experts can make short additions on their own (Vidgen & Gallegos, 2011, Appendix three). Open questions and comment fields are also used. Another, but less common form is rankings, in which the experts create a ranking of different answer options. It should be noted that rankings place a higher cognitive demand on respondents and therefore require more time to answer (Niederberger, 2021, p. 882 ff).

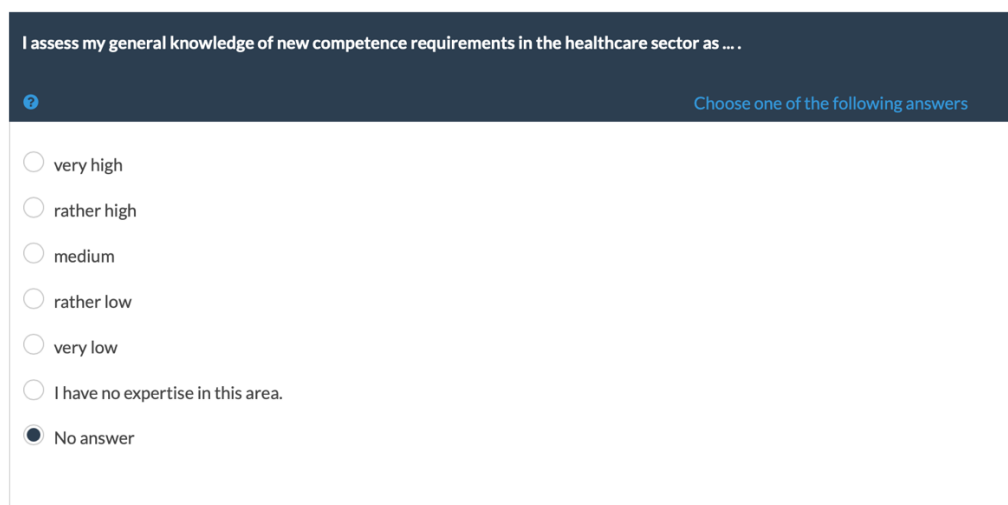
The subjective competence question is a special form of question in Delphi surveys. Since the subject of research is often a diffuse issue and a wide range of expert knowledge is required to deal with it, it may be the case that not all experts on the panel have the same level of expertise in the facets being discussed. In order to take this into account, the subjective competence of experts is often queried in Delphi surveys in order to assess their expertise. In practice, it has been shown that competence questions are asked both for individual theses as well as more broadly summarized for individual topic blocks (Häder, 2014, p. 131). Rating questions are used for self-assessment by the experts. More recent Delphi studies, such as Albrecht et al. (2018), often do without the subjective competence question. It is assumed that this is intended to reduce the experts' workload. Nevertheless, the use of the subjective competence question is considered important and relevant, especially in surveys with a heterogeneous panel of experts (Cuhls et al., 1998, p. 46; Niederberger, 2021, p. 887).

With regard to the sequence of theses and questions, attention should be paid to a logical structure of the thesis paper in order to facilitate fluid and comprehensible processing. Attention should be paid to a clear delimitation of the topic blocks.

The subjective competence question should be asked at the beginning of a topic block (Häder, 2014, p. 128).

Within this Delphi survey, the focus also lay on a logical structure of the thesis paper and the constant comparison of the conceptual steps with the research objective. Within the four thematic blocks, a fundamentally identical structure was used as a basis. At the beginning of each thematic block, the subjective competence question was asked to evaluate the individual expertise for processing and to be able to take this into account in the subsequent data analysis. In order to facilitate the assessment of the experts purely on the basis of the title of the topic block, its core content was briefly explained. This should also help to increase the comprehensibility of the topic paper and mentally prepare the experts for the following theses. Figure 24 shows an example of the subjective competence question.

Figure 24: Example of a subjective competence question



The image shows a screenshot of a survey question. At the top, a dark blue header bar contains the text "I assess my general knowledge of new competence requirements in the healthcare sector as ...". Below this, on the left, is a small blue circle with a white question mark. On the right, in the same bar, is the text "Choose one of the following answers". Below the header bar, there is a list of seven radio button options: "very high", "rather high", "medium", "rather low", "very low", "I have no expertise in this area.", and "No answer". The "No answer" option is selected, indicated by a filled blue circle next to it.

Note: Author's elaboration..

The self-assessment of individual expertise in the respective topic block was based on a Likert scale from "very low" to "very high". In addition, the experts could also state that they had no expertise in the subject area.

The subjective competence question was followed by the content-related theses on the respective topic block. Thematically matching theses were presented on a single page in order to avoid having to click on them too often and to keep the total number of pages compact. The majority of the theses in the thesis paper were theses with a two-dimensional assessment scale. The experts were asked to indicate their agreement with a thesis, its probability of occurrence or the relevance of certain theses or developments with regard to the successful promotion of dHL. When using the scales, care was always taken to use the same name and the same order of answer options. The use of familiar, repetitive designations was intended to make it easier for the experts to work through the familiar structure.

The developments outlined in the theses generally relate to the year 2030. This year was chosen in order to base the assessment of the theses on a uniform time horizon and to give the experts a certain orientation. The realization of the outlined developments is generally not required immediately, but rather over a certain period of time. The period of just under six years represents a realistic and equally clear period of time that the experts can survey with their imagination. Figure 25 shows an example of a thesis with a two-dimensional assessment scale.

Figure 25: Example of a two-dimensional Likert scale on agreement and relevance

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of eHL

Please indicate to what extent you agree with the following theses and how relevant you consider the outlined development to be with regard to the successful promotion of dGK.

	Agreement				Relevance				No answer
	disagree at all	disagree	agree	fully agree	not important at all	not important	important	very important	
New skills requirements with regard to digital health will change the job profiles of those involved in the SHI system by 2030.	☐	☐	☐	☐	☐	☐	☐	☐	☒
By 2030, new job profiles will be established to promote the dGK of insured persons in the SHI system. Example: Introduction of a "digital nurse" who advises insured persons in the doctor's practice on issues relating to the dGK (e.g. creating an electronic patient file, enabling video consultations).	☐	☐	☐	☐	☐	☐	☐	☐	☒
In the spirit of a "Health in All Policies approach", certain skills required for a high dGK should also be promoted in other policy areas outside the SHI system (e.g. in schools).	☐	☐	☐	☐	☐	☐	☐	☐	☒

Note: Author's elaboration..

In topic area II: Actors of the German SHI system, the experts were asked to assess whether and to what extent the traditional job profiles in the SHI system will change with regard to the promotion of dHL by 2030. The possible answers were given using two four-point Likert scales for agreement ("strongly disagree" to "strongly agree") and relevance ("not at all important" to "very important").

At another point, the experts were asked to assess which specific measures to promote dHL they consider important and feasible. A two-dimensional Likert scale on relevance ("not at all important" to "very important") and likeliness of implementation ("not at all likely" to "very likely") was also used for this purpose. Figure 26 illustrates the procedure using an example of a question from topic block IV: Promotion measures.

Figure 26: Example of a two-dimensional Likert scale on relevance and likeliness

Topic block 4: Support measures for dHL of SHI-insured persons

Thesis: Measures to change the structures of the SHI-system must be taken in order to successfully promote dHL of insured persons.

Please evaluate the structural developments outlined below in terms of their relevance for the successful promotion of dHL and their likelihood of implementation.

	Relevance				Likeliness				No answer
	Not im- portant at all	Not im- portant	Important	Very im- portant	Not likely at all	Not likely	Likely	Very likely	
By 2030, insured persons in the SHI-system will be able to choose more cost-effective digital insurance tariffs (e.g. "video consultation first") to encourage them to engage with digital health services.	☐	☐	☐	☐	☐	☐	☐	☐	☒
By 2030, the SHI-system will have a user-friendly digital ecosystem that has largely digitized analogue processes (e.g. e-prescription, digital communication channels).	☐	☐	☐	☐	☐	☐	☐	☐	☒
By 2030, insured persons in the SHI-system will be obliged to use a comprehensive digital ecosystem .	☐	☐	☐	☐	☐	☐	☐	☐	☒
The opt-out electronic patient file will contribute to increasing dHL.	☐	☐	☐	☐	☐	☐	☐	☐	☒
By 2030, there will be new remuneration structures for the promotion of dHL by healthcare stakeholders.	☐	☐	☐	☐	☐	☐	☐	☐	☒

Note: Author's elaboration.

In thematic block II: Actors of the SHI system, the experts were each asked to draw up a ranking of the future tasks of the SHI funds, healthcare professionals and politicians regarding the promotion of dHL. With regard to the responsibilities and roles of the above-mentioned players, the interest was on how these will be structured in the future with regard to the promotion of dHL. To be able to derive comprehensive and practice-relevant recommendations for action, however, the

prioritization of the aspects by the experts was also of interest, for example to enable the successive implementation of measures based on the relevance assessed by the experts. The experts were able to choose from a list of future tasks which of these the respective actor would take on in the future and put them in order using drag and drop. Tasks that were not relevant could remain in the initial list. As ranking tasks place a higher cognitive demand on the respondents and increase the risk of a dropout due to the increased processing effort (Niederberger, 2021, p. 884), this question type was only used sparingly.

Thematic block III: Concept of dHL focused on how the conceptual understanding of dHL will develop in the German SHI system. There is currently no uniform definition of dHL in Germany, which makes it difficult to establish a common basis in the SHI system. Against this backdrop, the Delphi survey was also intended to ascertain what understanding the experts share of dHL and what central elements they believe dHL comprises. To this end, the experts were presented with four different and equally widespread definitions, from which the most suitable one was to be selected. The experts were then asked to justify their choice in order to determine the necessary elements of a definition of dHL. Figure 27 shows the example question.

Figure 27: Example question for choice of definitions

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Thesis: The understanding of dHL in the German SHI system must be homogenized.

Please indicate which of the following definitions* best describes dHL in your opinion at the present time. Please select one of the following answer options. The parts of the text in **bold** represent significant changes in content compared to the previous definition. Please briefly explain below why you have chosen your definition.

* The source for each definition can be found on the final page of this survey.

- ☐ "Digital health literacy is the ability to search, find, understand and evaluate health information based on digital sources and apply the knowledge gained to address health challenges and solve problems."
- ☐ Digital health literacy "encompasses the **interplay of personal and social factors** in the use of digital technologies in searching, acquiring, understanding, evaluating, communicating and applying health information in all healthcare contexts with the aim of maintaining or improving quality of life throughout the lifespan."
- ☐ "Digital health literacy is the ability to use digital technologies in a **self-determined manner** for the purpose of maintaining, restoring or improving health. It enables patients and users to find and evaluate health information, **protect or release health-related personal data** if necessary, **assess the functionality, results and consequences of digital health applications**, weigh up the advantages and disadvantages and act accordingly. (...) Digital health literacy arises from the interaction of individual skills and socio-technological conditions. It includes awareness of the ethical, legal and social implications for both individuals and organizations and enables them to shape digital change in a way that promotes health."

Note: Author's elaboration.

Another question type used in the Delphi survey was a slider question. With regard to the necessity of proactive promotion of dHL, there are two opposing positions: on the one hand, (1) proactive promotion of dHL through training, for example, is considered necessary in order to promote the dHL of SHI policyholders. On the other hand, there is the view that (2) proactive promotion of dHL is not necessary, as insured persons have to deal with digital health offers anyway and thus dHL increases even without promotional measures. Figure 28 shows how the question was integrated in the survey.

Figure 28: Example of a slider question

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Which of the following theses do you tend to agree with? Please use the slider (from -100 to 100) to express your agreement with the thesis shown on the left or right.

The dHL of insured persons must be proactively promoted, e.g. through individual advice or training.

0

Proactive promotion of the dHL is not necessary, as insured persons have to deal with digital health information and applications anyway, which also increases the dHL.

Note: Author's elaboration.

To determine the degree of agreement with one of the two positions, the experts were able to position the slider in steps of ten between -100 for (1) and 100 for (2). In thematic block I: New skills requirements, the experts were asked to assess new skills requirements for insured persons in the area of digital health up to 2030 in terms of their agreement and relevance for the promotion of dHL. As the list of skills requirements is presumably not exhaustive, it was of interest to find out what other skills requirements the experts expect in the future. The Delphi survey therefore also asked about an issue that was difficult to formulate in advance as a closed thesis (Häder, 2014, p. 141). For this reason, an open question was also included in the mainly quantitative survey round in order to be able to record further information from the experts. The idea was to feed back the collected findings as part of the feedback in the second survey round. At the end of each topic block, a comment field was implemented in which the experts could enter further thoughts, questions, and criticism. It is important that the comments given are taken into account

by the experts during further processing and, for example, included in the feedback in the form of footnotes (Häder, 2014, p. 142). Finally, the socio-demographic data of the participants was collected on the basis of the quota characteristics defined for the composition of the expert panel. In addition, the respondents were able to provide general feedback and suggestions on the topic. The survey was concluded with a farewell page to confirm the successful submission of responses, to thank respondents for their participation and to provide an outlook on the further research process.

Pretest

Following the development and technical implementation of the thesis paper, it is obligatory for scientific studies to develop and implement a pretest strategy. In quantitative research in particular, procedures and items cannot be easily changed during the process without jeopardizing the standardization and comparability of data (Weichbold, 2022, p. 443). Extensive pretesting of the survey instrument is therefore necessary. The importance of pretests is emphasized by Sudman & Bradburn (1983, p. 283): "If you don't have the resources to pilot test your questionnaire, don't do the study". In general, the aim of pretests is to identify possible problems that respondents may have during processing in order to improve the instrument on this basis (Tausendpfund, 2022, p. 88). The cognitive psychology model by Tourangeau et al. (2000) describes four steps of response behavior: (1) comprehension, (2) retrieval, (3) judgement, (4) response. The validity of the response must be ensured at all four levels of the model, but this can be influenced, for example, by (1) unclear terms, (2) missing information, (3) inappropriate response categories or (4) socially desirable responses. With the help of pretests, researchers gain insight into the response behavior and can make improvements with regard to all four steps. Pretests play a very special role in Delphi studies. At the core of the survey are usually theses that always leave a certain amount of room for interpretation (Cuhls, 2019, p. 24). In this context, pretests check the comprehensibility and solvability of theses and the clarity of the terms used. In addition, they also test the survey framework and the evaluability of the results. Pretests are used to identify technical problems during processing, to determine the duration of the survey and to check the impact of the cover letter. Test results allow conclusions to be drawn

as to whether there is sufficient frequency distribution in the answers or whether questions should be adjusted or deleted in this respect (Häder, 2014, p. 144 f). Pretests therefore not only ensure that surveys function correctly, but also aim to eliminate any subsequent survey problems a priori (Schnell, 2019, p. 124).

In general, a survey instrument is tested on a small number of people from the population as part of the pretest (Berger-Grabner, 2013, p. 114). It has become established practice to carry out several coordinated procedures that take various aspects of quality assurance into account. Schnell (2019, p. 128), for example, recommends conducting at least two different tests. In this context, it is essential to allow sufficient time for the development and implementation of the pretest strategy. In addition to the testing itself, a time buffer for revising the survey instrument and retesting should also be taken into account (Weichbold, 2022, p. 443).

Quality assurance measures such as the use of checklists for the systematic checking of items or informal checks by research colleagues can be implemented as early as the questionnaire development stage (Weichbold, 2022, p. 444). Within this Delphi survey, a checklist from Faulbaum & Rexroth (2023, p. 107) was therefore already taken into account when designing the thesis paper. The checklist comprises twelve possible problem areas in the creation of survey instruments, which are illustrated by examples. Essential aspects for increasing the quality of the theses could thus already be considered in advance.

For an initial pretest, the thesis paper was discussed with two research colleagues, whose feedback was obtained and taken into account. The focus here was on the formulation of the theses, the structure of the survey and the length. The main finding was that some of the theses were not yet clearly formulated and were too long. In addition, several theses with the same meaning were identified. This impaired both the clarity of the thesis paper and the cognitive attention of the research colleagues. Particularly in the ranking questions, it was criticized that the core concern of the items to be ranked was difficult to see. On the other hand, the logical structure of the thesis paper was positively noted. This first test improved the clarity of the survey. In addition, the wording of the theses was reviewed and streamlined and theses with the same meaning were summarized. The items of the ranking questions were formulated substantively in order to place the core statement in front of the answer option. As part of the further pretests, it should be

checked whether all of the proposed topics are actually relevant or whether the length of the survey can be reduced by deleting them. With regard to the structure of the thesis paper, it became clear that the structure "from coarse to fine", which is based on the facet-theoretical approach, was also perceived as useful by the research colleagues. The thesis paper was revised on the basis of the feedback and a second pretest was prepared.

For Delphi surveys, it is recommended that the pretests are carried out in a face-to-face situation. A wide range of cognitive methods are available for this purpose. These make it possible to gain an impression of the functionality and comprehensibility of the survey instrument with just a few respondents. The survey group should be similar to the later expert panel, although a representative distribution is not necessary (Weichbold, 2022, p. 445). There are various recommendations regarding the required sample size for a pretest; however, in Delphi surveys, the often limited pool of experts should not be exhausted by preliminary studies. (Häder, 2014, p. 146). Cognitive pretest methods are thus cost-effective to conduct. However, it should be noted that the small number of test participants brings uncertainty regarding the generalizability of survey results (Häder, 2014). In the context of the present Delphi survey, a cognitive pretest was conducted based on the probing method (Weichbold, 2022, p. 446). In this process, the thesis paper was reviewed online by four test subjects who shared the structural characteristics of the expert panel but were not part of it, with the author present. After completing each page of the thesis paper, additional questions were posed regarding thesis comprehension or specialized terminology used. Moreover, general questions were asked to gather the respondents' impressions. The aim was to identify any processing problems and comprehension difficulties, as well as to evaluate the length of the thesis paper based on feedback from research colleagues. Processing the thesis paper within the survey tool also allowed, for the first time, a check of the technical implementation's functionality. The pretest results indicated further opportunities to shorten the thesis paper.

Thus, in Topic Block III: Concept of dHL, a reduction was made to the definitions available for evaluation. To further improve clarity, bold formatting was used to highlight the components in which the definitions differed. For better com-

prehension, unclear terms were clarified. In Topic Block II: Actors of the SHI System, for example, reference was made to § 20 k SGB V. However, the precise content of this paragraph was not clear to all test participants, so an explanation of the essential points was included in the thesis paper. Abbreviations such as BMG for Federal Ministry of Health were also misunderstood and thus avoided in the thesis paper due to their infrequent use. Further feedback addressed the design and clarity of the thesis paper in the survey tool, which was adapted within the technical possibilities. No changes were made to the structure and organization of the survey, as all test participants in the pretest noted a logical structure and clear progression. Based on discussions with the experts, the completion time was estimated to be 25-30 minutes.

After further revising the thesis paper, three additional test participants were asked to trial the new version. In this third stage of the pretest, the primary focus was on ensuring smooth navigation through the survey tool. Different devices (PC, smartphone, and tablet) were specifically used to identify any potential display issues. The feedback allowed for further improvements in terms of the survey's clarity and presentation. Additionally, the estimated time required to complete the thesis paper was confirmed. The final version of the thesis paper is presented in the appendix of this work.

Planning and Implementation of the Survey Waves, Follow-Up Actions, Response Rate

After the finalization of the thesis paper, the Delphi survey waves will be conducted, along with the associated fieldwork. Monitoring and documenting the survey response rate is also essential.

First, the number of survey waves must be determined, which is closely tied to the study's objective. For example, if consensus-building is the goal, so-called stopping criteria should be defined. These criteria refer to a specific level of agreement among views that should be achieved during the survey waves, which in turn will determine the number of waves needed. (Häder, 2014, p. 124). However, consensus-building is not always the goal, as in the case of the present study. Other outcomes, such as the finding that no consensus exists, are also conceivable (Cuhls, 2000, p. 21). In this Delphi study, the goal was to gather expert opinions on the

necessary development of framework conditions, responsibilities, and measures to promote dHL among publicly insured individuals in Germany, in order to derive recommendations for proactive participation in shaping these areas. In Delphi surveys of this type, opinion stability is the primary objective, which allowed for the omission of stopping criteria. There is no methodological standard for the required number of survey rounds; rather, various recommendations exist on this matter. De Villiers et al. (2005, p. 639) suggest stopping the process as soon as an acceptable degree of opinion stability is reached. Linstone & Turoff (2002, p. 223) found out that "in all forecasting Delphis [...] (,) a point of diminishing returns is reached after a few rounds. Most commonly, three rounds proved sufficient to attain stability in the responses; further rounds tended to show very little change and excessive repetition was unacceptable to participants". The biggest changes in results were reported between the first and the second survey wave, afterwards results were quite constant. It must be noticed that every further survey wave comes along with additional resources needed such as costs and time as well a high motivation among the surveyed experts. Delphi-results are generally accepted after a single repetition of the first survey. Researchers should achieve an acceptable level of accuracy with a minimum number of rounds (Häder, 2014, p. 126). Taking into account these findings, the number of survey rounds within this study was set at two.

The two survey rounds took place from February 22 to June 30, 2024. Since the main reason for non-participation in surveys is often the lack of time among invitees (Häder, 2014, p. 165), a longer completion period was deliberately planned. For instance, the first survey round coincided with the Easter holiday period, during which absences due to vacations are common. To minimize time pressure on the experts, the survey period was extended beyond the holidays. Thus, the first round was available online from February 22 to April 21, 2024, for a total of 8.5 weeks. Midway through the planned period, a follow-up reminder about the Delphi study was sent, along with a renewed request to participate (Häder, 2014, p. 165), to increase the response rates. To engage the respondents emotionally with the topic, the benefits of the study and the opportunity to contribute to shaping it through the input of expert knowledge were specifically highlighted. As part of the response tracking, the number of complete responses was monitored during the first survey round in relation to the total number of invited participants. After the first survey round was completed, a total of 32 fully completed thesis papers from

the 36 participating experts were recorded, corresponding to a response rate of 88.9%.

The responses from the first survey round were then analyzed. The results were fed back to the participants during the second survey round to stimulate cognitive processes for re-evaluating judgments based on the group results. For this, the thesis paper needed to be revised. It had to be ensured that the presentation was clear and easy to follow (Cuhls, 2019, p. 19). The presentation of the feedback should also align with the objectives of the proposed theses. Since the thesis paper primarily contained statements, feedback could be easily represented depending on the scale level by displaying the percentage distribution of responses (Häder, 2014, p. 155; 160). To create transparency, but also to avoid cognitively overwhelming the respondents, the values for agreement ("(fully) agree" or "disagree (at all)"), relevance ("(very) important" or "not important (at all)"), and likeliness ("(very) likely" or "not likely (at all)") were presented in a summarized format (Figure 29). This way, the experts could quickly see whether the overall group was more positive or negative toward a statement being evaluated, while only needing to compare two summarized result values from the first round, rather than four. The results were presented numerically to maintain the clarity of the survey and to prevent distracting the participants with, for example, the use of graphics.

Figure 29: Example of feedback presentation

Please indicate to what extent you agree with the following thesis and how relevant you consider the outlined development to be with regard to the successful promotion of dHL.										
In the first round, there was a high level of agreement on two theses. These were not put up for assessment again, so the previous response options were reduced. As a result of round 1, the two values for agreement/ no agreement and relevance/ no relevance are summarized. The values are highlighted in red below.										
	Consent				Relevance for the successful promotion of dHL					
	disagree at all	disagree	agree	fully agree	not important at all	not important	important	very important		No answer
By 2030, new job profiles will be established to promote the dHL of insured persons in the SHI system. Example: Introduction of a "digital nurse" who advises insured persons in the doctor's practice on issues relating to the dHL (e.g. creating an electronic patient file, enabling video consultations).										
Consent: (Fully) agree: 75,0% Disagree (at all): 25,0%	☐	☐	☐	☐	☐	☐	☐	☐		☒
Relevance: (Very) Important: 77,4% Not important (at all): 22,6%										

Note: Author's elaboration.

In the first topic block, the participants were presented with the results of the first survey wave when a thesis has not reached an opinion stability in the first survey round. Therefore, the feedback was placed underneath the theses that had to be assessed again in red in order not to interrupt the flow of reading. To increase clarity and ease of understanding, the two top and two bottom values of the four-point Likert scales were summarized.

Only in the four ranking questions the feedback was supplemented by a graphic representation of the results in order to increase comprehensibility. In topic block 3, for example, the participants were asked to rank future tasks of SHI companies to promote dHL of their insured persons. Figure 30 shows an example of the selected form of feedback in relation to the ranking questions. With the help of the diagram, the experts were able to recognize which tasks were considered relevant for the SHI companies by the group as a whole. The blue bar in the diagram shows how often a task was not included in the ranking by the participants. In addition, the mean ranking value was calculated for the ranked tasks in order to derive the priority of a particular possible task among all response options.

Figure 30: Example of feedback presentation including graphic visualization



Note: Author's elaboration.

In the case of answers to open questions and comments, the first fundamental question is whether feedback is given to the participants. "There is no way of concluding whether supporting comments or mean scores were more influential in effecting a change of opinion" (Duffield, 1993, p. 235). In practice, different approaches are taken, so that the monitoring team must decide individually how to

deal with responses and comments. Various design options are available here. In some cases, feedback information is not presented, and the results are only included in the interpretation of the survey results. Comments are also included in the interpretation of the results in this study. However, in the interests of transparency, to stimulate indirect discourse and because only a few open questions were used, the results of open questions and comments were also given back to the participants as part of this Delphi study, as Figure 31 shows (Häder, 2014, p.162).

Figure 31: Example for feedback presentation of open questions and comments from the first survey round

Topic block 4: Support measures for dHL of SHI-insured persons

Would you like to make any final comments on the topic of "Support measures for dHL of SHI-insured persons"?

Feedback from the first round:

1. In my opinion, no major "support measures" are to be expected, as the topic of dHL is more likely to be of symbolic-rhetorical interest in the overall context of digitization-relevant players.
2. In general, I believe that no "pilots" will be paid and that there will only be "individual support" if this is realized cost-effectively via technology / AI (this is also an advantage of technology).
3. Targeted support measures are particularly important for older target groups. They are sick much more often than younger people and are also less able to deal with digital services or need a lot of help with them. However, with a view to the further development of digitalization/AI etc., it is also important to keep all insured persons digitally fit at all times.

Note: Author's elaboration.

Compared to the first round, reductions were made in all thematic blocks of the thesis paper. This relates to theses in which there was already a high level of agreement among the experts after the first round of interviews. A new survey was not considered to make much sense here, especially as the chosen procedure also conserved the experts' resources (Häder, 2014, p. 125). As it is usual in Delphi surveys, theses were removed for the second round of questioning if more than 75.0% of respondents expressed a positive or negative opinion of a particular thesis, depending on the scale level (Niederberger & Deckert, 2022, p. 12; Niederberger & Spranger, 2020, p. 5). The subjective competence question at the beginning of the topic blocks was also not repeated in the second round. This is not absolutely necessary from a methodological point of view, but is useful for tracking whether and how the subjective competence assessment of the participants develops over time (Häder, 2014, p. 133). However, as the two Delphi rounds followed each other over

a comparatively short period of time and were therefore expected to yield little knowledge in comparison to the amount of work involved for the participants, the survey was not repeated.

In the first thematic block "New skills requirements in the field of digital health", the first round of the survey posed the open question of what further skills requirements the respondents expect for insured persons in the coming years in addition to the answer options presented. The answers given were clustered and integrated into the second round of the survey for assessment by the experts (Figure 32).

There are various suggestions in the literature as to whether the experts' own votes from the first round should also be played back in the second round. One argument in favor of this is that the respondents may have a more intensive cognitive engagement with the content of the question. When answering questions in round two, both their own answer and the group result can then be included (Keeney et al., 2006, p. 206). On the other hand, there is a risk that the expert's answer from the first round will simply be replicated with a view to fast processing (Häder, 2014, p. 157). For this reason, Häder's recommendation was followed, and the respondents' individual feedback was not returned.

When revising the thesis paper, care must be taken to avoid manipulating the research results. Nelson (1978, p. 55) describes that this circumstance occurs in Delphi surveys, for example, when the monitoring team pursues its own interests with regard to a desired result. Furthermore, unintentional manipulation of the feedback can also occur due to evaluation or presentation errors. In the interests of transparency, the revised topic paper should therefore be reviewed by external experts before publication (Häder, 2014, p. 156). The revised thesis paper was therefore checked by two research colleagues before being sent out and the validity of the results was thereby confirmed.

Figure 32: Example of new answer options integrated from the first survey round

Topic block 1: New skills requirements in the field of digital health

The aim of this thematic block is to determine what skills insured persons will need in the future in order to be able to participate in an increasingly digital SHI system in Germany.

Thesis: The competence requirements for insured persons in the SHI system will change over the next few years as a result of ongoing digitalization.

Please indicate the extent to which you agree with the following developments with regard to competence requirements for insured persons in the area of digital health by 2030 and assess their relevance in connection with the promotion of dHL.

In the first round, there was a high level of agreement on some theses. These were not put up for assessment again, so the previous response options were reduced. The result of round 1 is summarized in the two values for agreement/ no agreement and relevance/ no relevance. The values are highlighted in red below. In addition, new response options were added based on your free text responses.

	disagree at all	disagree	agree	fully agree	not important at all	not important	important	very important	No answer
Insured persons must be familiar with technologies such as AI or big data. Consent: (Fully) agree: 59,4% Disagree (at all): 40,6% Relevance: (Very) Important: 56,3% Not important (at all): 43,7%	☐	☐	☐	☐	☐	☐	☐	☐	☒
Insured persons must retain control over technologies (e.g. be able to decide on "digital detox").	☐	☐	☐	☐	☐	☐	☐	☐	☒
Insured persons must be able to handle digital identities .	☐	☐	☐	☐	☐	☐	☐	☐	☒
Insured persons must be familiar with robotics .	☐	☐	☐	☐	☐	☐	☐	☐	☒
Insured persons must be familiar with sensors .	☐	☐	☐	☐	☐	☐	☐	☐	☒
Due to the increasing flood of information , insured persons must be able to decide which digital health information is important to them individually.	☐	☐	☐	☐	☐	☐	☐	☐	☒
Insured persons need to know how to access digital health information and services .	☐	☐	☐	☐	☐	☐	☐	☐	☒

Note: Author's elaboration

The thesis paper was again sent to the experts online via LimeSurvey. The follow-up wave started on 22.05.2024 and ran until 30.06.2024. A response rate of 78.1% was achieved, which corresponds to the participation of 25 of the 32 experts from the first survey round. As Niederberger (2021, p. 881) describes, the willingness to participate in the first Delphi survey is often lower than in the second, if experts have already been recruited to participate. The response rates of the present Delphi study thus correspond to the typically achieved response rates. A 100% response rate can hardly be achieved in practice, although the response rate should be monitored particularly closely in the second Delphi round (Häder, 2014, p. 165).

This means that the structure of the expert group can change due to panel mortality and distort the validity of the results (Vorgrimler & Wübben, 2003, p. 766). This development can be counteracted by carrying out follow-up campaigns again or by recruiting certain groups of experts in a targeted manner (Häder, 2014, p. 165). The expert structure was also observed in the second wave of this Delphi survey as part of the response check in order to avoid a distortion of the results. However, it was found that there were no significant changes in the expert structure, meaning that no specific follow-up actions were necessary with regard to certain socio-demographic characteristics. Instead, general reminders were sent to the participants in order to increase the response rate. After a period of 5.5 weeks, the second survey wave was finally completed.

4.4.5. Data Preparation, Data Analysis and Presentation of Results

Once the two Delphi survey rounds had been completed, the data collected had to be analyzed in order to generate results. This was followed by the documentation of the results, the final report, and the transfer of findings into practice. This also includes a detailed description and documentation of the group of participants and the comprehensive documentation of the survey waves carried out. Important information in this context is the description of the research process and the framework conditions, the responses achieved, panel mortality and non-response (see chapter 5.1; Häder, 2014, p. 168). The planning considerations for the data analysis and presentation of results for this Delphi study are described below, while the results themselves are presented in chapter 5.

After the data from the first survey round had been analyzed and integrated into the second survey round, all data had to be analyzed again after the second survey had been completed in order to generate the overall results of the Delphi study. In both cases, the evaluation and visualization were carried out using the statistics program R as well as Microsoft Excel. For the data analysis, the raw data from the survey was exported from LimeSurvey and then further used (Häder, 2014, p. 183).

Using the participant ID collected at the beginning, the data sets of identical participants could be matched and merged into cases. Having in mind the aim of the study, which was to draw a broad picture of the experts' opinions, completed questionnaires were also included in the analysis if the expert only took part in the first round of the survey. Thus, 32 completed questionnaires were included in the first survey round and 25 in the second.

The first step in the data analysis was to evaluate the socio-demographic characteristics. This made it possible to obtain an overview of the actual composition of the expert panel and to make follow-up decisions for further analyses. It is common practice in Delphi studies to examine responses separately in subgroups based on socio-demographic criteria (Häder, 2014, p. 184 f). In this Delphi study, for example, this was carried out to identify differences in response behavior between members of SHI companies compared to participants from other professional groups. As the SHI companies are the only professional group in the healthcare sector that is currently legally obliged to promote dHL in accordance with § 20k SGB V and employees from SHI companies made up a large proportion of the participants in both rounds of the survey ($n_1 = 48.0\%$; $n_2 = 43.8\%$), the analysis of the two subgroups may provide important insights with regard to the intended objective of this study.

The data was then analyzed chronologically according to topic blocks. First, the subjective competence question was evaluated at the beginning of each thematic block in order to obtain an overview of the experts' self-assessed expertise in the respective part of the survey. The result could then be taken into account within the interpretation of the results.

As part of the data analysis, simple statistical evaluations are usually carried out in Delphi procedures, which means the calculation of frequencies and descriptive key figures (Niederberger, 2021, p. 884). The aim is to present the summarized opinions of the experts and thus create a basis for further scientific exchange. This can be illustrated well using the arithmetic mean, the median, modes and measures of dispersion. Graphics should then be used to better illustrate the results. In the context of this Delphi study, the visual presentation of the results is mainly done using bar charts. This made it possible to show both the distribution of the experts' responses and, where necessary, the change in opinion from the first to the second

survey round. The bar charts also make it possible to see immediately for which theses the pre-defined stability of opinion of the experts was achieved.

In addition to the evaluated data, the experts' written comments, which were left at the end of each thematic block, are included in the overall interpretation of the results. In the following chapter, the results are presented and discussed chronologically and underpinned with corresponding visualizations.

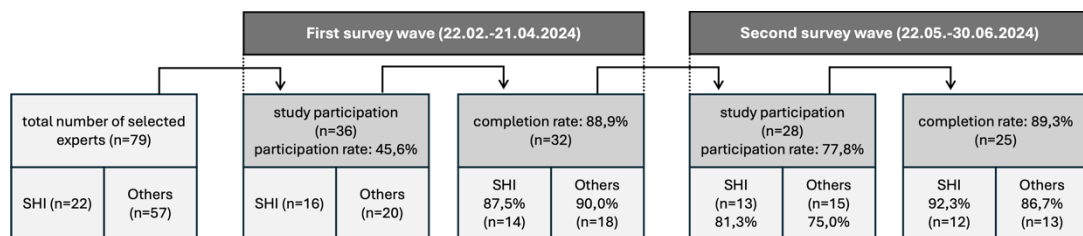
V – RESULTS OF THE DELPHI STUDY

V - RESULTS OF THE DELPHI STUDY

5.1. STUDY PARTICIPATION AND PANEL PROPERTIES

The experts for the Delphi survey expert group were recruited in accordance with the considerations described in chapter 4.5.3. It was primarily relevant that the experts had a certain level of expertise in the field of dHL or, more specifically, in the research objective and the central topics of the Delphi survey. To avoid a one-sided orientation of the research process, attention was also paid to the composition of the expert panel according to various quota characteristics such as profession, age, and gender. A total of 79 experts were identified and invited to take part in the survey. The participation and completion rates are shown in Figure 33. A total of 36 experts responded to the invitation and confirmed their participation in the survey. Of the 36 participating experts, 32 completed the first survey round (R_1), which corresponds to a completion rate of 88.9%. In the second survey round (R_2), 28 of the 32 experts took part. All in all, 25 surveys were completed, which corresponds to a completion rate of 89.3%. As described in more detail below, the majority of the experts can be assigned to SHI-companies in terms of profession. In the first survey round, the termination rates in the two subgroups were almost equal. In the second survey round, both the participation rate and the termination rate in the SHI group were slightly higher than in the group of other professions.

Figure 33: Delphi study participation and completion rates



Note: Author's elaboration.

All responses that were finalized using the "Complete Survey" button and in which at least one item from topic blocks I-IV, apart from the expertise question, was answered, were considered complete. To reduce the risk of respondents abandoning the survey entirely, particularly extensive, and cognitively demanding questions were not mandatory. Consequently, completing the survey via the "Complete Survey" button does not necessarily mean that all items were evaluated by the experts. In the first round, 3 questionnaires were partially filled out but still marked as completed, which explains the differing sample sizes in the two survey rounds in the results chapter. In the second round, all surveys were filled out completely. However, as the aim of the Delphi study is to represent the diversity of opinions of the participating experts, the partially filled questionnaires were included in the data analysis.

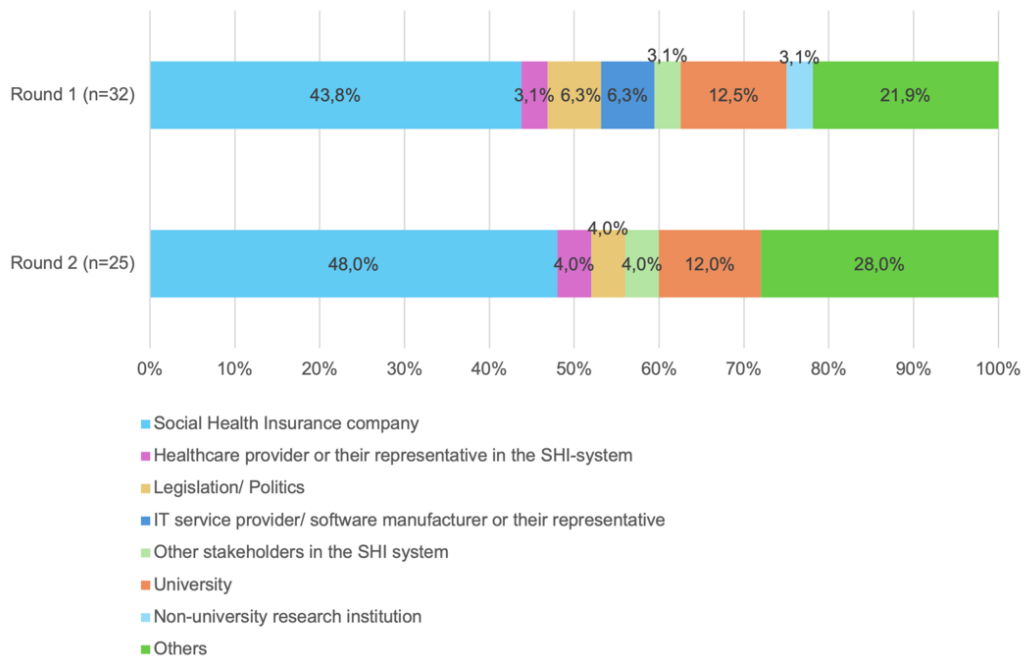
A closer analysis of the unanswered responses reveals that most missing answers occurred towards the end of the survey, specifically in the fourth topic block. Here, experts were asked to assess the relevance and feasibility of various potential support measures. On one hand, the advanced stage of the survey may have negatively impacted participants' concentration and attention, leading to skipped responses. On the other hand, based on the participants' self-assessments, it became apparent that they rated their expertise in this topic block as the lowest (see further details below). Accordingly, a lack of specific expertise in this area may have contributed to experts skipping these questions.

As previously described, sociodemographic characteristics such as gender, age, and occupation were collected as part of the survey. Regarding gender, more women than men participated in both rounds of the Delphi study. Specifically, in the first survey round, eight men (25.0%; n=32) and 24 women (75.0%; n=32) took part. Although this is not an even distribution, the gender ratio was consistent across both survey rounds. In the second round, six men (24.0%; n=25) and 19 women (76.0%; n=25) participated. A separate analysis of the gender distribution within the initially identified expert pool also showed a predominance of female experts (64.6%) compared to male experts (35.4%), indicating a similar gender distribution within the total sample of experts identified for the study.

The age distribution of the experts remained consistent across both survey rounds. Each age group contributed nearly 30% of the participants, with experts

aged 25-34 years (R₁: 31.3%; R₂: 32.0%), 35-44 years (R₁: 31.3%; R₂: 28.0%), and 45-54 years (R₁: 28.1%; R₂: 28.0%). Additionally, around 10% of the experts were in the 55-64 age group (R₁: 9.4%; R₂: 12.0%). Thus, no significant changes in age distribution occurred between the first and second survey rounds. By taking a closer look at the profession, some smaller changes from the first to the second survey wave become evident (Figure 34).

Figure 34: Profession of the experts in both survey waves



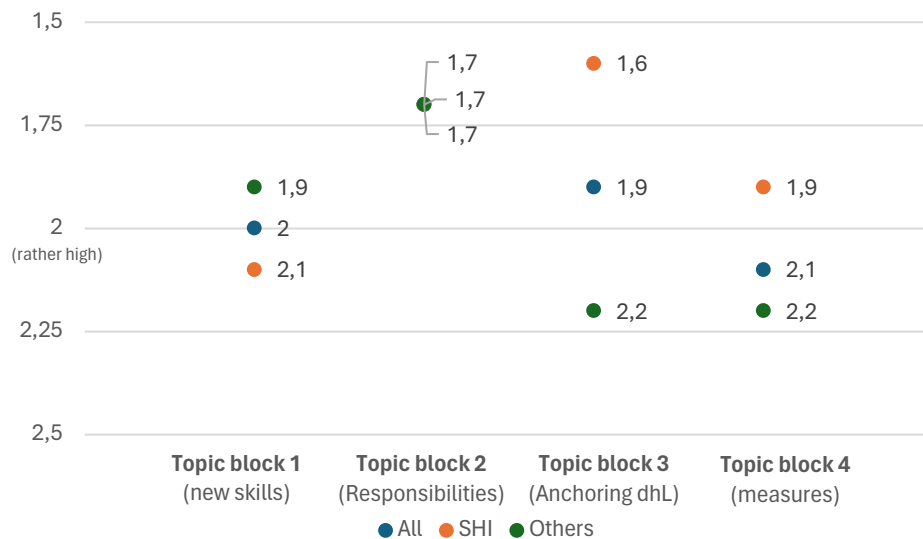
Note: Author's elaboration.

The largest share of participants works for a SHI company (R₁: 43.8%; R₂: 48.0%). In addition, the panel is made up of various professions as the second largest group (R₁: 21.9%; R₂: 28.0%). The free-text analysis reveals that this group primarily consists of employees from the consulting sector. The third-largest group of participants is affiliated with universities (R₁: 12.5%; R₂: 12.0%). Additionally, there were participants from politics (R₁: 6.3%; R₂: 4.0%), IT service providers or their

representatives (R₁: 6.3%; R₂: 0.0%), healthcare professionals or their representatives (R₁: 3.1%; R₂: 4.0%), as well as employees from non-university research institutions (R₁: 3.1%; R₂: 0.0%). The expertise from IT and non-university research institution employees was only represented in the first survey round. Given that health insurance fund employees constituted the largest group of experts, further analysis was conducted to assess any differences in response behavior between those affiliated with SHI and other participants. Despite the strong representation of SHI members, the heterogeneous composition of the expert panel ensures that the study does not lean toward a single perspective. Participants were selected for their expertise in the field of dHL and, through their professional roles, also hold influence over the future shaping of regulations, responsibilities, and measures in this area.

At the beginning of each topic block in the first round of the Delphi survey, experts were asked to assess their level of expertise in the respective topic area. This aimed to capture the existing expertise more accurately and allow for consideration of any knowledge gaps in later results analysis and interpretation. Since the two survey rounds were conducted in close succession, expertise assessment was not repeated in the second round. Furthermore, the benefit of a shortened position paper that could be more efficiently completed by the experts outweighed the knowledge gained from a repeated assessment. Experts could indicate their individual expertise level on a six-point scale from 1 (very high expertise) to 6 (no expertise). Figure 35 presents the experts' self-assessed levels of expertise across the four topic blocks, showing results for the total sample (blue), SHI members (orange), and other participants (green).

Figure 35: Comparison of self-estimated expertise (mean values)



Note: Author's elaboration.

The participants' self-assessed expertise in all topic areas generally falls in a "rather high" range. The highest average expertise was reported in Topic Block 2, regarding the roles and responsibilities of actors within the SHI system for promoting dHL. Here, SHI-affiliated participants and other respondents rated their knowledge similarly ($MV_{all, SHI, others}: 1.7$). Only in Topic Block 1, addressing new competence requirements in healthcare, one expert indicated a rather low level of knowledge. This topic block ($MV_{all}: 2.0$) and Topic Block 4 on potential support measures ($MV_{all}: 2.1$) showed the lowest self-assessment of expertise across all groups. This may be due to both topics being future-oriented and therefore less concrete than established stakeholders and the (legislatively established) integration of dHL in healthcare.

The largest difference in expertise between the comparison groups SHI and others is observed in Topic Block 3. Here, SHI members reported significantly higher expertise in the integration of dHL into healthcare, with an average score of 1.6, compared to other participants ($MV_{SHI}: 2.2$). Among the latter, one-third rated

their expertise as only moderate, while SHI members consistently reported "very high" or "rather high" expertise. This difference might be explained by the legal obligation of health insurance funds to support dHL. Further insights regarding the experts' knowledge will be explored in the following chapters on the respective topic blocks. All in all, despite intensive reminders via E-Mail and social media, seven experts less took part in the second survey round than in the first. Nevertheless, the structural composition of the expert panel was largely maintained and additionally represents the structure of the initially defined expert panel (n=79).

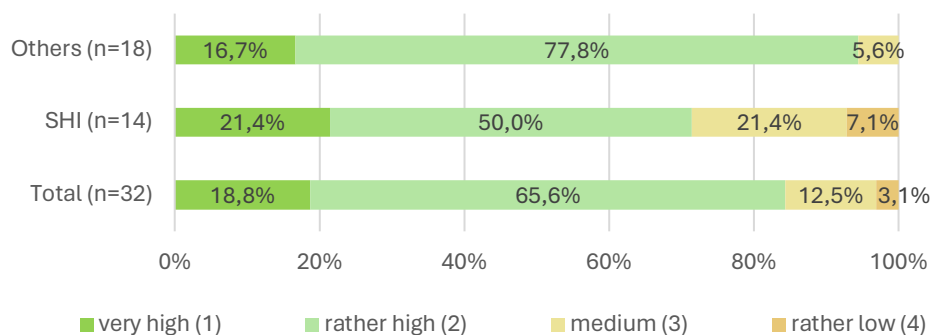
5.2. RESULTS: NEW COMPETENCE REQUIREMENTS IN THE SHI SYSTEM

The first thematic block of the Delphi survey focused on future skills for people with statutory health insurance in the German healthcare system. Based on the literature research and the expert interviews, it became clear that the skills insured persons need will change in the coming years, particularly because of further digitalization. However, it is not exactly clear which skills will really be relevant in the coming years and whether these should also be considered in the promotion of dHL and promoted as specific sub-skills. The aim of the thematic block was therefore to review the facets of dHL in terms of their relevance to see whether and where the promotional focus should be placed in the coming years. And whether there are any other competencies that are currently not yet included in the GKV-SV specifications but are nevertheless important. The theses developed are on the one hand based on future skills caused by the changing role of patients and the current legal regulations in Germany as outlined in the literature review. On the other hand, the results of the expert interviews were included. The theses take into account both competence facets that can be found in the definitions and conceptual approaches of dHL, as well as other competences that go beyond these and are more future-oriented. All theses were concretized with specific examples in order to support the experts' common understanding of a particular thesis.

At the beginning of the theme block, the experts were asked to rate their level of expertise considering new competence requirements. Most experts stated that they had a rather high or very high level of expertise in the topic area. Figure 36

visualizes the experts' self-assessed level of expertise on new competence requirements in the German healthcare system for insured persons by 2030 as a whole and in the subgroups of SHI employees and other participants.

Figure 36: Self-estimated expertise in topic block 1 (new skills requirements)



Note: Author's elaboration.

It becomes clear that a total of 84.4% of participants rated their level of expertise as rather high or even very high. 12.5% stated their level of expertise as medium and 3.1% as rather low. On closer inspection of the two sub-groups, it is noticeable that 94.5% of the other participants rated their knowledge as very high or rather high and 5.3% of the respondents stated that they had medium knowledge. In comparison, 71.4% of SHI members stated a very high or rather high level of expertise and 21.4% a medium level of expertise. In addition, one expert stated a rather low level of expertise in the subject area of the new competence requirements. No expert stated that they had no expertise in the subject area. For the further analysis, no questionnaires had to be excluded from the evaluation due to a low proportion of rather low expertise (n=32).

In the Delphi survey, the specific task of the experts was to indicate whether they agree that insured persons must have a certain competence by 2030 and how important the respective competence is in connection with the promotion of dHL.

Two four-point Likert scales were used for this purpose, based on which the experts were asked to express their agreement (fully agree (1), agree (2), disagree (3), disagree at all (4)) and relevance (very important (1), important (2), not important (3), not important at all (4)). The exact result of the experts' assessment can be seen in Figure 37.

The GKV-SV defines dHL as "the ability to find, understand, assess/ evaluate and use health-related information in relation to digital applications and digital information services" (GKV-Spitzenverband, 2020, p. 1) and defines the objective of the support services as informing and enabling insured persons to access and use digital health services for themselves and to make self-determined decisions about the use of digital services in the context of healthcare. Data protection issues should also be taken into account here (GKV-Spitzenverband, 2020, p. 1 f).

With regard to the competence requirements submitted for assessment as a whole, the majority of the expert group assumed that these will be a requirement for people with statutory health insurance in the SHI system by 2030 and that it is fundamentally important to also consider these aspects as sub-competences as part of the promotion of dHL. The sub-skills "Insured persons must be able to use their electronic patient file" and "Insured persons must be able to use digital structures in the SHI system" received particularly high levels of agreement and relevance. All experts fully agree or agree that insured persons must be competent in these areas by 2030. Along with this, all experts also stated that they consider the promotion of skills in the use of digital structures and the electronic patient file as part of support measures for dHL to be important or very important. Individual digital structures in the healthcare system were already established in the German SHI system at the time the Delphi study was conducted.¹⁹ Based on the developments, it also seems logical that insured persons should be able to use digital structures by 2030 and must be enabled to do so.

¹⁹ See chapter 2.1.2.

Figure 37: Future competences of insured persons in a digital SHI system by 2030

Thesis: The competence requirements for insured persons in the SHI system will change over the next few years as a result of ongoing digitalization. Please indicate the extent to which you agree with the following developments with regard to competence requirements for insured persons in the area of digital health by 2030 and assess their relevance in connection with the promotion of dHL.



Note: Author's elaboration.

The ability to use digital health information and services, to make self-determined decisions on the use of digital health services and to be familiar with data protection issues also received particularly high approval ratings. More than 60% of the experts "fully agreed" with the theses "Insured persons must be able to make self-determined decisions based on digital health information" and "Insured persons must be able to decide for themselves on the use of digital health services" and about 30% "agreed" with each. In addition, most experts agreed (fully agree: 43.8%; agree: 46.9%) that insured persons should have a certain understanding of data protection issues by 2030. With regard to the relevance of these skills, it can be seen that the experts consider making self-determined decisions based on digital health information in particular to be very important for promotion in the context of dHL (fully agree: 78.1%; agree: 15.6%). The ability to make self-determined decisions about the use of digital health services is also seen as very important by 65.6% of the experts and as an important sub-competence in the context of dHL by 21.9%. In contrast, 6.3% of the experts stated that this was not important or not important at all. Knowledge of data protection is seen as very important by 40.6% of the experts and as important by 53.1% of the experts in connection with the promotion of dHL. These three competencies are probably also most closely related to the definition and objective of dHL used by the GKV-SV in the guideline.

In connection with the use of digital healthcare services, there is also the expectation that insured persons will need to be able to communicate digitally with healthcare professionals by 2030, for example via video consultations (fully agree: 56.3%; agree: 34.4%) or handle digital documents (fully agree: 46.9%; agree: 46.9%). In addition, the experts assume that insured persons will need to improve their navigation skills in the healthcare system by 2030 and know which contact person is the right one for their respective concerns (fully agree: 58.1%; agree: 38.7%). This goes hand in hand with the finding from the literature that the healthcare system is becoming increasingly complex, and it is becoming more difficult for insured persons to find the right contact person in the system. A high level of navigation competence therefore seems essential to ensure participation in healthcare.²⁰ More than 90% of the experts agreed that insured persons must be able to understand

²⁰ See chapters 2.1.2 and 2.2.2.

their own health data collected via wearables, for example, by 2030 (fully agree: 48.4%; agree: 45.2%). The literature emphasizes that many health issues will shift to the home in the future due to digitalization and technological possibilities and that patients will have to go to a doctor's practice less and less often to share information about their state of health.²¹ In this context, patients will have greater personal responsibility, as they should be able to better understand and classify the data they collect themselves. It therefore seems important that insured persons are better able to interpret health data correctly. In this context, however, one expert used the free text comments in the first thematic block to name further technical developments through AI and questioned the extent to which insured persons will still have to interpret data independently in the near future if the results can also be processed, communicated and transformed into individual recommendations for action by AI: "Due to the large amount of data in general in our lives, insured persons will increasingly be given less the data and more the interpretations and recommendations resulting from this data".

Most experts stated that they considered the skills listed above to be relevant in the context of promoting dHL. A total of 96.8% of the experts named understanding their own health data, a high level of navigation skills and the handling of digital documents as important or very important topics in the context of promoting dHL. 87.5% of the experts consider digital communication skills to be important (fully agree: 46.9%; agree: 40.6%). In the first round of the Delphi study, more than 75.0% of the experts stated that they agreed or fully agreed with all the competencies mentioned so far. The relevance of the competencies in connection with the promotion of dHL was also rated as very important or important by at least 75.0% of the experts for all items. Accordingly, the pre-defined stability of opinion was already evident in the first survey round, meaning that the items were no longer included in the second survey round.

One exception to this is the competence "Insured persons must be familiar with technologies such as AI or big data". In the first round of the survey, the experts were indifferent as to whether this competence will be required of insured persons by 2030 and whether knowledge in dealing with AI or big data should be

²¹ See chapters 2.2.1 and 2.2.2.

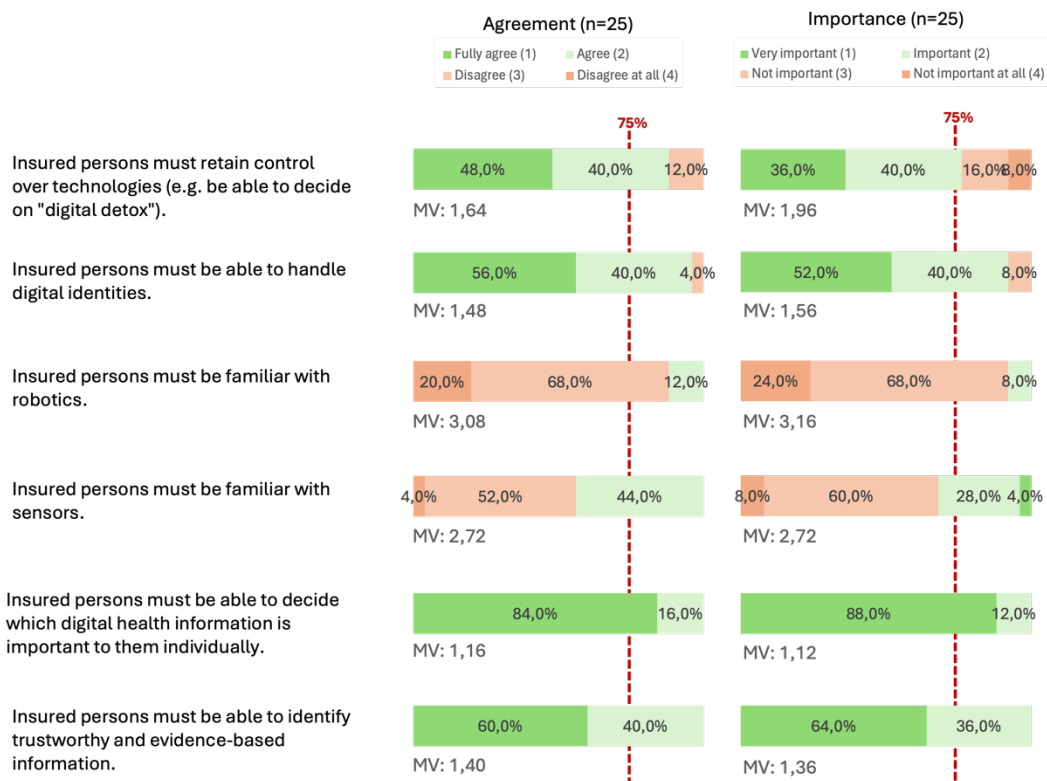
promoted as part of dHL. In the first survey round (n=32), around 60% of the experts agreed (fully agree: 6.3%; agree: 53.1%) that this knowledge will be a requirement for insured persons by 2030. In contrast, about 40% disagreed (disagree: 37.5%; disagree at all: 3.1%). In addition, 56.3% of the experts stated that they consider it very important (9.4%) or important (46.9%) that these skills are considered as part of dHL support measures. In contrast, 37.5% of the experts did not consider this important and 6.3% did not consider it important at all. The survey results of the first round were presented to the experts in the second round due to the indifferent opinion and the thesis was to be assessed neutrally. Almost 70% of the experts (n=25) stated that they fully agreed (24.0%) or agreed (44.0%) with the development. A third of the experts disagreed (28.0%) or did not agree at all (4.0%). The relevance of promoting knowledge in dealing with AI or big data was rated as very important (24.0%) or important (48.0%) by 72.0% of the experts and as unimportant by 28.0% of the experts. Accordingly, the second round of the survey showed a slightly higher level of agreement and a slightly higher relevance of the thesis. Overall, however, it was not possible to achieve an opinion stability of at least 75.0% agreement or rejection, or relevance or irrelevance as defined in the Delphi study.

Finally, in the first round of the survey, the experts were encouraged to use free text to add what other skills requirements they consider relevant for insured persons up to 2030. These were then included in the second round of the survey and presented to the experts for assessment in the same way as in the first round in order to obtain as holistic a picture as possible of the skills required. The assessment result is shown in Figure 38.

Apart from the competence "handling sensors", in the second round of the survey it was also possible to achieve stability of opinion in terms of agreement and relevance for all of the other five competences named by the expert panel.

Figure 38: Future competences of insureds in a digital SHI system by 2030 (added by experts)

Thesis: The competence requirements for insured persons in the SHI system will change over the next few years as a result of ongoing digitalization. In addition to round 1, new response options were added based on your free text responses. Please indicate the extent to which you agree with the following developments with regard to competence requirements for insured persons in the area of digital health by 2030 and assess their relevance in connection with the promotion of dHL.



Note: Author's elaboration.

The competence "Ability to filter digital health information with individual relevance" received the highest approval and relevance scores overall. In the first round of the survey, the relevance of this competence was justified by the increasing flood of digital information, which makes it increasingly important for insured persons to be able to assess for themselves which information is relevant to them. All experts agreed (16.0%) or fully agreed (84.0%) that this competence will be relevant for insured persons by 2030. The relevance of promoting this competence as

part of the promotion of dHL was rated as very important (88.0%) or important (12.0%) by all experts. In connection with the increasing availability of digital information, the experts believe that it is also becoming increasingly important for policyholders to identify trustworthy and secure information from the mass of information available. The experts see the increasing spread of misinformation, myths, and false promises of salvation via the internet as a growing challenge for policyholders in the future. According to one expert, the use of AI in connection with digital health information also increasingly requires the ability to identify reliable information: "Particularly with regard to the use of AI, it is becoming increasingly important for insured persons to be able to distinguish between real and fake and therefore trustworthy and untrustworthy".

These aspects serve the ability to assess digital health information. For this reason, the thesis "Insured persons must be able to identify trustworthy and evidence-based information" was included in the second round of the survey. Overall, all experts agreed (40.0%) or fully agreed (60.0%) that this competence will be relevant for insured persons in the SHI system by 2030. All experts also rated the relevance of promoting this competence as part of dHL as very important (64.0%) or important (36.0%).

Due to the increasing role of technology in everyday life, one expert expects that by 2030, insured persons will need to be able to maintain control over the use of technology and, for example, take digital breaks ("digital detox") to not overextend themselves. 88.0% of experts agree that this ability will be relevant for insured persons by 2030 (fully agree: 48.0%; agree: 40.0%). 76.0% of the experts also consider it important (40.0%) or very important (36.0%) that this topic is also included as part of support measures for dHL. So, only a narrow stability of opinion was achieved, with 16.0% and 8.0% of experts saying that this was not important or not important at all. In general, the ability to maintain a controlled approach to digital technologies regarding one's own health is considered important in an increasingly digital world. Whether this ability is also relevant in the context of promoting dHL, however, is only rated as positive with a narrowly stable opinion.

In addition to the theses on dealing with digital structures in the SHI system that were already included in the first round of interviews, the experts also stated that insured persons should also be able to handle digital identities by 2030. The

digital identity in the healthcare system will be used in future as a replacement for the electronic health card and will then give insured persons cardless access to all applications of the telematics infrastructure. It will therefore serve as an essential key to being able to use services such as the electronic patient file or the electronic prescription. As the so-called "health-ID" is already established in Germany, it is not surprising that 96.0% of experts agree (40.0%) or fully agree (56.0%) that insured persons will be faced with this requirement by 2030. On top of that, 92.0% of the experts consider it very important (52.0%) or important (40.0%) that the handling of digital identities is considered as part of the promotion of dHL.

There was no stability of opinion regarding agreement and importance in the context of promoting dHL for the competence "Insured persons must be familiar with sensors". There is a tendency for the experts not to see this competence as coming to SHI-insured persons by 2030, as a total of 56.0% of the experts disagreed with the thesis (disagree at all: 4.0%; disagree: 52.0%). 68.0% of the experts also assume that the promotion of skills in dealing with sensors should not be part of support measures for dHL (disagree at all: 8.0%; disagree: 60.0%). The only competence requirement for which a high level of stability of opinion has emerged that it should not occur and should not be relevant for promotion is knowledge of robotics. 88.0% of the experts stated that they do not agree (at all) that this competence requirement will be relevant for SHI-insured persons by 2030 (not important at all: 20.0%; not important: 68.0%). As a result, 92.0% of the experts stated that they did not consider the promotion of skills in dealing with robotics to be part of support measures for dHL (not important at all: 24.0%; not important: 68.0%). One expert explained this as follows: "It should not/cannot be the task of each individual policyholder to understand the individual technologies (How does big data work? To what extent does AI play a role in application x or diagnosis y and which one?) That would possibly be too much for the individual".

In the concluding comments on the theses of the first thematic block, some experts emphasized that, in addition to the promotion of relevant skills, a certain rethinking of the SHI system must also take place to become more digitally health literate: "We can't just discuss the topic with skills. We also need to focus on the mindset. People need to be more open to change in the healthcare sector and want to try out new things. This has more to do with personality and attitude than with

skills". This emphasizes that, in addition to individual ability, the corresponding will is also necessary to be able to successfully use new, digital information channels and services. To underline the range of opinions among the experts having in mind the research objective of the type III Delphi study, one statement shall be presented where a participant fundamentally questioned whether the skills required in the healthcare sector will change by 2030: "Further mandatory skills requirements are not expected by 2030; digitalization will not yet be established across the board". Even if the majority of experts assume that insured persons in the SHI system will face new skills requirements as a result of increasing digitalization by 2030, not all experts on the panel are convinced of this.

All in all, it became clear that there is a largely uniform opinion among the experts regarding the future development of skills requirements in the SHI system and the relevance of promoting these as part of the support measures for dHL. For most theses, it was possible to achieve a stable opinion in one direction or the other after one round of questioning. Although the result cannot predict the future, it indicates a direction as to which competencies may be relevant for insureds by 2030 and whether current regulations on support measures adequately meet these requirements or should be further developed. The skills to be promoted included in the guideline by the GKV-SV are also considered relevant by most experts. Within the survey, most competence requirements showed a stability of opinion in one direction or the other. The theses that received the highest level of agreement were those that are probably most closely related to the definition and objective of dHL used by the GKV-SV: the assessment and use of digital health information for self-determined, individual health decisions and the independent making of decisions about the use of digital health services and structures. In addition, the ability to use digital structures, especially in the SHI system, such as the e-prescription, electronic health record, digital identities, digital documents, or video consultations, should also be promoted. This also includes access to digital health information and services, as well as understanding one's own health data, which is collected, for example, based on smartwatches. Data protection issues and control over the use of technologies are also considered to be part of the promotion of dHL. These topics are already covered by the GKV-SV guideline and some (few) available offers for the promotion of dHL by SHI funds in accordance with § 20k SGB V. But on top of that,

the experts see some more competence requirements that might be relevant for insured persons by 2030 and should be considered in the context of support measures for dHL, which are not explicitly mentioned in the guideline of the GKV-SV or covered by existing measures. For example, the assessment of the reliability of digital health information was mentioned several times by the experts in the free text comments as a relevant competence for insured persons in the SHI system by 2030.

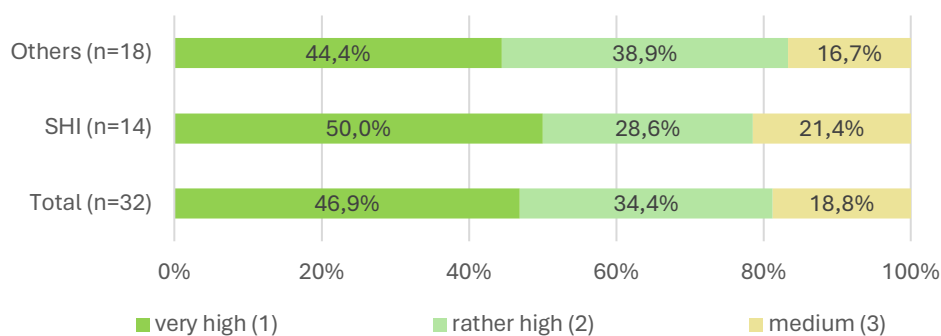
Opinions are rather indifferent when it comes to theses that overlap with technology topics. Here, the experts are apparently still uncertain about the relevance of technological competences in the healthcare sector and especially in connection with the promotion of dHL. There is still a lack of a stable opinion among experts regarding the theses on general technical skills in dealing with AI or sensors. While some experts consider these skills to be relevant for insured persons by 2030, others do not and additionally see no need for such support as part of dHL. There is a higher level of approval for technologies such as AI and big data, possibly because they are already more present in the everyday lives of many people and receive a lot of media attention, which increases their awareness and the perception of their importance. A competence that is of undisputed importance in this context, as already mentioned, is the assessment of information generated by technology, for example via AI or big data analyses. The relevance of skills in dealing with robotics, on the other hand, is by most experts not seen as a realistic development and therefore rated as unimportant in the context of dHL promotion. The area of technology-oriented skills is a highly dynamic topic, the relevance of which the experts have not yet been able to assess with a clear opinion. It is possible that the results of the survey would be different just a few months after the initial survey if it were conducted again, as developments in this area are progressing rapidly.

5.3. RESULTS: RESPONSIBLE ACTORS FOR THE PROMOTION OF DIGITAL HEALTH LITERACY

The aim of the second thematic block was to determine the extent to which established roles, responsibilities and structures in the SHI system need to be further developed for the successful promotion of dHL. Compared to the other blocks, the respondents rated their subjective expertise in this thematic area the highest

(MV_{all} : 1.7). Figure 39 visualizes the experts' self-assessed level of expertise for the panel as a whole as well as in the subgroups of SHI employees and other participants.

Figure 39: Self-estimated expertise in topic block 2 (roles and responsibilities)



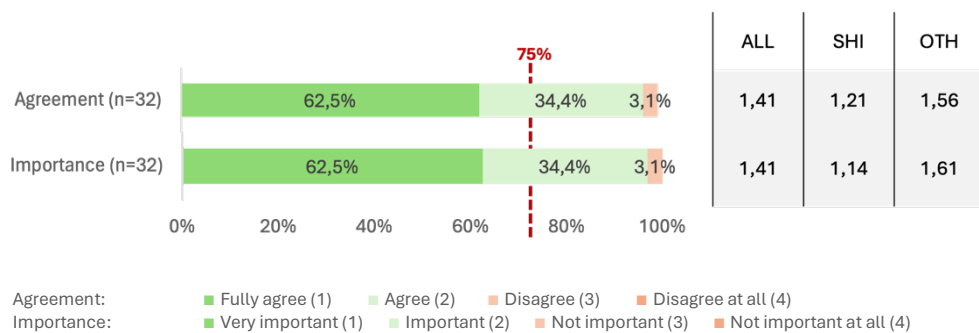
Note: Author's elaboration.

Almost half of the experts stated that they had a very high level of expertise in the topic of roles and responsibilities for promoting dHL (46.9%). Further 34.4% stated that they had a rather high level of expertise and 18.8% a medium level. This distribution is also reflected in a closer analysis of the two subgroups SHI members and other professional groups. Overall, none of the respondents indicated a rather low or very low level of expertise in the subject area, meaning that all questionnaires could also be included in the analysis in this subject block ($n=32$).

At the beginning of the second thematic block, the experts were first asked to assess a thesis on the fundamental responsibility of the SHI system for the promotion of dHL. For this purpose, two four-point Likert scales were used with the levels Agreement (Fully agree, agree, disagree, disagree at all) and Importance (Very important, important, not important, not important at all). In the interviews and literature, it was frequently described that the promotion of dHL should be understood more strongly as a task for society as a whole and that other policy areas such as schools should also promote skills that are connected with dHL. Accordingly, the

thesis to be assessed was **"In the spirit of a "Health in All Policies approach", certain skills required for a high dHL should also be promoted in other policy areas outside the SHI system (e.g. in schools)".** The result is visualized in Figure 40. The distribution of responses is shown on the left-hand side and the mean value for the respective survey group is shown on the right-hand side.

Figure 40: Assessment of the thesis "In the spirit of a "Health in All Policies approach", certain skills required for a high dHL should also be promoted in other policy areas (...)."



Note: Author's elaboration.

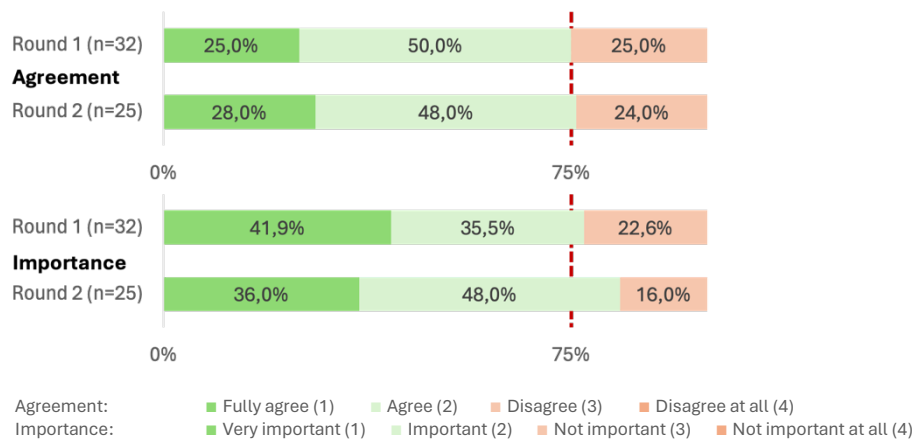
The experts agree with the thesis that dHL should not only be promoted within the SHI system, but also in other policy areas. At this point, the experts' opinions largely coincide with the literature findings and the expert interviews. Only one expert disagreed with this thesis and did not consider this development to be relevant. The mean agreement and relevance values of the SHI members are higher than those of the rest of the group.

The experts were also asked to assess two theses on the further development of traditional job profiles in the healthcare sector due to changing skills requirements in connection with digitalization and the promotion of dHL. Specifically, the experts were also asked to indicate the extent to which they agreed with a thesis and how important they consider the development to be with regard to the successful promotion of dHL. Once again, the Likert scales were used to answer the

questions, with agreement (Fully agree, agree, disagree, disagree at all) and importance (Very important, important, not important, not important at all). The first thesis to be assessed was **"New skills requirements with regard to digital health will change the job profiles of those involved in the SHI system by 2030"**. 34.4% of the experts (n=32) fully agreed and 53.1% of the experts agreed that the job profiles of those involved in the SHI system will change by 2030 due to new skills requirements with regard to digital health. 12.5% of the experts disagreed that the development will occur. 41.9% of respondents (n=31) consider this development to be very important for the successful promotion of dHL and 38.7% consider it to be important. 19.4% of the experts do not consider this to be important. As more than 75.0% of the experts already (fully) agreed with the thesis in the first survey round and considered the development to be (very) important, it was not included again in the second survey round.

The second thesis on the further development of traditional job profiles was **"By 2030, new job profiles will be established to promote the dHL of insured persons in the SHI system (example: introduction of a "digital nurse")"**. In the first survey round, 25.0% of the experts (n=32) fully agreed with this development and 50.0% agreed. In addition, a quarter of the experts stated that they disagreed. As the approval rating was exactly 75.0%, the thesis was included in the second round of the survey. Here, 28.0% of the experts (n=25) stated that they fully agreed with the thesis and 48.0% agreed. In contrast, 24.0% disagreed. For the relevance of this development, an agreeing opinion stability was achieved in both rounds ($R_1=77.4\%$, $R_2=84.0\%$). Figure 41 visualizes the survey results described above.

Figure 41: Assessment of the thesis "By 2030, new job profiles will be established to promote the dHL of insured persons in the SHI system."



Note: Author's elaboration.

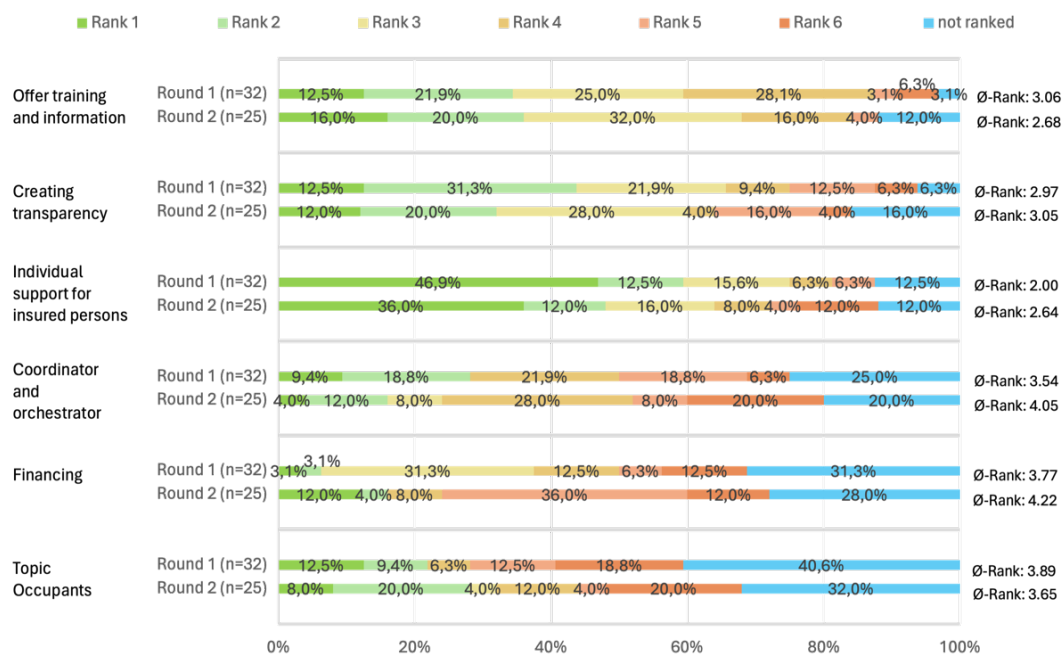
Based on the results of the two theses, the experts assume that new skills requirements and the necessary promotion of dHL will have an impact on traditional job profiles in the SHI system and that these will change in the future. The experts also consider it important for the successful promotion of dHL that this further development takes place.

To concretize this and also generate new insights into the future tasks of the players in the SHI system, theses on this were included in the Delphi study. Firstly, the experts were asked to assess the extent to which the roles of the key players - health insurance funds, doctors and politicians - will change by 2030 with regard to promoting the dHL of insured persons. Based on the expert interviews and the literature research, theses on the potential future tasks of the respective actors were developed. The experts were then asked to assess which of the tasks presented would be taken on by the stakeholders and what priority they would give to the task. The priority of the task was to be presented using a ranking.

Figure 42 shows which tasks the respondents would consider relevant for the SHI funds in the future and which tasks they do not see for them. The ranking results of both the first and second survey round are shown for each potential task

using the bars. Each bar shows, which proportion of the experts prioritized the corresponding task, and at which rank. The blue part of the bar represents the proportion of experts who did not include a task in the ranking and therefore did not see the task in question as a task for the health insurance funds. The tasks are abbreviated in the diagram for the sake of clarity; in the Delphi survey, they were accompanied by explanatory text and examples to ensure a uniform understanding among the experts. With the bar chart, the focus of the evaluation is initially on whether a task should be assumed by the health insurance funds in the future. For the relevance of a task, the mean ranking values are subsequently included in the evaluation.

Figure 42: Ranking of potential future tasks of SHI companies to promote dHIL of insured persons



Note: Author's elaboration.

The task that was included in the ranking most frequently across both survey rounds, is the provision of training and information material to policyholders. This

means that the SHI funds should offer their policyholders training courses on dHL topics or promote dHL via information media such as flyers or articles in member magazines. Only one expert (R₁; 3.1%) and three experts (R₂; 12.0%) do not see this as a task for the statutory health insurance funds. Another task that is seen as being the responsibility of the health insurance funds is to create transparency about existing digital offerings in the healthcare sector. In particular, this means that the SHI funds should better communicate and present their own service portfolio with regard to digital healthcare offerings in order to give insured persons an overview of which information offerings and services they can make use of in the digital healthcare sector. 93.7% of the experts in R₁ and 84.0% of the experts in R₂ included this task in their ranking. 87.5% (R₁) and 88.0% (R₂) of the experts also see the individual support of insured persons as a task of the SHI. In this role, the SHI funds would advise their policyholders more on digital information and services at the respective point of contact or direct the insured person directly to such services. This could help to increase the level of awareness, the use of the services and thus provide individual offers that also contribute to dHL.

75.0% (R₁) and 80.0% (R₂) of the experts see the role of coordinating and orchestrating activities to promote dHL in the sense of bringing together the relevant stakeholders for a joint approach as lying with the health insurance funds. Around a third of respondents does not see the SHI funds as responsible for funding support measures, including those of other stakeholders such as doctors in the SHI system (R₁: 31.3%; R₂: 28.0%). It is striking here that 57.1% of SHI employees in the first round in particular did not include this task in the ranking, which is in contradiction to the currently applicable regulations in accordance with the GKV-SV guidelines.²² 11.1% of the other professions did not include the task (R₂: SHI 25.0%; others: 23.1%). The experts see a similarly low relevance in the role of the topic occupier, which would mean that SHIs should position themselves more strongly as those primarily responsible for promoting dHL. In the first survey round, 40.6%

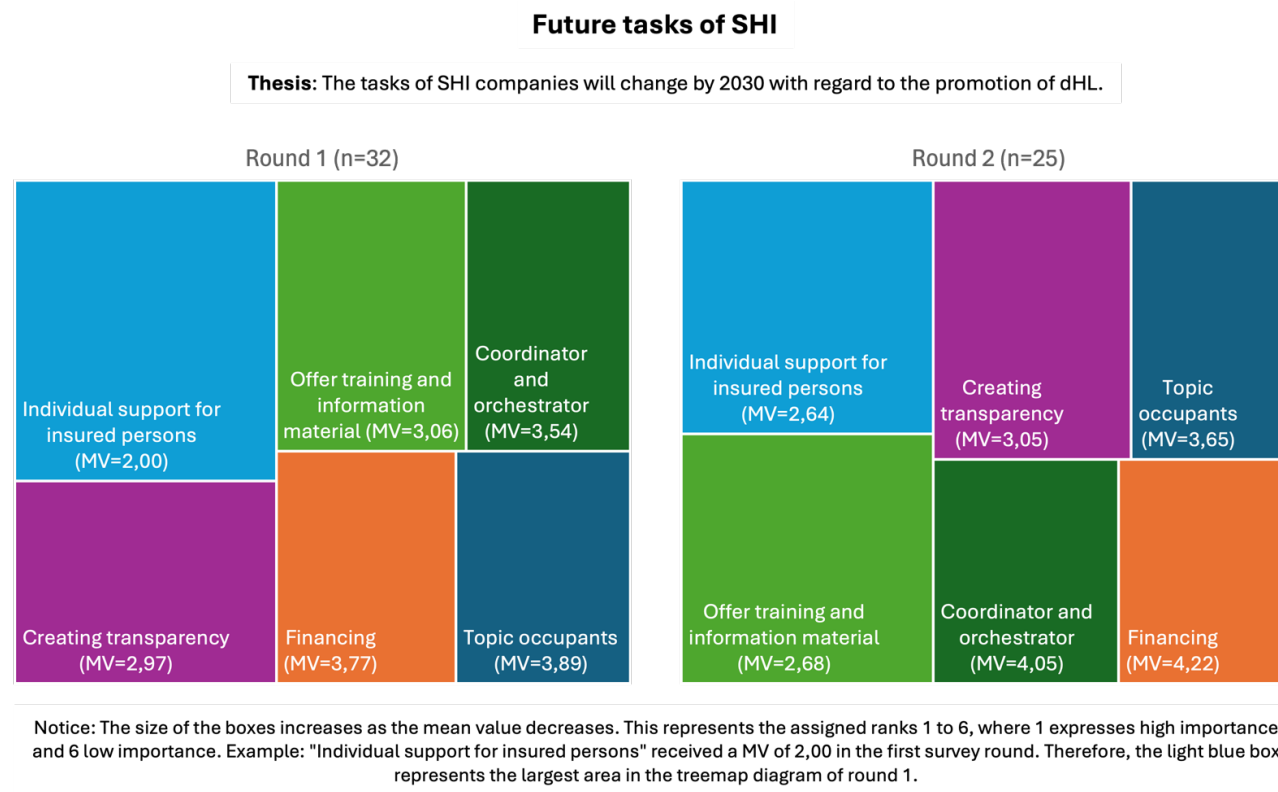
²² Accordingly, the health insurance funds are responsible for offering their policyholders services to promote dHL and, in this sense, for covering the costs. See also the following comments and the explanations in chapter 3.2.1.

of respondents did not assign this role to the SHIs, compared to 32.0% in the second survey round.

The interest in gaining insights into the future tasks of key players in the SHI system for the promotion of dHL was not limited to the tasks themselves. Rather, the aim was also to find out which tasks the respondents consider most important for the successful promotion of dHL. To reflect the opinions of the panel the mean rankings of the ranking were calculated and presented with the help of a treemap diagram in Figure 42. A treemap diagram allows to display data hierarchically. The area of the rectangles in the diagram is proportional to the data they represent. In this case, the size of a rectangle indicates the importance of the potential task of SHI funds from the experts' point of view. The figure shows the results for both rounds of the survey. Identical tasks are highlighted in the same color so that the changes between the two rounds are clearly visible at first sight. The calculated mean values have also been included in the figure for each potential task.

In both rounds of the survey, the task "individual support for insured persons" was attributed the greatest importance for the successful promotion of dHL on second and third rank came the provision of training and educational material and the creation of transparency about existing digital services in the healthcare system. The tasks of the topic occupier, coordinator and orchestrator and financing follow on the remaining ranks. Overall, it becomes clear that the experts assessed those tasks to be particularly important for the successful promotion of dHL that involve direct interaction with the insured persons. More overarching political activities such as, for example, the identification of topics or the coordination and orchestration of activities to promote dHL are seen as a less relevant contribution by SHI funds to the successful promotion of dHL. As already shown, the task of financing support measures was not included in the ranking by almost a third of the expert group in both survey rounds and was therefore not assigned to the SHI funds. The experts who did include financing in their ranking tend to see this task in the lower midfield of the ranking. Even though the financing of support measures in accordance with § 20k SGBV is a legal task of the SHI funds, it does not appear to be of the greatest importance for the successful promotion of dHL from the experts' perspective.

Figure 43: Treemap-diagram of future SHI-tasks considering the promotion of insureds dHL



Note: Author's elaboration.

In their view, insured-related support and the independent provision of training and information material are more important. One SHI-expert stated in the free text comments that the cooperation of society as a whole is crucial: "Even if the strengthening/promotion of the digital health literacy of insured persons has been assigned to the statutory health insurance funds by § 20k SGB V, implementation is still a task for society as a whole that can only be achieved jointly and by all systems. The earlier citizens are or become health literate, the more positive it is for their own health and the less burden it places on the entire (healthcare) system. In the best-case scenario, the topic should already be made compulsory in the school setting".

Regarding the tasks of **doctors**, both rounds of the survey showed a homogeneous picture. The result is shown in Figure 44. The design follows the logic of the presentation of the SHI funds results (Figure 42).

Figure 44: Ranking of potential future tasks of doctors to promote dHL of insured persons



Note: Author's elaboration.

The tasks that were most frequently included in the ranking by the respondents in both survey rounds and thus assigned to doctors firstly includes directing insured persons to suitable digital services (R₁: 90.6%; R₂: 80.0%). This task refers to the fact that in future, doctors should proactively provide insured persons with digital health information and steer them towards digital health services. This can help to promote trust and to fuel the use of reliable digital health information and applications by insured persons. At the same time, the role of the intermediary also promotes the use of digital infrastructures in the SHI system, such as electronic prescriptions, video consultations or digital health applications. Another task that was included in the ranking by most respondents in both survey rounds was the use of a digital infrastructure in their own practice (R₁: 90.6%; R₂: 80.0%). Following on from the role of the intermediary, the experts expect doctors to digitize their own practice processes to support a digital infrastructure in the SHI system and thus create a basis for the use and communication of digital health information and applications. To enable the competent handling of digital health information and applications and to be able to adequately represent this in the role of intermediary, the experts also consider the development of an organizational dHL for the doctors themselves and the practice staff to be important. In the first round of the survey, 87.5% of the experts included this task in the ranking; in the second round of the survey, this proportion was 84.0%.

In direct contact with the insured persons, the tasks of patient empowerment and acting as a role model as a testimonial were also attributed to doctors, although between a fifth and a quarter of respondents did not rank these tasks. Specifically, these tasks would mean that doctors should pay more attention to promoting and also demanding digitally health-competent insured persons in everyday treatment and that they themselves should be open to digitalization topics and communicate this openly in treatment, for example by demonstrating the added value of digital solutions instead of communicating constraints.

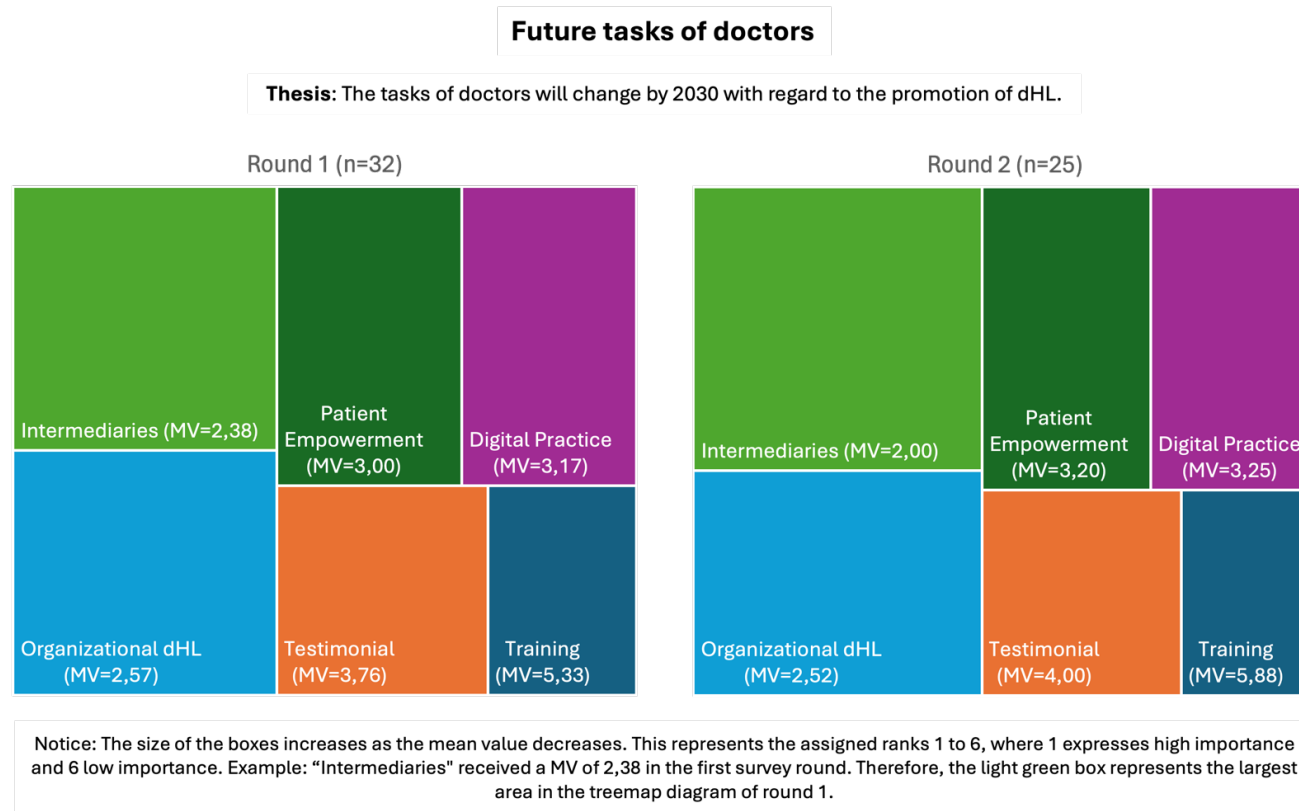
A clear picture emerges for the task of training insured persons. 62.5% of the experts in the first round of the survey believed that training insured persons should not fall within the remit of doctors. In the second survey round, this proportion was 32.0%, with the experts who included this task in the ranking assigning it a low relevance (rank 5: 8.0%; rank 6: 60.0%).

Also for the doctors it was important, which tasks were considered most important by the experts. The mean rankings of the individual tasks were therefore also determined here. The following Figure 45 shows the calculated mean values of both survey rounds with the help of a treemap diagram. The visualization follows the logic of the presentation in Figure 43.

The analysis of the mean values and the ranking shows that there were no changes in ranking from the first to the second round. Although the mean values themselves changed, this had no effect on the ranking itself. The three highest-ranked tasks for physicians in both survey rounds were communication, creating organizational clarity, and patient empowerment, which was closely followed by digital practice. The tasks ranked as least important were testimonials and training. Overall, the tasks of doctors for the promotion of dHL should on the one hand be reflected in the existing interaction with patients. For example, the experts consider it important for the successful promotion of dHL that doctors guide the insured person at the point of contact to individually tailored digital health information and services. On the other hand, it was considered important that doctors should demand greater personal responsibility for health and related decisions from the insured. On the other hand, however, the experts also see it as the task of doctors to strengthen their own (organizational) dHL and to set up their own practice digitally to enable a digital infrastructure. According to the experts, it is therefore not only important for the successful promotion of dHL that doctors support their patients in the digital world, but also that they themselves create the appropriate framework conditions to be digitally health literate and to be able to use and communicate digital information and services in the first place. This corresponds with the facet of organizational dHL, which Samerski & Müller (2019b) describe in their explanations.²³

²³ The aspect of organizational dHL is described in more detail in chapter 3.1.2 and refers, among other things, to the targeted promotion of dHL among insured persons.

Figure 45: Treemap-diagram of future tasks of doctors considering the promotion of insureds dHL



Note: Author's elaboration.

The overall expert group also agreed that the training of insured persons is the task that doctors should pursue with the lowest priority. In both subgroups, in both rounds and in the overall evaluation, the task was ranked last in each case (R₁: 5.33; R₂: 5.88). It already became clear in the expert interviews that the participants do not consider it realistic for doctors to train insured persons. The reason for this is the scarcity of medical resources, which should rather be used in other areas of the healthcare system. Due to developments such as the shortage of specialists, the efficient use of medical resources will become increasingly important in the future.²⁴ The respondents in the interviews tended to see other players such as SHI funds, adult education centers or even new professional groups such as digital nurses as being responsible for training the insured.

For a third and final time, the experts were asked to draw up a ranking of possible future **politics** tasks in connection with the promotion of dHL among insured persons. The presentation of the results in Figure 46 and Figure 47 also follows the logic of the previous visualizations.

With regard to the tasks of politics, the most frequently ranked task in both rounds of the survey was the statutory framework as a legal basis setter (R₁: 87.5%; R₂: 84.0%). This means that politics continue to be responsible for enacting and specifying the legal requirements for the promotion of dHL in accordance with § 20k SGB V. The task that was included in the ranking second most frequently in both survey rounds is the promotion of general dHL (R₁: 84.4%; R₂: 84.0%). This task refers to the idea from the expert interviews of not only promoting the dHL of insured persons individually at the respective point of contact with the SHI systems and its respective actors, but also promoting a general dHL, which could be done via information campaigns on a trustworthy body, such as politics in the form of the BMG or the BZgA. In recent years, this has already taken place in Germany, for example, in the form an AIDS campaign or, in times of the coronavirus pandemic, for the implementation of vaccinations or a warning app.²⁵

²⁴ See also the explanations in chapter 2.1.2.

²⁵ See the explanations in chapter 4.3.2.

Figure 46: Ranking of future tasks of politics to promote dHL of insured people



Note: Author's elaboration.

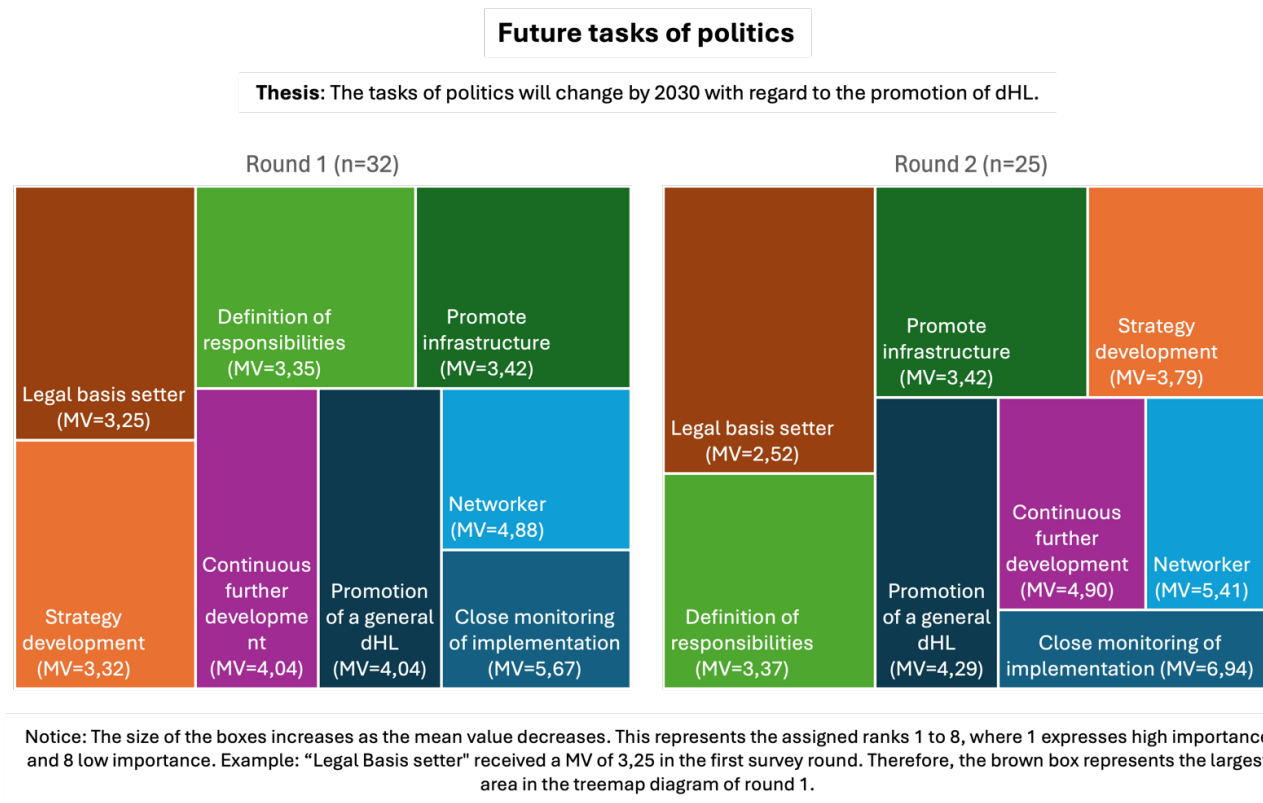
In the middle of the ranking, between 75.0% and 80.0% of participants ranked the tasks of politics. Closely related to the role of the legal basis setter, this concerns, for example, the definition of additional, responsible actors for the promotion of dHL beyond the previously defined one for SHI funds (R₁: 81.2%; R₂: 76.0%). Many experts also consider the further development of the guidelines in accordance with § 20k SGB V to be a task for policymakers (R₁: 81.2%; R₂: 80.0%). 81.2% of the experts in the first survey round and 68.0% of the experts in the second survey round also see politics in the role of a networker, which means the role of bringing together the players in the SHI system to promote dHL within the framework of jointly initiated measures. The creation of a digital infrastructure to make digital health information and services accessible to insured persons in the SHI system in

the first place is also seen as a task for policymakers in both survey rounds (R₁: 78.1%; R₂: 76.0%). 78.1% of the experts in the first survey round and 76.0% of the experts in the second survey round saw a stronger strategic approach to the topic of dHL, for example by integrating it into the BMG's digitalization strategy, as a further task.

A topic that is rarely included is "close monitoring", which means a close monitoring of the implementation of activities to promote dHL, including the imposition of sanctions in the event of non-compliance with legal mandates. This task was included in the ranking by 57.2% of respondents in the first round, and by 72.0% in the second round, although the relevance of the task was then rated at the lower end of the ranking. At this point, it is interesting that in fact there is a legal mandate to review the implementation of § 20k SGB V. More specifically, the GKV-SV regularly reports the activities of the SHI funds to the BMG. However, no sanctions are currently being imposed. Overall, apart from implementation control, the experts appear to consider the tasks presented to be necessary tasks for policy. By comparing the average rankings (Figure 47), further conclusions can be drawn about the relevance of the individual tasks.

Overall, there were some changes in the rankings of the tasks assigned to politics between the first and the second round of the survey. This is, on the one hand, due to the higher number of tasks to be ranked. On the other hand, a reason could be that comparatively more potential tasks were not included in the ranking than in the case of SHI funds and doctors. However, in both rounds of the survey, the role of politics as the provider of the legal framework was considered the most important task for the successful promotion of dHL. This goes in line with the existing legal regulations. Other important tasks that go hand in hand with a framework function and concretize this are defining further responsibilities for the promotion of dHL (R₁: rank 3; R₂: rank 2) and promoting a digital infrastructure in the SHI system as a basis for digital health information and services (R₁: rank 4; R₂: rank 3). The development of a strategy to promote dHL ranks second in the first round of the survey and fourth in the second round. This idea was raised by several experts in the interviews.

Figure 47: Treemap-diagram of future tasks of politics considering the promotion of insureds dHL



Note: Author's elaboration.

According to the overall opinion, the promotion of general dHL through, for example, awareness campaigns and the continuous development of the topic received medium priority. Both tasks were included in the ranking by the majority of experts but were placed in the middle range (Figure 46). It is also worth noting that close monitoring of the implementation of support measures and the proactive intervention as a networker ended up at the bottom of the ranking and were not included in the ranking by a large number of experts. This suggests that the majority of experts do not consider excessive political intervention, such as sanctions, implementation monitoring, or actively bringing stakeholders together, to be an effective means of successfully promoting dHL. Instead, the role of politics should focus on setting the legal framework and defining the guiding principles for promoting dHL. This is in line with the principle of self-administration in the German healthcare system and gives the actors a certain degree of personal responsibility for their actions.²⁶ However, in order to reflect the opinion diversity of the expert panel, one expert opinion from the free text comments should also be presented here, which at least refers to a stronger perception of the tasks of politics with regard to the biennial reporting obligation on measures to promote dHL:

"The normatively and technically defined responsibilities are often not reflected in the understanding of roles and, above all, in the active actions of the central SHI players. Since 2019, we have had a law that obliges SHI funds to provide services for their policyholders. Even today, a large proportion of SHI funds document that they do not provide any services or that their services do not meet the requirements (!). The BMG takes note of this - and does nothing. The SHI funds do not publish their reports on this - they only become transparent after being requested by insured persons via information portals, which shows that the SHI funds are not fulfilling their legally assigned roles and obligations. This behavior is one of the main obstacles to digital transformation (not "data protection", as these players often claim)."

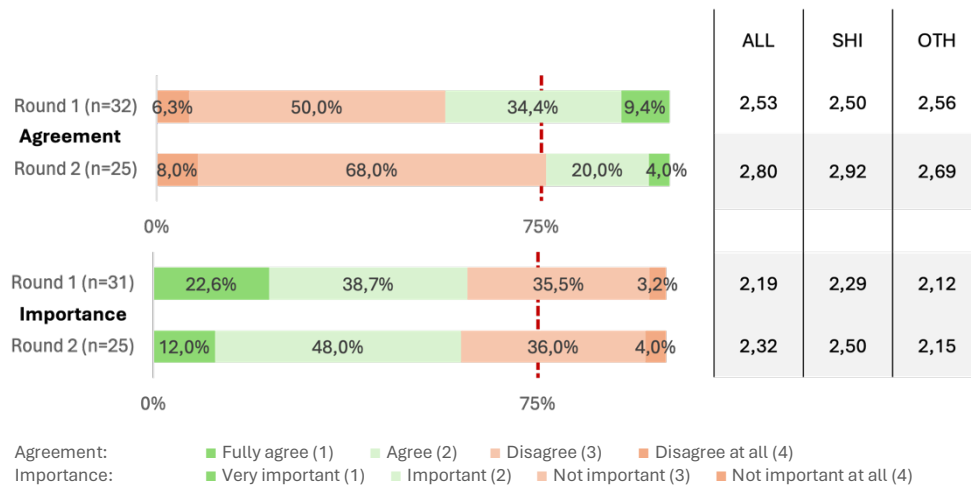
²⁶ The principle of self-governance is explained in chapter 2.1.2.

The three rankings enabled the ideas generated on the future structure of the roles and responsibilities of the three key players—SHI funds, physicians, and policymakers—to be ranked and further developed. Following the theses on the tasks of these central stakeholders, the experts were also asked to assess whether **other groups of actors** from the healthcare system should play a role in promoting dHL and what form this could take. In the interviews and the literature review, it was frequently pointed out that the health insurance funds are not the only institution in the healthcare system that can be made responsible for promoting dHL among the insured. Rather, other actors should be involved, so that theses on the responsibility of pharmacies, self-help groups, umbrella organizations and potential new organizations were included based on the ideas mentioned. The two Likert scales with the dimensions Agreement (fully agree; agree; disagree; disagree at all) and Importance (very important; important; not important; not important at all) were again used for the assessment.

The first thesis was **"By 2030, stakeholder groups such as self-help groups and patient organizations will contribute to the promotion of dHL with their educational offerings"**. A stable consensus (84.4%; fully agree: 18.8%; agree: 65.6%; n=32), that self-help groups and patient organizations will play a stronger role in the promotion of dHL was already reached in the first round. This aspect is considered as very important by 34.4% of the experts (n=32) and as important by 59.4%. Due to the high level of agreement, the thesis was not reassessed in the second round of the survey.

A second thesis outlined a possible future role for pharmacies in connection with the promotion of dHL: **"By 2030, pharmacies will be included in the promotion of dHL as a central consultation point for insured persons"**. The result is illustrated in Figure 48.

Figure 48: Assessment of the thesis "By 2030, pharmacies will be included in the promotion of dHL (...)."

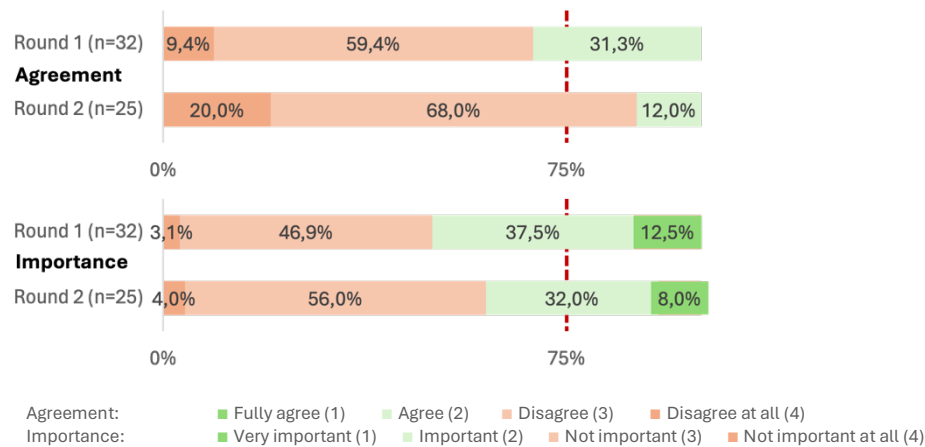


Note: Author's elaboration.

After a total of 56.3% of respondents in the first survey round stated that they did not agree (at all) that pharmacies should be included in the promotion of dHL, this proportion was 76.0% in the second round. This means that a stable level of agreement was achieved. A closer look at the mean agreement values reveals that the SHI members responded less positively on average in the second round than in the first round (MV_{SHI1} : 2.52; MV_{SHI2} : 2.92) and in comparison, to the other participants (MV_{OTH1} : 2.56; MV_{OTH2} : 2.69). In addition to the rather low approval of the outlined development, the relevance of the inclusion of pharmacies in both rounds is just under 60% (R_1 : 61.3%, R_2 : 60.0%). A rather indifferent opinion can be seen among the experts. In a comparison of the mean relevance values, the SHI members rated the relevance lower than the other participants and rated a lower relevance in the second round than in the first (MV_{SHI1} : 2.29; MV_{SHI2} : 2.50; MV_{OTH1} : 2.12; MV_{OTH2} : 2.15).

A similar picture emerged for the thesis "By 2030, a central and independent institution (e.g. foundation) will be established to promote dHL in the SHI system". The result is visualized in Figure 49.

Figure 49: Assessment of the thesis "By 2030, a central and independent institution (e.g. foundation) will be established (...)."



Note: Author's elaboration.

In some countries, there are specific institutions and foundations that are specifically responsible for promoting dHL and have, for example, set up their own dHL strategies and programs (Briseño, 2021, p. 30). The thesis presented above was defined to examine whether such a development could also be relevant for Germany. The figure shows that most experts do not believe that there will be an independent institution to promote dHL in the SHI system by 2030. In the first round, 68.8% of the experts stated that they did not agree (at all) with this development. In the second survey round, 88.0% of the experts disagreed (at all) and a stability of opinion emerged. Regarding the relevance of the development for the successful promotion of dHL, no clear opinion emerged. In the first round, half of the experts considered development to be (very) important and the other half considered development to be not important (at all). In the second round, 60.0% of the experts stated that they considered the development to be "not important (at all)" and 40% of those surveyed considered it to be "(very) important".

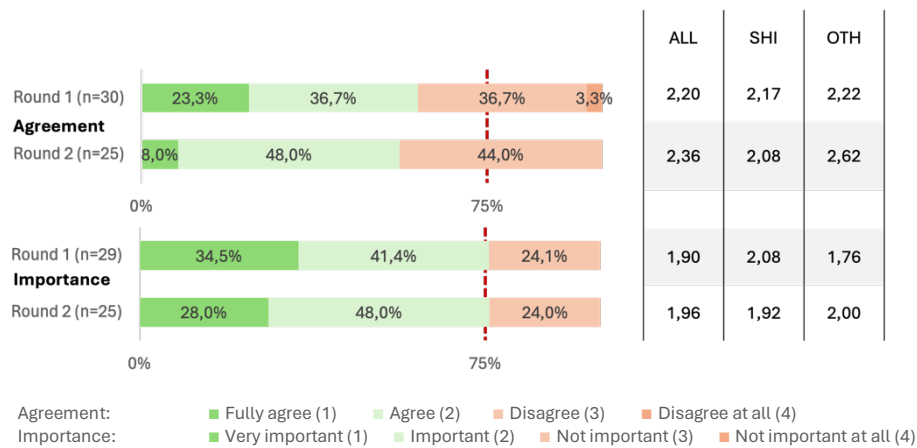
In Germany, there is already a cooperation project between scientific institutions that developed a national action plan for health literacy in 2018. The action

plan was developed with the participation of representatives from politics, civil society, healthcare professions and patient and citizen representatives and includes fifteen recommendations for action to promote the health literacy of the population.²⁷ In some interviews, the idea arose of also creating such an action plan for dHL, which is why the experts were asked to assess the thesis "**By 2030, there will also be a National Action Plan for the promotion of dHL**". The result (Figure 50) shows a rather indifferent picture with regard to the agreement to this development and at the same time a predominantly high relevance.

In both survey rounds, a stable opinion as to whether there will be a national action plan for dHL could not be reached. The experts are undecided here and responded almost equally in agreement ("fully agree" and "agree"; R₁: 60.0%; R₂: 56.0%) and disagreement ("disagree" and "disagree at all"; R₁: 40.0%; R₂: 44.0%). In the second round, there is a difference in the opinions of the two subgroups: on average, SHI members responded much more positively than the other participants. Regarding the importance of a National Action Plan, a narrowly stable opinion in both survey rounds that the development is (very) important (R₁: 75.9%; R₂: 76.0%) became evident. After the SHI members in the first round still attributed less relevance to development on average than the other participants (MV_{SHI}: 2.08; MV_{OTH}: 1.76), the average relevance value in the second survey round was almost at the same level and was more relevant in the SHI group than in the other group (MV_{SHI}: 1.92; MV_{OTH}: 2.00).

²⁷ Further information on the National Action Plan on Health Literacy can be found in chapter 3.2.1.

Figure 50: Assessment of the thesis "By 2030, there will also be a National Action Plan for the promotion of dHL."



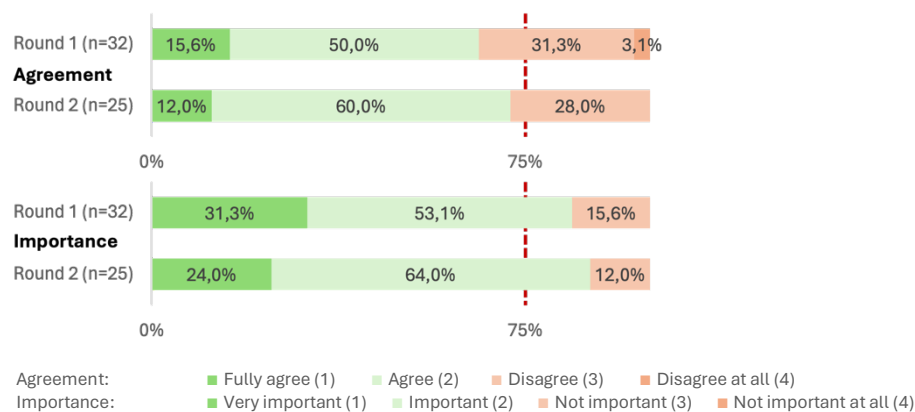
Note: Author's elaboration.

Finally, four theses on **organizational health literacy** were included in the survey. As the interviews and the literature research repeatedly revealed that not only the dHL of insured persons, but also that of healthcare employees should be strengthened, potential ideas for strengthening this in the German SHI system were transformed into theses.²⁸ Although the focus of the work is not on strengthening organizational dHL in the healthcare sector, this aspect should be taken into account in the sense of a holistic approach due to its frequent mention. The relevance of a high level of organizational dHL was also made clear by the experts in the survey via a free text comment on the second topic block: "Strengthening or expanding organizational health literacy is at least as important as strengthening the digital health literacy of each individual". The first thesis on the promotion of organizational dHL was **"By 2030, the interest groups and umbrella organizations in the SHI system will play a central role in promoting dHL of their members**

²⁸ Further information on organizational digital health literacy can be found in chapter 3.1.2 and chapter 4.3.2.

(e.g. GKV-SV, KVs and KBV)". This takes account of the idea that umbrella organizations in the healthcare system should be made more responsible for promoting the dHL of their members. Accordingly, this is not primarily about promoting the dHL of insured persons, but about the dHL of, for example, doctors who are in direct contact with patients and could therefore influence the dHL of insured persons. In addition to this idea, it became clear in the interview with members of two umbrella organizations that this role is not yet perceived as a task of the respective institution. The results of the survey are visualized in Figure 51.²⁹

Figure 51: Assessment of the thesis "By 2030, the interest groups and umbrella organizations in the SHI system will play a central role (...)."



Note: Author's elaboration.

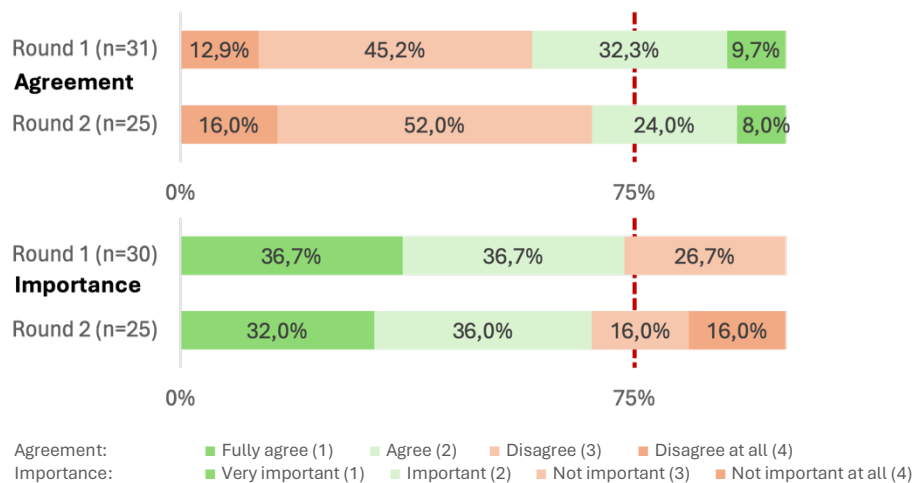
In both survey rounds, no stable opinion (> 75.0%) as to whether interest groups and umbrella organizations in the SHI system will be more involved was achieved. The majority of respondents (fully) agreed with this development ($R_1=65.6\%$, $R_2=72.0\%$), although just under a third of respondents disagreed (at all) ($R_1=34.4\%$, $R_2=28.0\%$). Although it was not possible to achieve a stable opinion on

²⁹ See the explanations in chapter 4.3.2.

the occurrence of the scenario, the experts consider the involvement of interest groups to be predominantly (very) important ($R_1=84.4\%$, $R_2=88.0\%$) regarding the promotion of (organizational) dHL.

In the interviews, the idea of mandatory training on dHL to strengthen organizational dHL came up. This could take place similar to the annual training doctors have to prove. The thesis to be assessed in this context was **"By 2030, all players in the SHI system will have to complete mandatory training on dHL"**. Figure 52 below shows the results.

Figure 52: Assessment of the thesis "By 2030, all players in the SHI system will have to complete mandatory training on dHL."

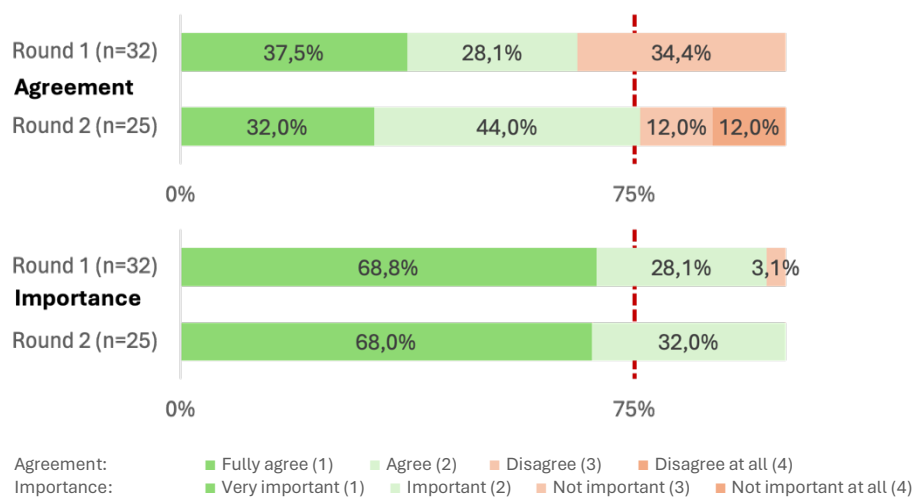


Note: Author's elaboration.

No stable opinion above 75.0% as to whether there will be mandatory training on dHL for stakeholders was achieved in the survey rounds. However, most respondents do not agree (at all) with the development ($R_1: 58.1\%$; $R_2: 68.0\%$). Also, no stability of opinion was achieved regarding the relevance of this development. However, the development is predominantly considered as (very) important ($R_1: 73.3\%$, $R_2: 68.0\%$).

In addition to the mandatory training on dHL, it was emphasized both in the interviews and in the literature that the training and study content of healthcare professions should be revised to the extent that dHL-related content is already taught in training: **"By 2030, dHL topics will be part of the training and study programs for healthcare professions"**. Figure 53 shows the result.

Figure 53: Assessment of the thesis the thesis "By 2030, dHL topics will be part of the training and study programs."

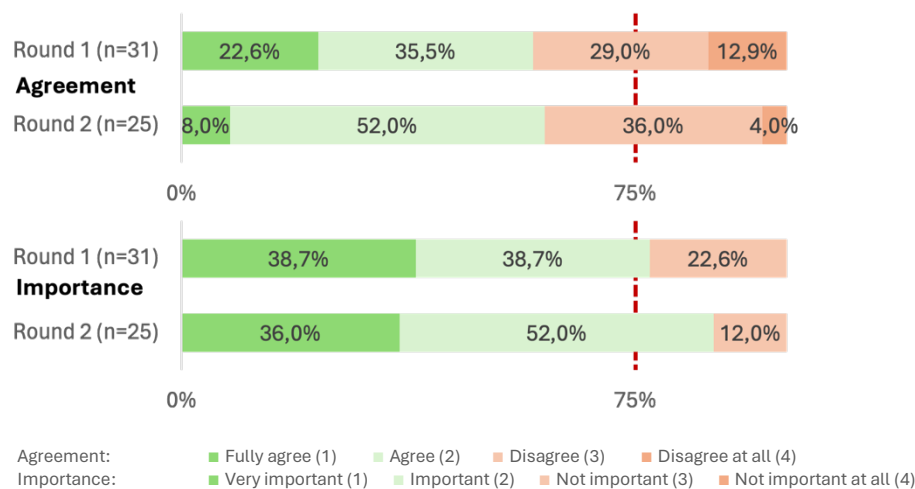


Note: Author's elaboration.

37.5% of respondents fully agreed and 28.1% agreed in the first round of the survey. This means that almost two thirds of respondents were convinced that dHL topics will be included in the training curricula of healthcare professionals by 2030. In the second round of the survey, it was possible to achieve a close stability of opinion (76.0%), as 32.0% of the experts fully agreed and 44.0% of the experts agreed. In contrast to the first survey round, experts in this round also stated that they did not agree with the development at all, with 12.0% of the experts doing so. The relevance of the development was predominantly (R₁: 96.9%) and exclusively (R₂: 100.0%) rated as (very) important by the respondents.

The fourth thesis on promoting the dHL of stakeholders in the healthcare system relates to the integration of a high organizational dHL in quality assurance standards in the healthcare system. Already today, actors in the SHI system must meet certain quality standards to ensure good treatment processes. The topic of dHL could also be included in this context to promote digitally health-competent organizations and stakeholders. The thesis to be assessed was **"By 2030, a high organizational dHL will be part of quality assurance standards in the SHI system"**. As a result, Figure 54 shows that although the experts are generally undecided as to whether this development will occur by 2030, they predominantly consider the inclusion of dHL in quality assurance standards as important.

Figure 54: Assessment of the thesis "By 2030, a high organizational dHL will be part of quality assurance standards (...)."



Note: Author's elaboration.

A stability of opinion whether a high level of organizational dHL will be part of quality assurance standards did not emerge. A small majority of respondents agrees with the development (R₁: 58.1%; R₂: 60.0%), although around 40% of respondents disagree (at all) with the development. The integration of a high level of

dHL into quality standards is predominantly regarded as (very) important in both survey rounds. This shows a stable level of approval (R₁: 77.4%; R₂: 88.0%).

Overall, the second thematic block on the responsibilities of the stakeholders in the SHI system for the promotion of dHL reveals a partly uniform, but also heterogeneous opinion among the experts. In the thematic block with the subjectively highest rated expertise of the experts, there was agreement that the job profiles of the professions in the healthcare system are changing due to digitalization and the associated skills requirements. Most respondents consider it important that this change occurs in order to successfully influence the promotion of dHL among insured persons. The survey results on the future tasks of SHI funds, politicians, and doctors in connection with the promotion of dHL also provide initial starting points here. Most experts consider it important that these stakeholders, who already play a role in the promotion of dHL today or have a close relationship with the insured, also take on tasks in this area in the future.

Overall, it is important to proactively consider today which roles can be assumed by which responsible parties and which new professional groups are still needed. For example, self-help groups and patient organizations were seen as potential stakeholders to be included due to their proximity to the insured. The resulting opinions are consistent with the results of the interviews and the literature in that a change in the roles of the individual professions is also evident here, partly due to the need to increase efficiency in the healthcare system. All three levels of actors in the German SHI system can contribute to the successful promotion of dHL.³⁰

There was no clear opinion among the experts regarding the inclusion of other stakeholders or institutions that have not yet played a role in promoting dHL among insured persons in the German SHI system. Even though it was emphasized several times in the interviews, for example, that pharmacies could take on an important advisory role in the future, no clear opinion on this could be derived from the Delphi study. One possibility would be to further specify the possible role of pharmacies with the involvement of experts. The establishment of an independent

³⁰ The three levels of actors refer to politics, self-administration, and those who are in direct contact with insured persons. See also chapter 2.1.2.

institution or foundation to promote dHL, as in other European countries, or the establishment of a national action plan for dHL seems unrealistic according to the experts, but not completely unimportant. Here, too, there was no clear opinion. If necessary, the idea could be fleshed out with further experts or the creation of synergies with the alliance on the National Action Plan for Health Literacy could be driven forward.

The theses on the promotion of organizational dHL are assigned a very high relevance in the Delphi study. This goes hand in hand with the findings of the literature and the expert interviews. According to this, there is a uniform opinion that the dHL of the stakeholders in the SHI system must also be strengthened to successfully promote the dHL of insured persons. Only then can they fulfill their new role as promoters and active supporters of dHL. Inclusion in training curricula and quality assurance standards have become particularly relevant. Training courses are also conceivable, but implementation is considered less realistic, which could be related to the scarce resources in the healthcare sector. In addition, umbrella organizations should be involved as relevant stakeholders in order to promote the dHL of their members. Regarding the implementation of these four measures, the experts' opinions were mixed, which suggests that there may be obstacles to implementation or that the timeframe for implementation by 2030 is unrealistic. The reasons behind this and which measures could be pushed and in what form should be analyzed more closely.

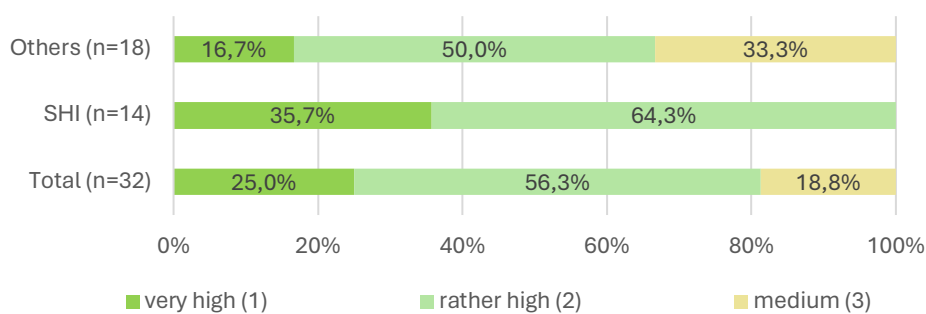
There was a very high level of agreement among the experts that the promotion of dHL should not be seen as the sole task but must also be supported by other policy areas as a challenge for society as a whole in the sense of a HiaP approach. This opinion was also reflected in the literature and the expert interviews and is further substantiated by the theses in the third thematic block. However, the tendency towards a joint approach is also reflected in the fact that a high level of relevance was consistently attributed to the fact that various stakeholders should make their contribution to the promotion of dHL. This awareness must be strengthened among all relevant stakeholders, as it became particularly clear in the interviews that individual stakeholders were not yet able to identify with tasks to promote

dHL.³¹ The challenge here seems to be the practical implementation, as individual developments were not considered realistic by all experts, at least not until 2030.

5.4. RESULTS: CONCEPTUAL UNDERSTANDING OF DIGITAL HEALTH LITERACY IN THE GERMAN CONTEXT

The third thematic block dealt with how the topic of dHL must be understood and anchored in the German SHI system in the future. Figure 55 visualizes the experts' self-assessed level of expertise for the panel as a whole as well as for the subgroups of SHI employees and other participants.

Figure 55: Self-estimated expertise in topic block 3 (anchoring dHL)



Note: Author's elaboration.

³¹ For example, doctors' representatives stated in the interviews that they see the promotion of dHL by doctors more as a topic for the future. There were also no concrete ideas for the promotion of dHL by doctors themselves through the professional associations. See chapter 4.3.2.

Overall, 25.0% of respondents stated that they had a very high level of expertise in the subject area. 56.3% rated their expertise as rather high and 18.8% as medium. No experts stated that they had a rather low, very low or no expertise at all. The third thematic block showed the greatest differences in expertise between SHI members and the other professional groups. SHI participants rated their expertise as very high (35.7%) or rather high (64.3%) (MV: 1.6). The members of the other professional groups were less likely to rate their expertise as very high (16.6%) or rather high (50.0%). In addition, 33.3% of respondents from other professional groups stated that they had medium expertise (MV_{all}: 2.2). Overall, the self-assessed expertise of SHI members is therefore higher than that of the other professional groups. Due to the predominantly high level of expertise in the subject area overall, all questionnaires in the third subject block could be included in the evaluation (n=32).

The literature review and the expert interviews have shown that dHL is understood in different ways. For example, different **definitions** are used in scientific publications and the expert interviews also revealed different nuances and emphases in the experts' conceptual understanding. Another key finding that emerged from the expert interviews was that the understanding of dHL in the German SHI system should be homogenized. Within the Delphi study, one aim was to investigate which definition approach widely used in Germany best describes the concept of dHL from the experts' point of view and which core elements the conceptual understanding currently comprises. Therefore, four common definitions were presented (Table 15) and the experts were asked to give reasons for their choice. To enable an independent assessment, neither the author nor the publication year of the definition were given in the survey.

Table 15: Definitions of dHL proposed in the Delphi study

Author	Definition
Norman & Skinner (2006a, p. 2)	dHL is "the ability to seek, find, understand, and appraise health information from electronic sources and (to) apply the knowledge gained to addressing or solving a health problem."

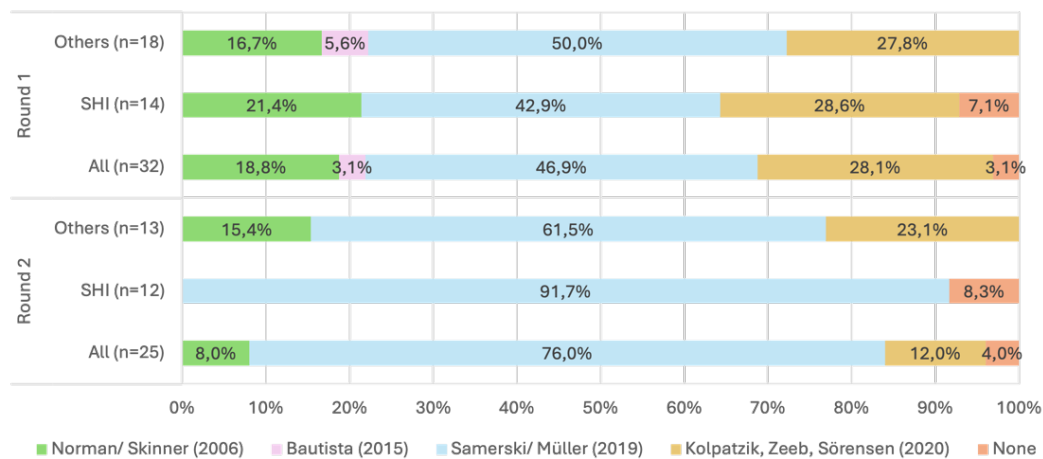
Author	Definition
Robert Bautista (2015, p. 43)	eHealth literacy involves the interplay of individual and social factors in the use of digital technologies to search, acquire, comprehend, appraise, communicate, and apply health information in all contexts of healthcare with the goal of maintaining or improving the quality of life throughout the lifespan.
Samerski & Müller (2019b, p. 49)	Digital health literacy is the ability to use digital technologies in a self-determined way for the purpose of maintaining, restoring, or improving health. It enables patients and users to find, understand and evaluate health information, protect, or release health-related personal data as required, assess the functionality, results, and consequences of digital health applications, weigh up the advantages and disadvantages and act accordingly. Digital health literacy enables organizations to make a transparent digital policy public, to guarantee high information quality and data security and to specifically consider and promote the digital health literacy of patients and insured persons (in the sense of corporate digital responsibility). Digital health literacy arises from the interaction of individual skills and socio-technological conditions. It includes awareness of the ethical, legal, and social implications for both individuals and organizations and enables them to shape digital change in a way that promotes health.
Kolpatzik et al. (2020, p. 6)	General digital health literacy encompasses individual, social, and technical skills and resources that are important for searching, finding, understanding, evaluating, and using digitally available health information. It is a dynamic concept that is closely linked to the lifelong learning and empowerment approach. Digital health literacy takes into account the continuous development of digital technologies. It should enable citizens to increase their self-efficacy through the use of digital health applications and to lead a self-determined life with a

Author	Definition
	high quality of life. Specific digital health literacy includes dimensions such as computer literacy (computer-related competence), data literacy (data competence), privacy literacy (data protection competence), traditional literacy (reading and writing competence), media literacy (media-related competence), navigation literacy (search and find competence), information literacy (information competence) and health literacy (health competence). These dimensions are each to be applied to the dynamic context of health, the healthcare system and society as a whole. The respective specific competencies enable citizens to protect their privacy, increase data security and maintain and improve their health and well-being based on reliable information.

Note: Author's elaboration.

Figure 56 shows the result of the selection in the first and second round, also broken down by overall group, SHI members and the other participants. The definition of Samerski and Müller (2019) was selected with the highest proportion in both survey rounds (R1: 46.9%; R2: 76.0%). The experts who opted for this definition gave several reasons for this. Firstly, the definition was selected due to its wide scope, as this would cover the entire range of dHL. Thus, in addition to the dHL of insured persons, organizational dHL would also be specifically considered. In addition, the assessment of risks and consequences of digital health information and applications, data protection issues, digital self-determination and patient empowerment were considered relevant components of the definition of dHL. One expert also emphasized that the definition would best fit the German SHI system, as it goes hand in hand with the objectives of § 20k SGB V. The definition by Kolpatzik, Zeeb and Sørensen (2020) was selected the second most frequently in both survey rounds (R1: 28.1%; R2: 12.0%). The experts argued that the definition includes the lifelong learning approach and the dynamics of the concept of dHL. Technologies such as AI are seen as a main driver of dynamic and complexity and a main reason for disruptive changes in the healthcare system.

Figure 56: Result considering a definition that best describes the concept of dHL



Note: Author's elaboration.

Therefore, lifelong learning becomes more and more important and should reflect in the definition of dHL. Furthermore, some experts favored it because it also includes the various competencies that should be an essential part of dHL. In the third place, the definition by Norman/Skinner was chosen (2006; R₁: 18.8%; R₂: 8.0%). In the first round, a higher proportion of experts (18.8%) opted for the Norman/Skinner (2006) definition. This is considered to be the "original" definition of dHL that is still widely used today. At the same time, however, it is also subject to a certain amount of criticism, which describes the conceptual understanding as too old and insufficiently differentiated. In the second survey round, 8.0% of the experts opted for Norman/Skinner (2006). One given reason for this was that the definition best points out the conceptual scope of dHL and, in contrast to the other definitions, is compact and easy understandable. In addition, the definition would reflect the current understanding of dHL, as the concept is still a long way from an agile and networked approach as presented in the other definitions.

In the first round of interviews, one participant opted for Bautista's definition (3.1%), as this definition includes reflective competence and refers to the entire

lifespan. Furthermore, the expert does not consider the ethical, legal, and social implications to be a core component of dHL, as they are taken into account within the other approaches. Rather, these tend to be general competence areas that do not directly relate to dHL. The respondent did not take part in the second round, so the answer was not included. In both rounds of the survey, one SHI expert also stated that none of the definitions listed were suitable for him (R₁: 3.1%; R₂: 4.0%). He justified this by stating that the definitions by Samerski and Müller as well as Kolpatzik, Zeeb and Sørensen are too extensive and complex and therefore not suitable as a definition. The definitions by Norman and Skinner as well as Bautista are no longer up to date, as they only focus on information, whereas dHL increasingly also refers to the use of digital technologies. He proposed his own definition for dHL: "dHL is the ability to search, find, understand and assess digital health information and health related digital services in order to apply these or the knowledge gained in relation to health issues or needs for action".

Overall, the detailed analysis shows a shift in responses from the first to the second survey round towards the definition of Samerski/ Müller (2019). This may be due to the reasons returned from the first survey round. At the same time, the question is associated with high cognitive demands, as reading the definitions takes a certain amount of time. The answer shift can therefore be the result of the indirect group communication process intended by the Delphi method, but also due to quick response by the experts without attentive reading by orienting to the most frequent answer. Regardless of this, the definition by Samerski/ Müller (2019) also received the most responses in the first round of the survey.

In the overall analysis, and particularly in the first survey wave, it became clear that there is no truly uniform understanding of dHL among the experts. All four definitions available for selection were selected by the experts in varying frequencies as the most suitable for describing dHL. In addition, one expert did not consider any of the definitions to be suitable and came up with his own definition. Even if the focus points to the definition by Samerski and Müller, the experts selected a variety of definitions. These in turn place different emphases on the understanding of dHL. For example, some experts favor a short and concise understanding of the concept of dHL with a focus on the competencies covered by dHL, as is the case with the definitions by Norman and Skinner or Bautista. Other experts see

dHL as a comprehensive, complex, and continuously evolving concept, as described in the definitions by Samerski/ Müller or Kolpatzik, Zeeb and Sørensen.

Overall, the result already found in the literature research and the expert interviews, that there is still no uniform understanding of dHL, is also reflected in the expert panel of the Delphi survey.³² In addition, the experts seem to consider different facets and definition components to be important. The main difference to the literature research is that the Norman and Skinner definition is frequently used there, and the conceptual understanding of the experts surveyed in the Delphi study tends to shift towards the more comprehensive Samerski and Müller definition. Taking into account the panel size, it can at least be assumed that the term dHL is subject to change and that other definitional components are now relevant, which was not the case in the relevant studies a few years ago.

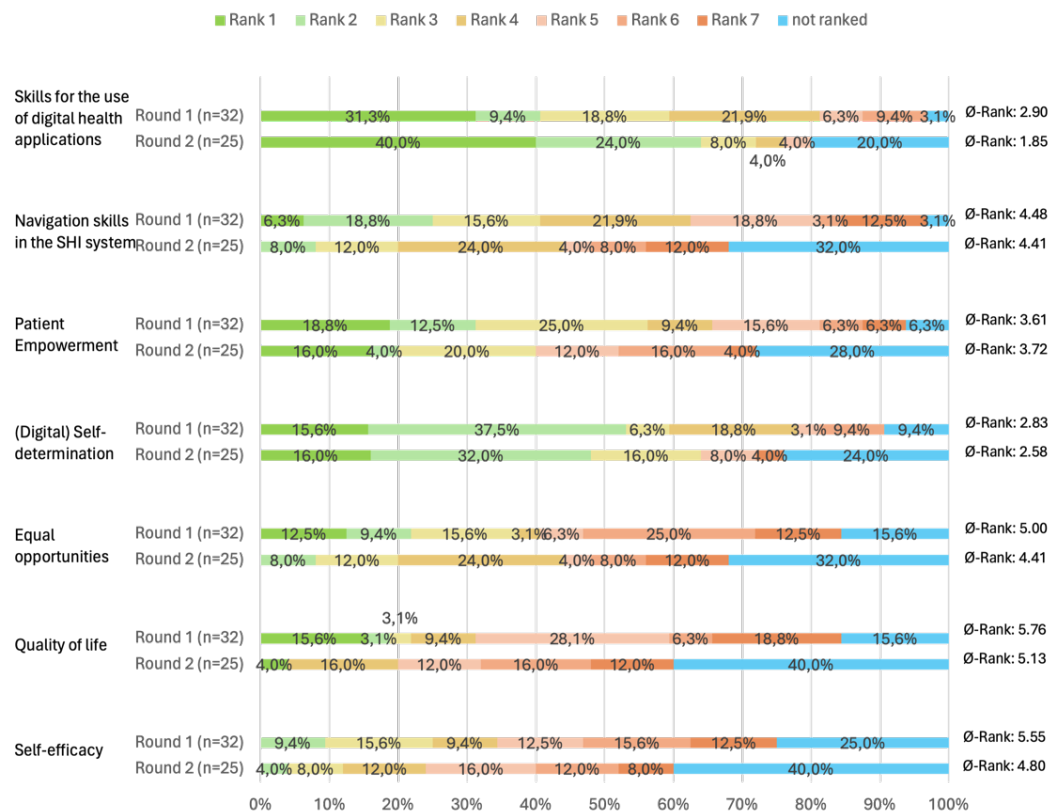
In order to create a uniform understanding of the concept of dHL in the context of the German SHI system, the expert interviews also suggested defining uniform objectives for the promotion of dHL among insured persons so that further activities and measures can be uniformly aligned with this. Accordingly, the thesis **"For a successful increase in dHL in the SHI system, uniform goals must be defined to which the promotion is oriented"** was derived and underpinned with possible objectives. These emerged from the literature research and the interviews. The experts were asked to select which of the objectives presented should be pursued with the promotion of dHL of insured persons and to rank them according to the importance of the individual objectives. Objectives that are not pursued with the promotion of dHL should not be included in the ranking.

Figure 57 shows the overall result after two rounds of the survey. It can be seen, which objectives should be associated with the promotion of dHL in the German SHI system with which priority. The ranking results of both the first and second survey round are shown for each potential objective using the bars. Each bar represents the proportion of experts who prioritized the corresponding goal and the rank they assigned it to. The blue part of the bar represents the proportion of experts who did not include an objective in the ranking and therefore did not see it

³² For the discussion of the current understanding of dHL in the German SHI system, see also chapter 3.2.3 and chapter 4.3.2.

as a suitable one. The descriptions of objectives are abbreviated in the diagram for the sake of clarity; in the Delphi survey, these were accompanied by explanatory text and examples to ensure a uniform understanding among the experts. With the bar chart, the focus of the evaluation is firstly on whether an objective should be pursued with the promotion of dHL. To analyze the relevance of a possible objective, the mean rankings were also included in the evaluation in a second step.

Figure 57: Ranking of objectives that should be pursued with the promotion of insureds dHL in Germany



Note: Author's elaboration.

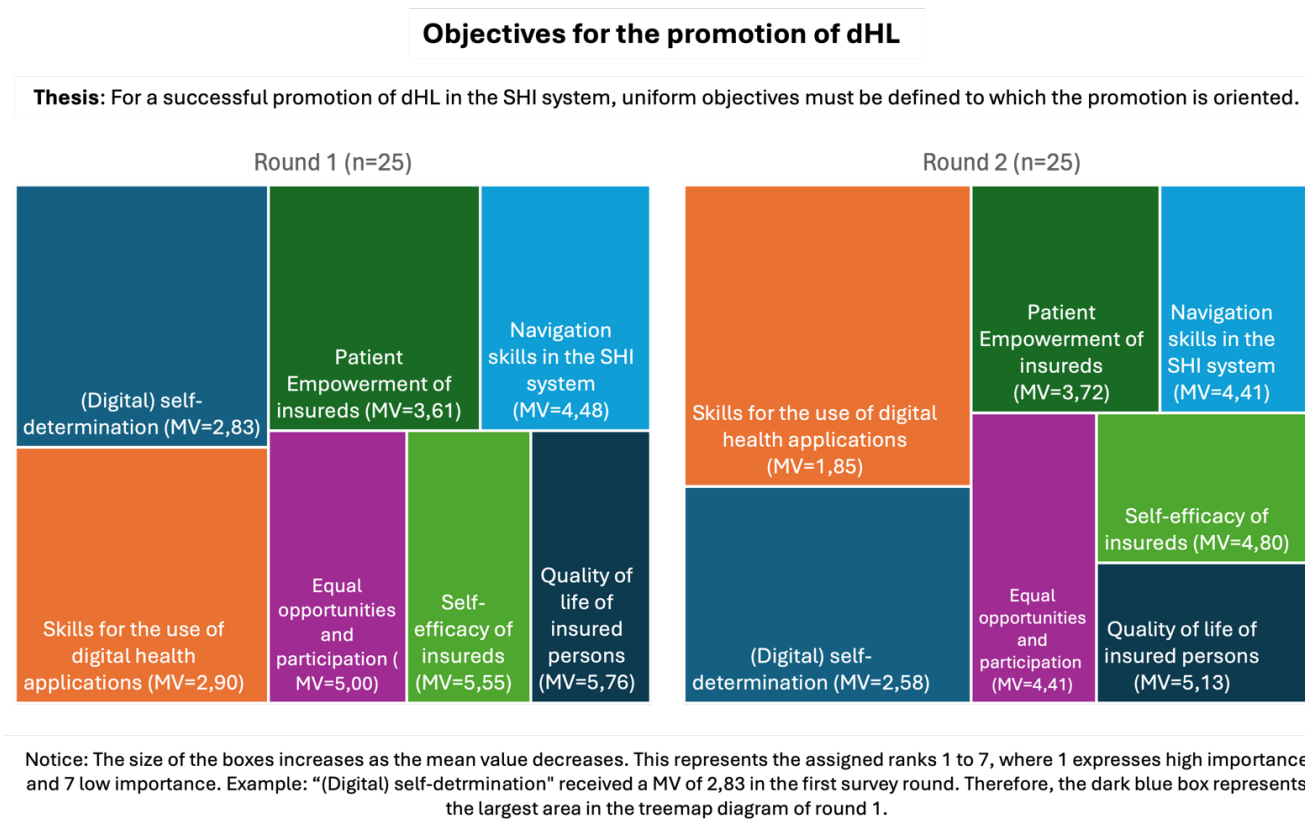
When asked which objectives should be pursued with the promotion of dHL, a different picture emerges regarding the number of objectives included in the two

rounds of the survey. More objectives were included in the ranking in the first round than in the second round and the potential objectives presented were ranked by at least 75.0% of respondents in each case. In round two, at least 60.0% of respondents ranked the potential goals. In line with the task's logic, this means that in the second round, potential objectives tended not to be seen as objectives for the promotion of dHL more frequently than in the first round of the survey. Although this has hardly any effect on the general ranking of the objectives, the fact must be taken into account in the evaluation. As the ranking task is a task that involves higher cognitive demands, the result may also be due to decreasing attention.

In both survey rounds, the goal most frequently included in the ranking was to convey skills for using digital applications. The goals of increasing the digital self-determination of insured persons through dHL (R₁: 90.6%; R₂: 76.0%) and strengthening patient empowerment (R₁: 93.7%; R₂: 72.0%) were also frequently included in the ranking. In addition, the goal of strengthening navigation skills in the SHI system through higher dHL was included in the ranking by 31 (R₁: 96.9%) and 17 experts (R₂: 72.0%). In the first round of the survey, 84.4% of the experts included the goals of creating equal opportunities through dHL and improving the quality of life of insured persons in the ranking. In the second round, these two objectives were ranked by 68.0% and 60% of the experts. The goal of strengthening the self-efficacy of the insured persons through a higher dHL was included in the ranking the least of all goals in both survey rounds. 75.0% (R₁) and 60.0% (R₂) of the experts included this task in the ranking.

By analyzing the mean values of the ranking, further conclusions can be drawn regarding the priority of individual objectives. A treemap diagram is used to visualize the priority of the objectives. The area of the rectangles in the diagram is proportional to the data they represent. In this case, the size of a rectangle indicates the importance of a potential objective from the experts' point of view. Figure 58 shows the results for both rounds of the survey. Identical objectives are highlighted in the same color so that the changes between the two rounds are clearly visible at first sight. The calculated mean values have also been included in the figure for each potential objective.

Figure 58: Treemap-diagram of objectives that should get along with the promotion of insureds dHL



Note: Author's elaboration.

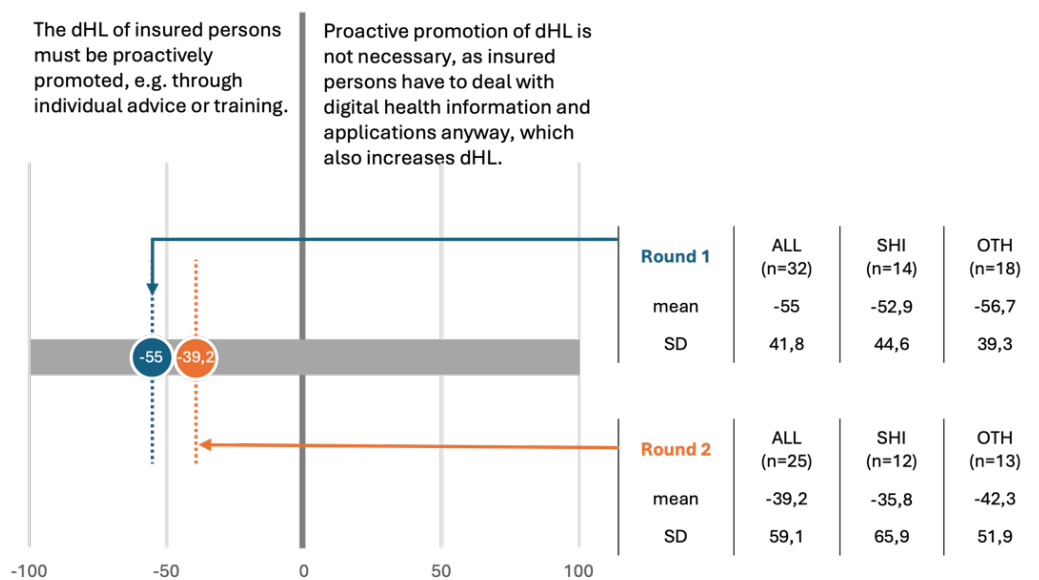
When comparing the rankings, it becomes clear that there were hardly any shifts in the individual ranking positions from the first to the second round of the survey. There was only one shift between the first two ranks, with the goal of digital self-determination in first place in the first survey round (R₁: 2.83; R₂: 2.58) and the teaching of skills for using digital applications in the second round (R₁: 2.90; R₂: 1.85). In third place was the goal of "patient empowerment", followed by the teaching of navigation skills and the creation of equal opportunities for insured persons. In sixth place is strengthening self-efficacy and in seventh place is improving the quality of life of insured persons. The two last-ranked objectives are also the objectives that were most frequently not ranked in the two rounds of the survey, which indicates that the experts did not consider them to be objectives that should be pursued. Overall, however, the experts consider it as important that the promotion of dHL goes hand in hand with a wide variety of objectives and that there is not just one clear objective. Rather, it can be seen that the primary aim of the funding is to achieve the ability inherent in dHL from its name and the objective set out in the GKV-SV guideline of imparting skills for the use of digital applications and strengthening digital self-determination.

The top-ranked objectives also make it clear that empowering individuals is seen as a more important goal than achieving overarching objectives such as creating equal opportunities and improving quality of life. These goals were also the least frequently included in the rankings and appear to be more the result of a high level of dHL rather than goals to be pursued through support measures, for example. As the mean rankings and ranks changed only slightly over the two survey rounds, there appears to be a certain degree of agreement among the experts surveyed regarding the relevance of individual objectives for promoting dHL. However, it remains striking that from the first to the second survey round, objectives that were still included in the ranking by the experts in the first round were no longer regarded as relevant objectives in the second round. It cannot be clearly interpreted whether this is due to the actual change of opinion of the experts, or the question was not fully answered for concentration reasons.

During the interviews, some experts critically questioned whether a **proactive promotion** of dHL is really necessary or whether dHL will not increase anyway if people get more into contact with digital health information and services.

These two theses were therefore compared, and the experts were asked to use a slider to rate in steps of ten which thesis they tended to agree with more. The thesis "The dHL of insured persons must be proactively promoted, e.g. through individual advice or training" was included for proactive promotion of dHL. The other position was represented by the thesis "Proactive promotion of dHL is not necessary, as insured persons have to deal with digital health information and applications anyway, which also increases dHL". As a result, both rounds showed an average preference for the proactive promotion of dHL thesis. The detailed result is shown in Figure 59.

Figure 59: Necessity of a proactive promotion of dHL

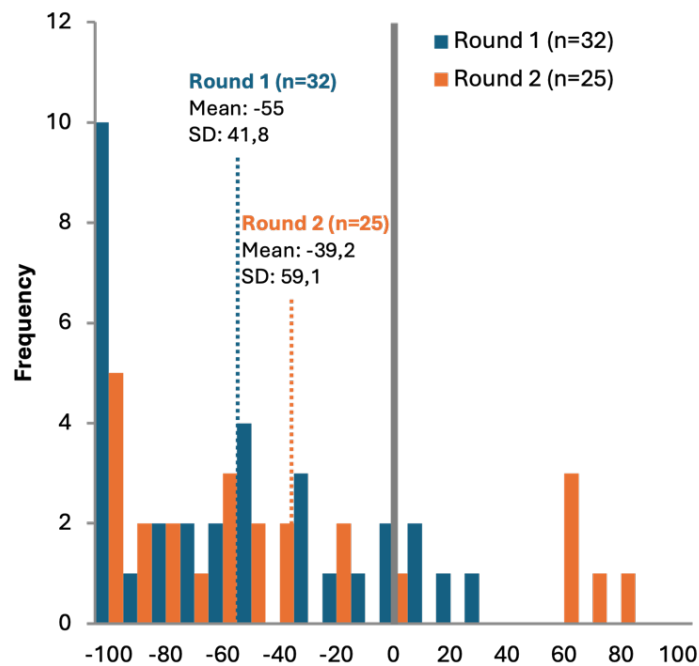


Note: Author's elaboration.

In the first survey round (n=32), the mean value was -55, with SHI and other participants being almost on a par (SHI: -52.9; Others: -56.7). The standard deviation (SD) is slightly higher in the SHI group (44.6) than in the others group (39.3) and overall 41.8. In the second round of the survey, agreement with the above thesis is slightly lower on average, with this particularly affecting the group of SHI

members. In addition, the spread of responses is greater than in the first survey round (59.1), with the responses of SHI members scattering more widely (65.9) than those of the other participants (51.9). With the help of a histogram (Figure 60), the dispersion of the answers and the different characteristics of the answers in the two survey rounds can be seen in more detail.

Figure 60: Distribution of responses regarding the need for proactive promotion of dHL



Note: Author's elaboration.

In the first survey round (n=32), there were far fewer swings towards the extreme positions of the thesis "Proactive promotion of dHL is not necessary". Here, most respondents were quite clearly in favor of the proactive promotion of dHL thesis, with a total of one third of respondents opting for the maximum value for thesis 1 (-100; n=10). Only a few experts agreed with the second thesis and if, to a rather small extent (max. value 30). In the second round of the survey, the spread

of answers was greater. A quarter of the respondents gave the maximum agreement value for the thesis on proactive promotion of dHL (-100; n=5), but a quarter of the respondents also tended to express their agreement with the other thesis (60: n=3; 70: n=1; 80: n=1). The approval ratings for the second thesis were higher than in the first survey round, where the maximum value for the second thesis was 30. The remaining respondents expressed their agreement more in the direction of the first thesis. Overall, only a trend can be derived from the experts' opinions. On average, the experts tend to agree with the need for a proactive promotion of dHL, but some also believe that dHL does not need to be promoted separately and will increase anyway through the use of digital health information and services. One expert explains this as follows in the free text comments: "It is not to be expected that "big things" will be done with regard to dHL. It will essentially remain a case of "learning by doing" and "muddling through", as is likely to be the case for practically all aspects of digitalization in the consumer sector, in my opinion. all conceivable organizations, especially those with direct contact to insured persons, will probably consider ways of dealing with it and implement them more or less well. it seems conceivable that dHL will be part of major digitalization activities in many areas and for many players. It is rather unlikely that there will be a concentration of "the" dHL as a topic in institutional form".

In order to further sharpen the conceptual understanding of dHL in the German healthcare system, the experts were asked to assess seven theses on the anchoring of dHL. For six theses, there was already a uniform opinion among the experts in the first survey round, so that these theses were not assessed again in the second survey round. The results are summarized in Figure 61.

Figure 61: Result of theses assessed by the experts in topic block 3



Note: Author's elaboration.

Since the interviews and the literature review showed that the successful promotion of dHL requires not only a certain degree of personal responsibility on the part of the insured, but also suitable framework conditions in the SHI system, the extent to which the experts participating in the Delphi study share this understanding should be examined.³³ To this end, they were asked to use a four-point Likert scale to assess their agreement with the thesis **"Insured persons have a personal responsibility to promote their dHL, but are also dependent on suitable framework conditions and support from the SHI system (e.g. existence of digital structures, understanding of the benefits and necessity of a high level of dHL)"**. 46.9% of the experts (n=32) fully agreed and 43.8% agreed that insured persons are responsible for promoting their own dHL, but that the framework conditions in the SHI system must also be suitable to enable promotion. Overall, 90.6% of participants agreed with this, meaning that a high level of stability of opinion was already achieved in the first round of the survey and the thesis was not included in the second round of the survey. 9.4% of the experts stated that they disagreed with the thesis. In addition to the slider question and the results in chapter 5.3, the experts' opinion that the promotion of dHL as envisaged in the theoretical models can only work in the German SHI system as an interplay between individual skills and suitable framework conditions is reinforced here.

High levels of agreement and relevance were also achieved with regard to the need for regular further development of the concept of dHL. Due to the fast-moving developments, technical advances and the resulting new skills requirements, the interviews highlighted that support measures for dHL should take these into account. In this context, the development of ChatGPT and AI was cited as examples. The experts were therefore asked to assess the following thesis: **"The dHL concept must be regularly adapted and further developed in line with changing competence requirements and framework conditions"**. 62.5% of the experts fully agree and 34.4% agree that the content of the promotion of dHL must be regularly adapted to changing competence requirements and framework conditions. Overall,

³³ See the eHealth Literacy Framework by Norgaard et al. (2015) and the model by Kolpatzik et al. (2020) in chapter 3.1.3 and results of the expert interviews in chapter 4.3.2.

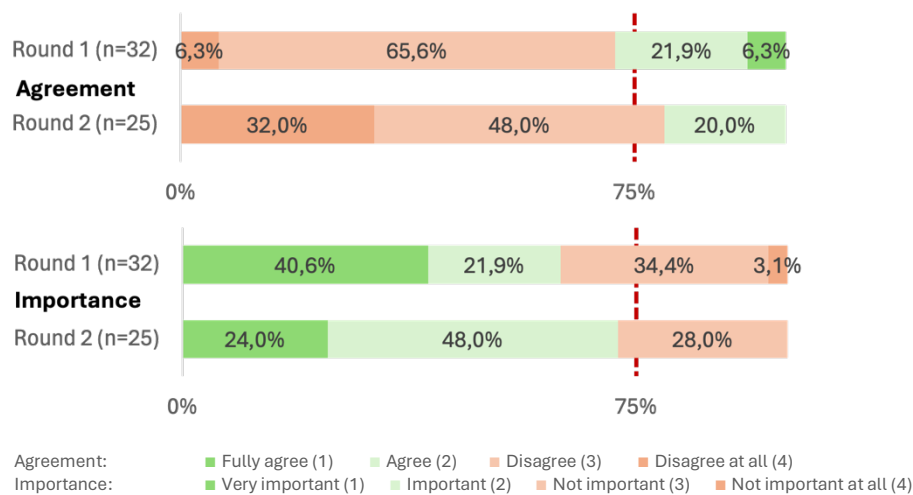
96.9% of the experts agree with this thesis. This condition was also rated as very important by 56.3% of respondents and as important by 34.4% of respondents, meaning that 90.6% of experts rated the thesis as important. Due to the high relevance and agreement ratings in the first survey round, the thesis was not included in the second survey round.

Along with the regular adaptation of support measures, the experts also agreed to the inclusion of new competence requirements in the healthcare sector and moreover, found this important. This became evident by the assessment of the thesis " **The support measures for the dHL should be geared towards new competence requirements in the digital SHI system**". 31.3% of the experts (n=32) fully agreed and 62.5% of the experts agreed that this development is necessary for the successful promotion of the dHL of insured persons. 6.3% of the experts disagreed with the thesis. 31.3% of the experts also consider it very important for the successful promotion of dHL that new skills requirements are taken into account and 65.6% of the experts consider this important. 3.1% of the experts do not consider this to be important. Due to the overall high agreement of 93.8% among the experts and the high relevance of 96.9%, this thesis was also not to be assessed again in the second round of the survey. The results also go hand in hand with the findings from chapter 5.2, which state that the experts expect the skills requirements for insured persons to change in the coming years.

Another idea derived from the expert interviews to sharpen the conceptual understanding of dHL was the creation of a standardized curriculum that specifies the content for promotion and thus specifies the previous implementation regulations of the GKV-SV based on § 20k SGB V. To this end, the thesis "**By 2030, there will be a coordinated curriculum in the SHI system that specifies the content for promoting dHL**" was included in the Delphi study.

As a result, Figure 62 shows that the experts do not assume that this will be established in the German SHI system by 2030.

Figure 62: Assessment of the thesis "By 2030, there will be a coordinated curriculum in the SHI system (...)."



Note: Author's elaboration.

In the first survey round, 71.9% of the experts disagreed with the development, with 6.3% disagreeing and 65.6% disagreeing at all. In the second survey round, 80.0% rejected the thesis, with just under a third (32.0%) of the experts disagreeing at all and 48.0% of the experts disagreeing. With regard to the importance of a curriculum for the successful promotion of dHL, there is also no clear opinion among the experts expressed in a stable opinion of more than 75.0%. However, there is a tendency for the experts to consider a curriculum to be (very) important. In the first round, 40.6% of the experts considered a curriculum to be very important and 21.9% of the experts considered it to be important (combined 62.5%). In the second survey round, 24.0% of the experts stated that they considered development to be very important and 48.0% considered it to be important (72.0% in total). This means that in both survey rounds, just under a third and a quarter of the experts considered the introduction of a curriculum by 2030 not to be important, although the majority of experts stated that it was of some relevance. One expert addressed the development of a curriculum for dHL in the German SHI system in the free text comments. In his opinion, a curriculum for dHL is very relevant,

but currently failing due to the lack of a common understanding of what dHL should comprise. In his view, structural changes such as a curriculum are only possible in the long term. Rather, it requires greater cooperation between stakeholders in the healthcare sector to strengthen dHL: "If we don't even manage to define the terminology surrounding (digital) health literacy in the same way, it will be all the more difficult to develop a coordinated curriculum, let alone establish it in the long term, even if this is absolutely necessary. Unfortunately, the mills grind very slowly, making short-term structural changes unthinkable. All stakeholders must pull together to make citizens health literate and simplify the system".

Finally, the suggestion from the literature and expert interviews that the anchoring of dHL in the German SHI system and beyond needs to be considered in a more holistic and networked way was explored further. Three theses were included in the survey for this purpose. The experts predominantly agreed with the theses and considered them to be highly relevant. For this reason, all three theses were only put up for evaluation in the first survey round (n=32) of the Delphi study. The results go hand in hand with the findings from chapter 5.2, where the opinion emerged that, in addition to the health insurance funds, other stakeholders in the SHI system, but also in other policy areas, should be involved in the promotion of dHL.

Firstly, following on from the expansion of the actors responsible for promoting dHL to other policy areas, a thesis on the HiaP approach was included in the second thematic block. The respective thesis was **"In addition to the localization of support measures for dHL in the SHI system, networking with other policy areas in which dHL competence areas are promoted is necessary ("health in all policies approach", e.g. early learning at school)".** The experts indicated a high level of agreement and high importance of the development (see Figure 61). A total of 96.8% of the experts agreed with the development, with 61.3% of the experts indicating their full agreement and 35.5% agreeing. 3.2% of the experts disagreed with the thesis. 58.1% of the experts considered networking with other policy areas to be very important and 35.5% of the experts considered it to be important (combined 93.5%). 6.5% of the experts did not find this important. The high level of agreement and relevance was also supported once again by one expert in the free text comments on the third topic block. He stated: "Nevertheless, the teaching of

basic (digital) health skills should ideally begin in the education sector (secondary schools etc.)". The survey results thus also support the findings from chapter 5.3, which also allow the conclusion that the promotion of skills correlating with dHL should not be anchored exclusively in the healthcare system.

In addition to the integration of dHL topics into other policy areas, the expert interviews also showed that the responsibilities and processes in the SHI system must also be better interlinked and more holistically conceived.³⁴ The thesis to be assessed was **"For the successful promotion of dHL, the processes and responsibilities in the SHI system must be better interlinked."** An example was derived from the expert interviews, as a health app (DiGA) should not only be financed by the SHI funds, but doctors must also proactively prescribe it and use it in everyday treatment, and manufacturers must ensure that insured persons understand the application and recognize added value through a user-friendly design. Already in the first round of the survey (n=32), the experts indicated a high level of agreement and importance for this thesis (see Figure 61). For example, 58.1% of the experts stated that they fully agreed and 32.3% agreed (combined 90.3%). In contrast, 3.1% of the experts stated that they disagree and 6.5% of the experts stated that they disagree at all. 54.8% of the experts consider better networking of processes and responsibilities to be very important, 35.5% of the experts consider this to be important (combined 90.3%). In contrast, 6.5% and 3.2% of the experts do not consider this important or not important at all. One expert emphasized the high importance of a more networked and holistic view in the free text comments as follows: "The aim should be to understand dHL as a cross-cutting issue that must be interlinked and linked in daily activities, whether in care, training, structural planning or wherever else".

To successfully anchor dHL conceptually in the SHI system, the expert interviews also suggested that the mindset of the actors involved must change and that digitalization and a high level of dHL should be more clearly understood and communicated as an opportunity and necessity. The Delphi study also revealed high importance and agreement ratings from the experts for the thesis **"The SHI system must see the benefits and added value of digitalization and a high level of dHL"**

³⁴ See the results of the expert interviews in chapter 4.3.2.

more clearly as an opportunity and communicate this". For example, 93.8% of the experts agreed (56.3% in the "fully agree" category and 37.5% in the "agree" category; n=32) to the thesis (see Figure 61). Thus, a highly stable opinion was already achieved in the first round. Each 3.1% of the experts disagreed or strongly disagreed with the thesis. With regard to the importance of the thesis, a stable opinion was also achieved. 93.8% of respondents consider an open mindset to be important (31.3%) or very important (62.5%). 6.3% of the experts consider this to be not important.

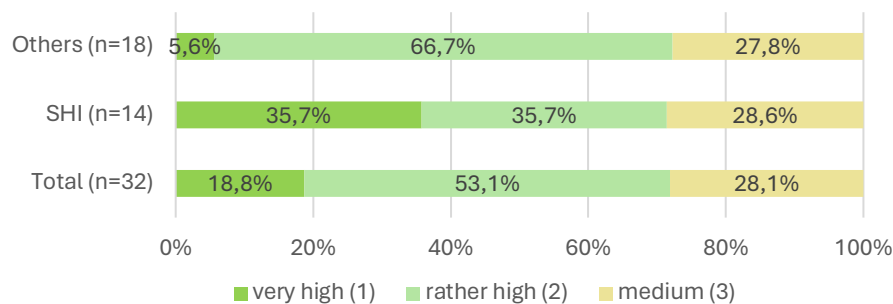
All in all, the third thematic block confirms the heterogeneous conceptual understanding of dHL among the experts surveyed. However, the trend indicates that dHL is increasingly understood as a comprehensive concept. In addition, the experts' overall opinion regarding the objective of promoting dHL, in particular for teaching user skills and strengthening digital self-determination, goes hand in hand with the existing regulations in the GKV-SV guideline. Although not all experts share this view, the majority of the panel agrees that a proactive promotion of dHL is necessary and that learning by doing is not enough to achieve the corresponding results. From a conceptual point of view, it became clear that the interplay between individual skills and structural framework conditions as envisaged in the dHL models could also be a decisive key to the successful promotion of dHL in the German SHI system. To this end, processes that are conducive to the promotion of dHL should be better interlinked. For reasons of efficiency, existing structures should be used. At a meta-level, the content and required skills that are promoted as part of dHL support measures should be more closely aligned with what is really needed by insured persons in the healthcare system. In addition, the mindset of stakeholders must change to the extent that digitalization and a high level of dHL are understood and communicated more strongly as an opportunity. In addition, other policy areas in terms of the HiaP approach were also considered important to promote skills that count to dHL from an intersystemic perspective.

5.5. RESULTS: MEASURES TO PROMOTE DIGITAL HEALTH LITERACY OF SHI-INSURED PEOPLE IN GERMANY

In the fourth thematic block, the aim was to determine which specific measures can contribute to promoting dHL of insured persons. Compared to the

other thematic blocks, the experts rated their knowledge of this topic on average as the lowest (MV_{all} : 2.1). This may be related to the fact that this question block deals with the most novel and future-oriented topic. As there are only a few informational support measures for dHL in the German SHI system, the experts cannot rely on existing knowledge, but presumably must work with assumptions. Figure 63 visualizes the experts' self-assessed level of expertise for the overall panel as well as in the subgroups of SHI employees and other participants.

Figure 63: Self-estimated expertise in topic block 4 (promotion measures)



Note: Author's elaboration.

18.8% of the experts in the total panel stated that they had a very high level of expertise and 53.1% a rather high level. Just under a quarter, 28.1% of the experts, rated their expertise as medium. Regarding the two subgroups, a higher proportion of experts with a very high level of expertise (35.7%) was found among SHI members than among the other group (5.6%). As in the other thematic blocks, no questionnaires were excluded due to the assessment of expertise.

The theses to be assessed within the fourth block mainly dealt with various support measures for dHL. The measures were mainly derived from the expert interviews and can be divided into individual-related, more educational measures and structural measures considering the framework conditions in the SHI system. With this subdivision, the aspect that a successful promotion of dHL may rather be achieved if both individual skills and systemic framework conditions interact is taken up and concretized for the German SHI system. A total of 13 measures were

derived from the expert interviews and formulated as theses, including six educational and eight structural measures. The focus was on innovative approaches and ideas that did not yet exist in the practice. In addition, principles of the support measures that were particularly important to the experts in the interviews were included in the theses so that these can be taken into account in the design.

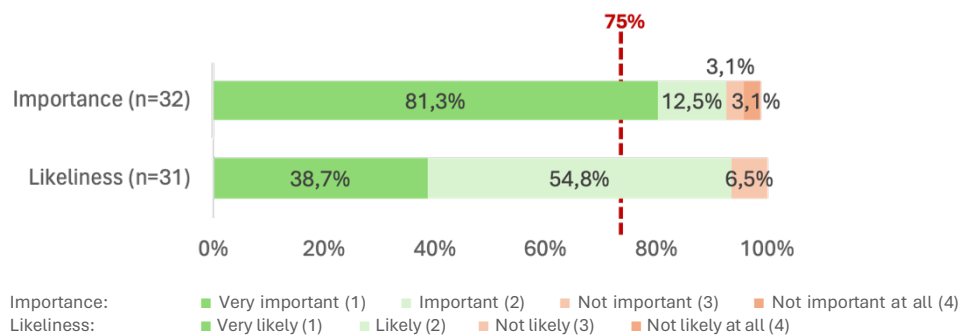
The experts were asked to use a two-dimensional, four-point Likert scale to assess how important (very important, important, not important, not important at all) and how likely (very likely, likely, not likely, not likely at all) they consider the implementation of a particular measure to be in the time horizon up to 2030. The aim was to find out which support measures are assessed as important by the experts. In addition, by assessing the likeliness of the measures, it was also intended to determine which of these measures are feasible and therefore relevant in practice. This contributes to the aim of the study to derive practical recommendations among others for the future design of support measures.

In the first round of the survey, three theses were assessed with a very high importance and likeliness of implementation. These are characteristics or design recommendations for support measures. As the first round of the Delphi study had already shown a high degree of stability of opinion with regard to the importance ((very) important or not important (at all) > 75.0%) and the likeliness of implementation ((very) likely or not likely (at all) likely > 75.0%), these were not presented again in the second survey round.

One of the three theses was **"As part of the promotion of the dHL, the added value of digital services must be highlighted in order to achieve a high level of acceptance"**. The communication of added value was rated as very important (R₁: 81.3%) or important (12.5%) by the majority of experts in R₁ (n=32). 6.2% of the experts consider this development to be not important. The likeliness of implementation was rated as very likely by 38.7% of the experts and as likely by 54.8%. 6.5% of the experts consider this to be not likely (Figure 64). The fact that the added value of digital healthcare services needs to be emphasized more strongly was already highlighted several times in the interviews. The interviewees stated that they often perceive a certain skepticism or caution towards innovative services in Germany, which can also be reinforced by negative media coverage. The media reporting on

electronic prescriptions was cited as an example of this: Instead of positive reporting on the new, digital option of redeeming prescriptions, most reports focused on data protection concerns. This image was also anchored in the minds of the population and there was no incentive to try out the new structures. The superficial discussion of data protection concerns was also underlined by an expert from the Delphi survey in the free text comments: "I think the topic of the opportunities and benefits of digitalization for patients is extremely important; far too often, the discussion is exclusively about data protection". If people better understood that digital processes can benefit them by saving time or improving the quality of treatment, the experts believe that there would also be a greater incentive to use them and, in this context, to strengthen dHL by engaging with these new services. This echoes the result of the two theses to be assessed via slider question (Figure 59). The result was that the promotion of dHL can be strengthened both proactively and by dealing with the relevant topics on a daily basis. The likeliness of a stronger value-added communication is also rated as (very) likely, meaning that this should be taken into account in digital health offerings.

Figure 64: Assessment of the thesis "As part of the promotion of the dHL, the added value of digital services must be highlighted (...)."



Note: Author's elaboration.

One expert noted in the free text comments that honesty is important to him: "Honesty is crucial here: on the one hand, there will 1. probably be digital applications which, if you acquire any missing skills, will mean improvements for you (or

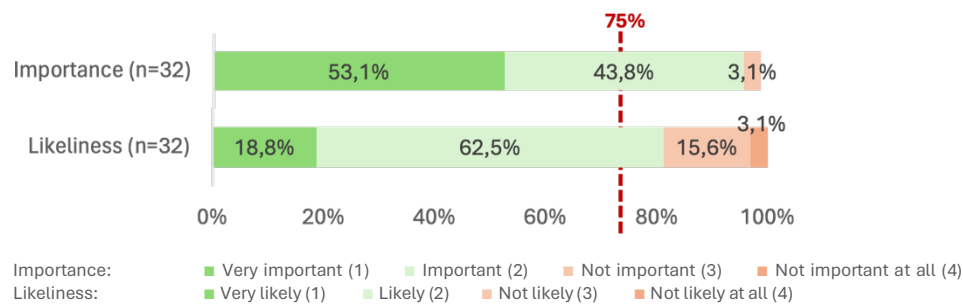
your relatives) (either procedural in terms of appointments, prescriptions, applications, overview of your own data, etc.), or medical to improve care provision. However, there will presumably also be "offers" or mandatory uses that do not offer any individual benefits for the insured person and may also require effort but increase the efficiency of care or serve research purposes. It seems important that a distinction is made between the two (even if they are initially indistinguishably present simultaneously in certain products and processes) and that they are communicated honestly". The approach of highlighting the specific added value of digital information and services as part of promotion measures also goes hand in hand with the finding from chapter 5.4 that a more positive attitude towards digitalization issues is also fundamentally needed on the part of stakeholders in the SHI system.

Another measure assessed by the experts relates to the diversity of promotional measures: **Promotional measures should be varied and take into account different methods (e.g. storytelling) and distribution channels (e.g. magazines, face-to-face, social media).** The literature has already emphasized that promotional measures should be varied and take into account different methods and channels. This goes back to the different and individual support needs of the population, from people who are already digitally health literate and digitally affine to digitally averse people with a low dHL.³⁵ The result is shown in Figure 65.

In the first round of the Delphi survey (n=32), 53.1% of the experts stated that they find various support measures very important, while 43.8% rate them as important. One expert does not find this important. 18.8% of the experts rated the likeliness of implementation as very likely and 43.8% as likely. In contrast, 15.6% and 3.1% stated that implementation was not likely and not likely at all.

³⁵ According to studies, people's dHL is influenced by various social gradients such as age, state of health and digital affinity. The HLS-2-GER shows, for example, that dHL in Germany is particularly low among older and sicker people and that there is therefore a particular need for support. For more information on this, see also chapter 3.2.2.

Figure 65: Assessment of the thesis "Promotional measures should be varied and take into account different methods (...)."



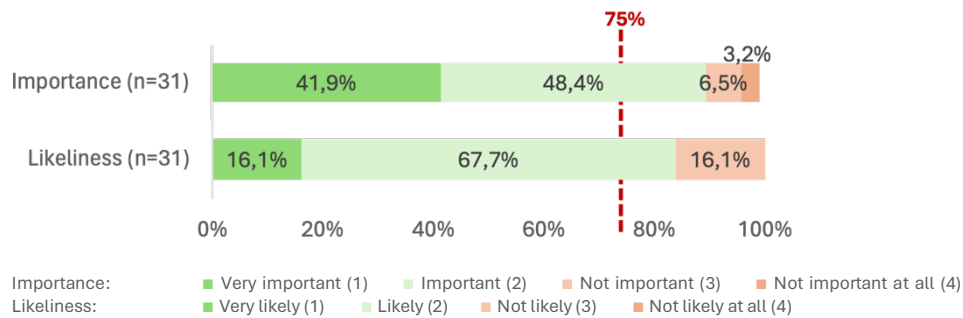
Note: Author's elaboration.

In the free text comments, the experts added that no target group should be left out when offering diverse and target group-specific measures. Although older generations need to be taken by the hand, which implies analog support measures, younger generations also face the challenge of being digitally health literate due to the increasing flood of digital information and rapid technological developments. "The approach must be specific to the target group. The elderly in particular need to be taken by the hand, but also younger generations who are overwhelmed by the flood of information on the internet". And "Targeted support measures are particularly important for older target groups. They are sick much more often than younger people and are also less able to deal with digital services or need a lot of help with them. However, with a view to the further development of digitalization/AI etc., it is also important to keep all insured persons digitally fit at all times". Another expert stated: "It is important to consider insured persons who have little room for maneuver - due to structural disadvantages, acute stress situations, cognitive limitations, etc. - in all questions. All solutions must therefore be designed in such a way that they also work for these people. Otherwise, they will only contribute to an increase in the already very large health inequalities". In addition, individually tailored support measures are considered important because this is the only way that dHL can be supported in a needs-oriented manner and achieve its goal: "It is essential to take the insured along with them with regard to the new competence requirements in the area of digital health and to train them in line with

their needs. This is the only way to increase the digital health literacy of each individual". In addition to the opinions expressed in the Delphi study, the free text comments also make clear that the experts consider it important for support measures to be tailored to individual needs and that one size fits all support measures are considered less efficient. Insured persons could receive individual support through individual contact with healthcare professionals, but also through individualized technological support such as chatbots.

Another idea from the expert interviews was to integrate support measures in existing support settings, for example by making them part of workplace health promotion: **"The promotion of dHL should be integrated into existing prevention and setting approaches on a topic-specific basis (e.g. workplace health promotion)"**. This would allow existing structures to be used, synergies to be created and dHL topics to be linked with specific application scenarios. A high level of importance and likeliness of implementation was attributed to this development. The suggestion resulted from the interviews and specifically means, for example, that prevention programs carried out by SHI companies in schools, kindergartens or as part of workplace health promotion could also be used to provide information on dHL topics. In this way, synergies can be created, and people can be reliably reached in existing structures and contact points. In the first survey round (n=32), 41.9% of the experts stated that they considered this measure to be very important. 48.4% consider it important, 6.5% not important and 3.2% not important at all. With regard to the likeliness of implementation, the majority of experts assume that the measure is likely to implemented. More precisely, 16.1% and 67.7% of the experts stated that they consider the integration of the topic of dHL into existing prevention and setting approaches to be very likely or likely. In contrast, 16.1% of the experts consider this to be unlikely (Figure 66).

Figure 66: Assessment of the thesis "The promotion of dHL should be integrated into existing prevention and setting approaches (...)."



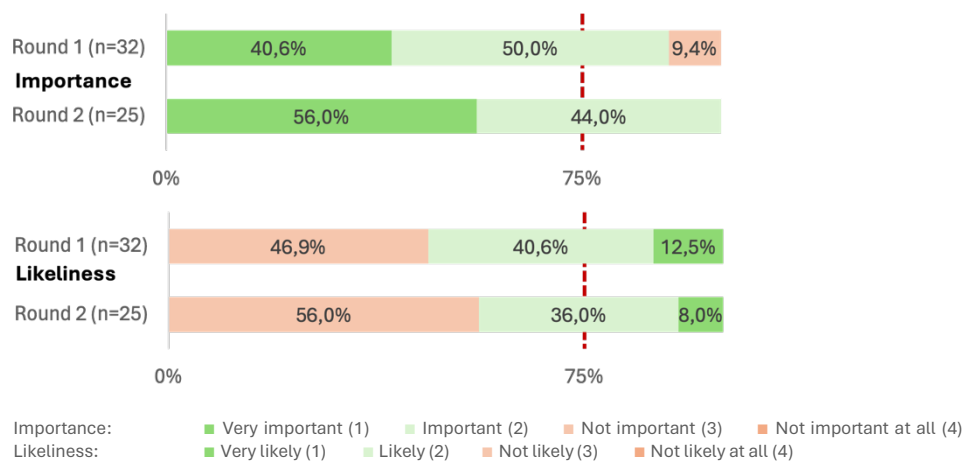
Note: Author's elaboration.

In addition, the experts were asked to assess three further educational measures. These were included in both rounds of the survey, as a stable opinion had not yet emerged in the first round. As these specific measures do not yet exist in the SHI system, they are quite new measures. The novelty could be an explanation for the heterogeneous opinions of the experts. This goes in line with the assessment of the experts' subjective expertise described at the beginning, which in average is rather good in the fourth block (MV 2.1), but lower compared to the other topic blocks.

One of the theses picks up on the idea of integrating dHL topics into existing contact points: **"By 2030, dHL topics will be incorporated individually and integrative (according to target group, competence, needs) into every point of contact between insured persons and healthcare stakeholders (e.g. integration into DMP training courses)".** The experts rated it as especially important that the topic of dHL is integrated individually into every point of contact between insured persons and the healthcare system and that, in this context, each stakeholder contributes to promoting the dHL of insured persons in their area of responsibility (importance R₁: 90.6%; R₂: 100%). For example, SHI companies could refer to digital alternatives when providing advice and inform the insured person about the use, added values and options. Such elements could also be included in structured treatment programs, as could already be the case with a planned digital disease management

programme for diabetes patients. In the interviews, the relevance of this measure was justified by the fact that the insured person already has a concrete point of contact with the healthcare system and is then more motivated to deal with the relevant topics. The likeliness of this measure, however, was not considered realistic by about half of the experts and also lower in the second survey round than in the first (R1: 53.1%; R2: 44.0%). The measure therefore seems to be very relevant, but the experts have a heterogeneous opinion with regard to its feasibility (Figure 67).

Figure 67: Assessment of the thesis " By 2030, dHL topics will be incorporated (...) into every point of contact (...)."



Note: Author's elaboration.

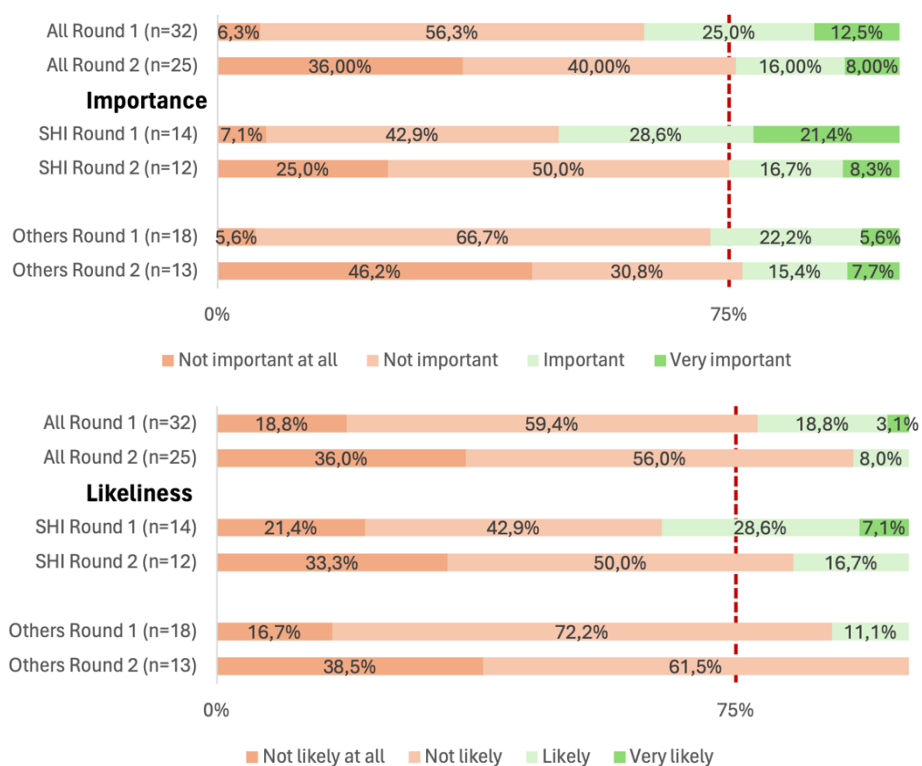
One reason for this heterogeneous opinion could be the high level of prerequisites that must be met for the implementation. The actors in the SHI system play a decisive role. They must be aware of their responsibility and take into account the topic of dHL at every point of contact. This requires a high level of organizational dHL and the corresponding personnel resources for implementation. Another challenge in this context may come up with the envisaged time horizon up to 2030. The relevant question of responsibility is also made clear by the following free text comment: "The question of responsibility would first have to be clarified as to who

should promote dHL and implement competence development. It is questionable whether it will remain the sole responsibility of the SHI or whether other institutions or associations (e.g. BZgA or new formations such as the "Alliance for Health Literacy" or similar) will take on these tasks". However, one expert also sees the implementation of individual support as being associated with a high use of resources and therefore highlights the potential of technologies such as AI in this context: "there will only be "individual support" if this is realized cost-effectively via technology / AI (this is also an advantage of technology)". In this context, AI could be used in the context of specific support measures and, for example, to answer individual questions via chatbots. On the other hand, the use of AI in the processes of the players in the SHI system could also lead to routine activities being dispensed with and more time being created for personal, individual support in dHL issues.

One specific educational measure from the expert interviews was the introduction of a digital driver's license for dHL, which insured persons can complete: **"By 2030, SHI-insureds will have the opportunity to obtain a "digital driver's license" that will enable them to make appropriate use of healthcare services"**. This refers to a kind of certification or test for insured persons that they are digitally health literate. The experts predominantly consider the introduction of a "digital driver's license" for dHL in the SHI system to be unimportant (Figure 68). In the first survey round, 6.3% of respondents rated the development as not important at all and 56.3% as not important. In the second round, a narrowly stable opinion (76.0%) emerged that the development is (very) unimportant. With regard to the likeliness of implementation, a stable opinion (78.1%) was already evident in the first round. Consequently, the offer of a digital driving license was predominantly considered as not likely (at all). In the second survey round, the stability of opinion was 92.0%, with the proportion of not likely at all responses at 36.0% and not likely responses at 56.0%. As the two figures below show, the digital driver's license was rated as less relevant and less likely by 2030 by the other participants in both survey rounds than by SHI members. In general, the digital driver's license received the lowest importance and likeliness assessment of all educational measures. From the first to the second round of the survey, both dimensions fell significantly by 2030. It can be assumed that a digital driver's license requires clear content to be learned by insured persons. Considering the discussions from the two previous chapters,

this consensus is currently still missing in the SHI system. Furthermore, there is currently no actor in the healthcare system who could be made responsible for this measure. Presumably, the high costs of a digital driver's license would also be accompanied by questionable benefits. An obligation to complete a digital driving license would also make it more difficult for insured persons to access healthcare and would therefore need to be carefully examined from an ethical and legal perspective. In addition, the measure runs counter to the approach of integration into existing measures.

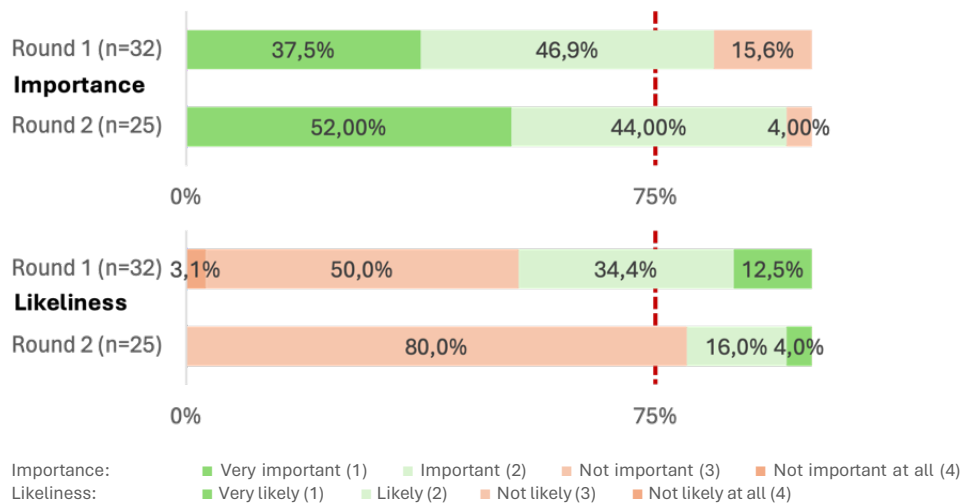
Figure 68: Assessment of the thesis "By 2030, SHI-insureds will have the opportunity to obtain a "digital driver's license (...)." "



Note: Author's elaboration.

The experts were also asked to assess how important it is to introduce nationwide information campaigns to promote dHL by 2030 and how likely the implementation is: **"By 2030, there will be nationwide information campaigns on general digitalization topics (e.g. "E-prescription before the news")"**. In the first survey round, 84.4% of the experts rated this measure as (very) important and in the second survey round, 96.0% of the experts did so. With regard to the likeliness of implementation, 53.1% of the experts in the first round stated that this was (very) unlikely, compared to 80.0% in the second round. In the second survey round in particular, this indicates a high relevance but low estimated probability of implementation of the measure. The results are shown in Figure 69.

Figure 69: Assessment of the thesis "By 2030, there will be nationwide information campaigns (...)."



Note: Author's elaboration.

In addition to the more individual measures to promote dHL, the survey results show that the experts are also in favor of carrying out more general information campaigns. On the one hand, this could raise awareness of the issue among the population and, on the other, contribute to global capacity building. In recent years, there have been repeated approaches to health education campaigns, such

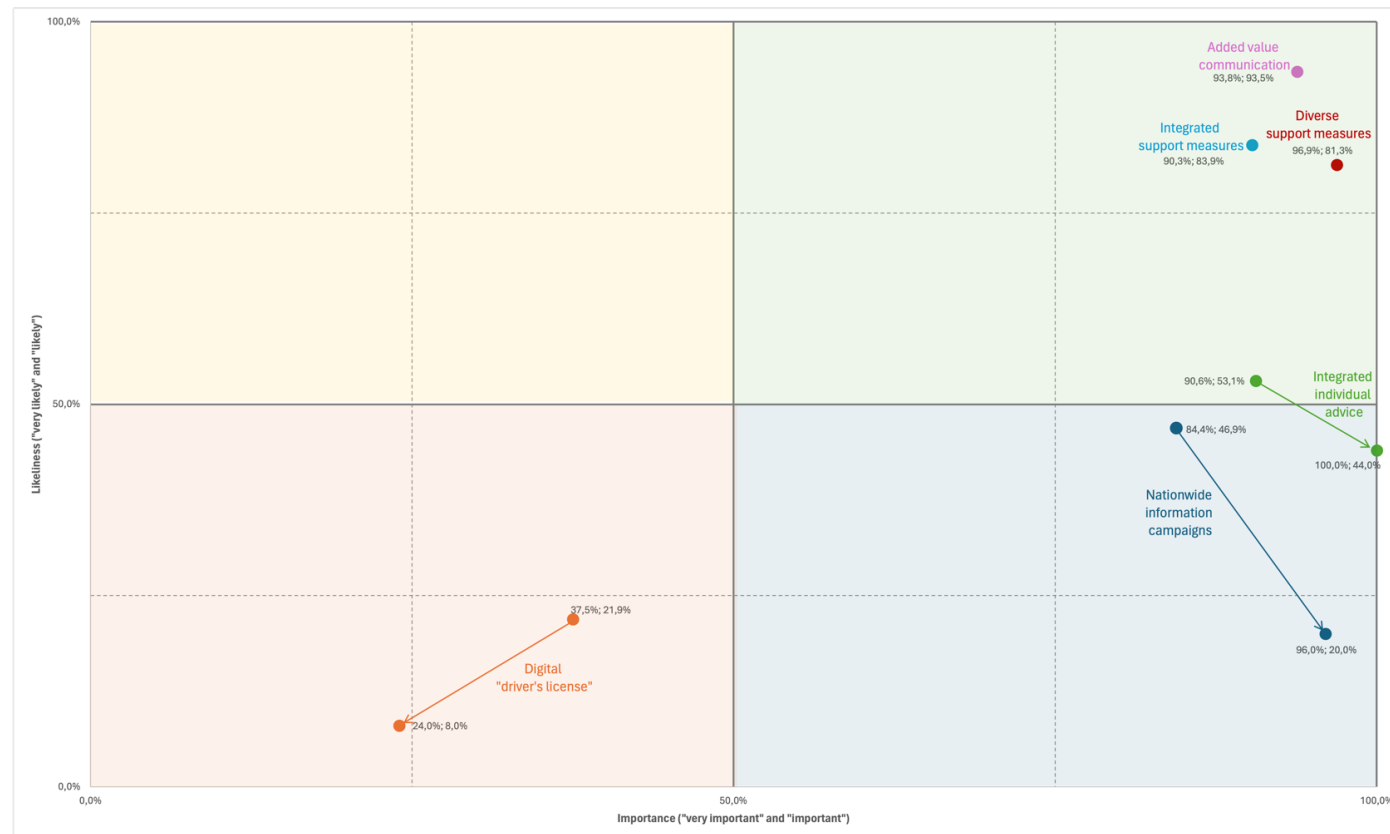
as the "Don't give AIDS a chance" campaign. Since 1987, the BZgA and German Aids help have been educating the population about the successful prevention of HIV and AIDS with the help of mass media offers, counseling options and online offers. Even today, the campaign is considered one of the largest and most comprehensive health promotion campaigns in Germany, partly because it has established a long-term communication process with many different, interlinked blocks of measures (Bundesinstitut für Öffentliche Gesundheit). During the COVID-19 pandemic, broad information campaigns were also carried out to increase vaccination readiness and to introduce the contact tracing app "Corona-Warn-App". Both campaigns were cited in the expert interviews as a blueprint for possible information campaigns to promote dHL and were therefore transformed into an item for the Delphi survey. The low likeliness could be reasoned in the clearly defined content and responsibilities that the implementation of an awareness campaign requires. These do not yet exist. In the expert interviews, several suggestions were made for the BZgA, the BMG or the newly founded Federal Institute for Prevention and Education in Medicine. Again, also the time horizon of 2030 may be too short for the implementation of an information campaign. A division of tasks between various stakeholders in the healthcare system as part of a campaign requires good cooperation and defined interfaces, which means a high need for coordination, a certain willingness to cooperate and a corresponding time for preparation.

For the supplementary visualization of the survey results, a matrix was created that combines the two dimensions of "importance" and "likeliness". The four-point Likert scales were used to summarize each the two highest ("very important" and "important" as well as "very likely" and "likely") and lowest values ("not important" and "not important at all" as well as "not likely" and "not likely at all") to show the extent to which the experts consider a measure to be important or feasible. The direction of the arrow between two measure points shows the change in the survey result from the first to the second round.

Consequently, the matrix can be divided up into four fields.

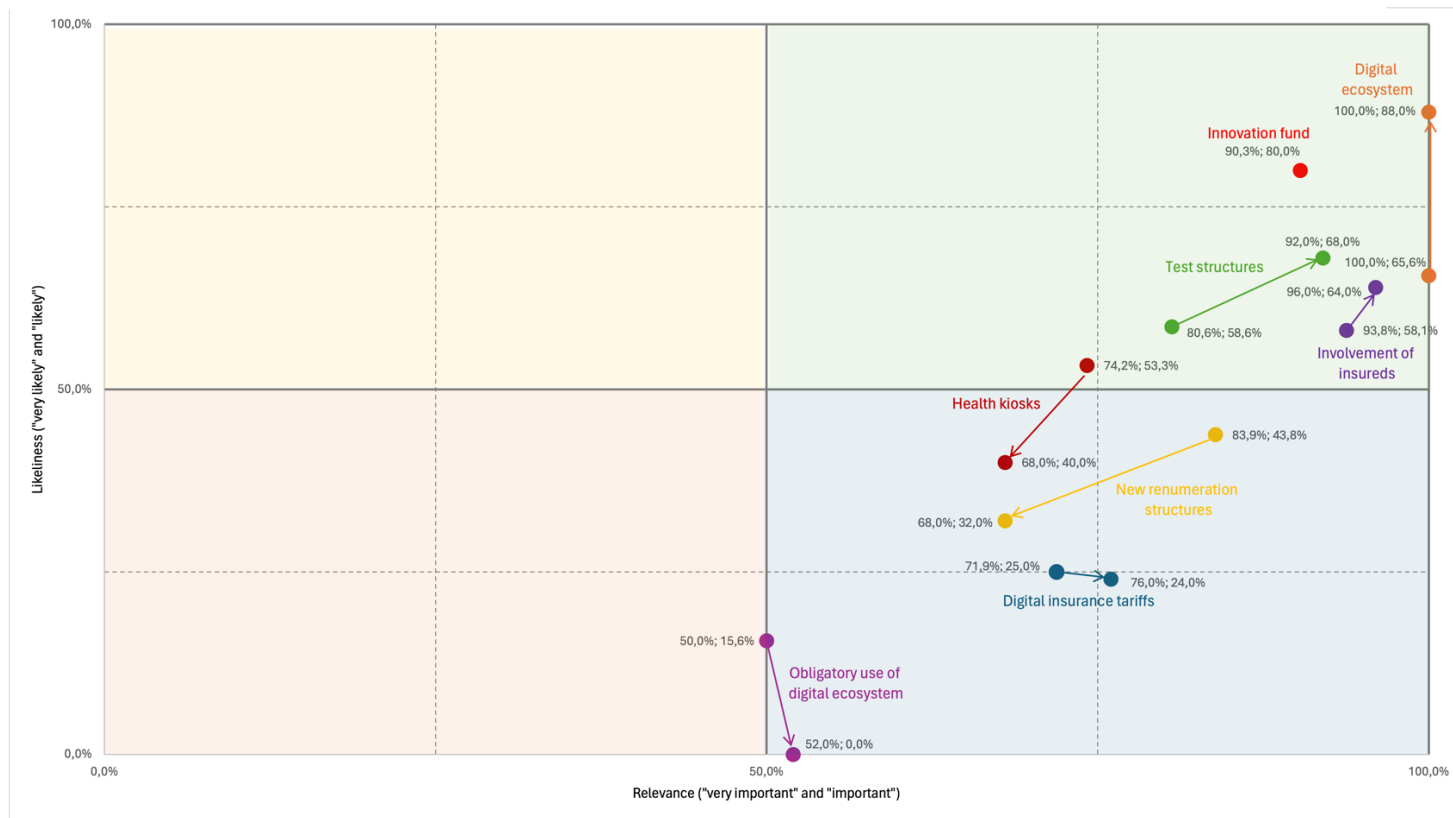
- Red field: Measures rated by < 50.0% of experts as (very) important and by < 50.0% of experts as (very) likely to be implemented.
- Yellow field: Measures that were assessed as (very) important by < 50.0% of the experts and as (very) likely to be implemented by > 50.0% of the experts.
- Blue field: Measures that were assessed as (very) important by > 50.0% of the experts and as (very) likely to be implemented by < 50.0% of the experts.
- Green field: Measures rated by > 50.0% of the experts as (very) important and by > 50.0% of the experts as (very) likely to be implemented.

Figure 70: Importance-likeliness-matrix of educational measures to promote dHL



Note: Author's elaboration.

Figure 71: Importance-likeliness-matrix of structural measures to promote dHL



Note: Author's elaboration.

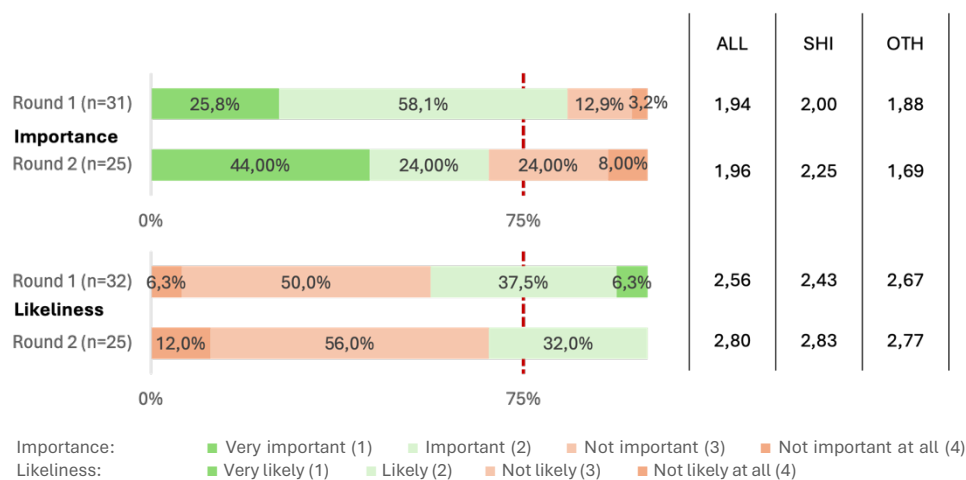
Besides the educational measures, the experts were also asked to assess concrete structural measures to promote dHL in addition to the individual-related, educational measures. As well as for the previous theses, the experts were asked to use a two-dimensional, four-point Likert scale to assess how relevant (very important, important, not important, not important at all) and how likely (very likely, likely, not likely, not likely at all) they consider the implementation of a particular measure to be. In general, the theses refer to the time horizon up to 2030. Based on the interviews and the literature review, a total of seven potential structural measures to promote the dHL of insured people were identified and transformed into corresponding theses. For one thesis, a highly stable opinion among the experts had already emerged in the first round, so that this was not presented again for assessment in the second round.

Respondents were asked to assess the following development: **"By 2030, the Innovation Fund will have established new funding waves for projects to promote dHL"**. To date, the Innovation Fund has primarily financed projects on new forms of healthcare and on healthcare research in order to test innovations and incorporate them into standard care. It serves as a central funding instrument for optimizing healthcare in Germany (Bundesministerium für Gesundheit, 2025). As the experts in the interviews called for more space to test funding measures, the topic of dHL could become part of the funding waves of the Innovation Fund. This measure is assessed as very important by 22.6% of the experts and as an important structural measure by 67.7%. About 10% of the experts do not consider the measure to be important. The likeliness of implementation by 2030 is also predominantly assessed by the experts as very likely (30.0%) and likely (50.0%). 20.0% of the experts consider implementation to be unlikely.

In addition to promoting pilot projects, the experts were also asked to assess how important and likely new remuneration structures for the promotion of dHL by healthcare professionals are: **"By 2030, there will be new remuneration structures for the promotion of dHL by healthcare stakeholders"**. In the expert interviews, the idea of remuneration structures for services to promote dHL came up frequently. For example, it was suggested that practice staff or pharmacies who

advise insured persons at their respective points of contact should receive appropriate remuneration for this. As Figure 72 shows, it was not possible to establish a uniform opinion on this thesis in the two survey rounds.

Figure 72: Assessment of the thesis "By 2030, there will be new remuneration structures (...)."



Note: Author's elaboration.

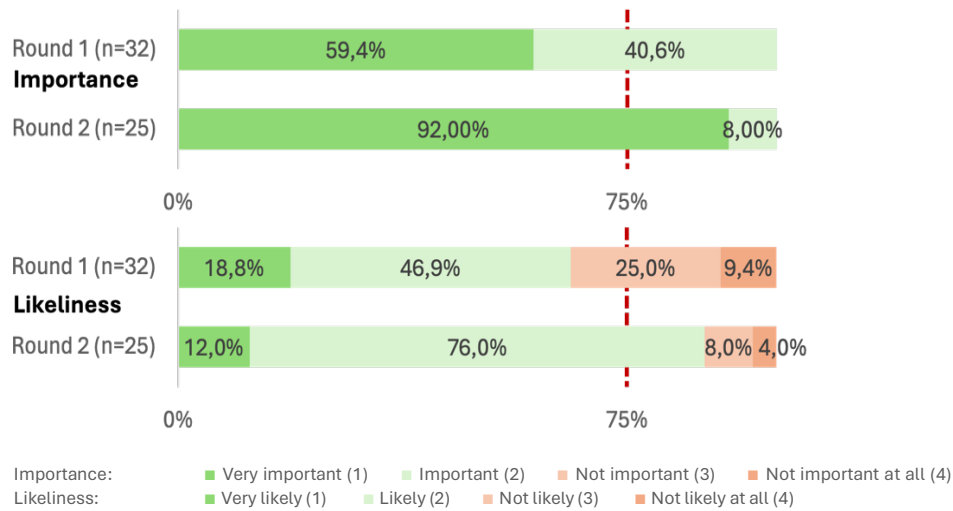
In the first survey round (n=32), the majority of experts rated the development as "(very) important" (83.9%). In the second round, 68.0% of respondents considered the development as (very) important. It is striking that the SHI members as financiers consider the development to be less important on average in the second round than the other participants (MV_{SHI}: 2.25; MV_{OTH}: 1.69). This becomes particularly clear in the second survey round.

The experts are divided on the likelihood of implementation, but a slight majority does not believe that there will be new remuneration structures in the SHI system to promote dHL by 2030. Although a stable opinion could not be achieved, 56.3% of the experts in the first round and 68.0% of the experts in the second round

considered the development to be not likely (at all). In the first round, the SHI participants were on average more convinced that the measure is likely. In the second round, the mean values were almost equal.

One structural measure that was rated as very important or important by all experts in both survey rounds is the thesis **"By 2030, the SHI system will have a user-friendly digital ecosystem that has largely digitized analogue processes (e.g. e-prescription, digital communication channels)"**. In the first round of the survey, 59.5% of respondents rated the measure as very important and 40.6% as important. In the second round (n=25), 92.0% of experts considered a user-friendly digital ecosystem to be very important and 8.0% rated its relevance as important. With regard to the likeliness, the two survey rounds showed a heterogeneous picture, as Figure 73 illustrates. In the first survey round, 65.6% of the experts assessed the implementation to be (very) likely (very likely: 18.8%; likely: 46.9%). A quarter of the experts rated the implementation as not likely and a further 9.4% as not likely at all. In the second round, 88.0% of the experts rated the implementation as (very) likely (very likely: 12.0%; likely: 76.0%) and 12.0% as not likely at all (not likely: 8.0%; not likely at all: 4.0%). Consequently, a stable opinion that a digital ecosystem appears feasible by 2030 was reached in the second round (>75.0% of responses were "very likely" and "likely").

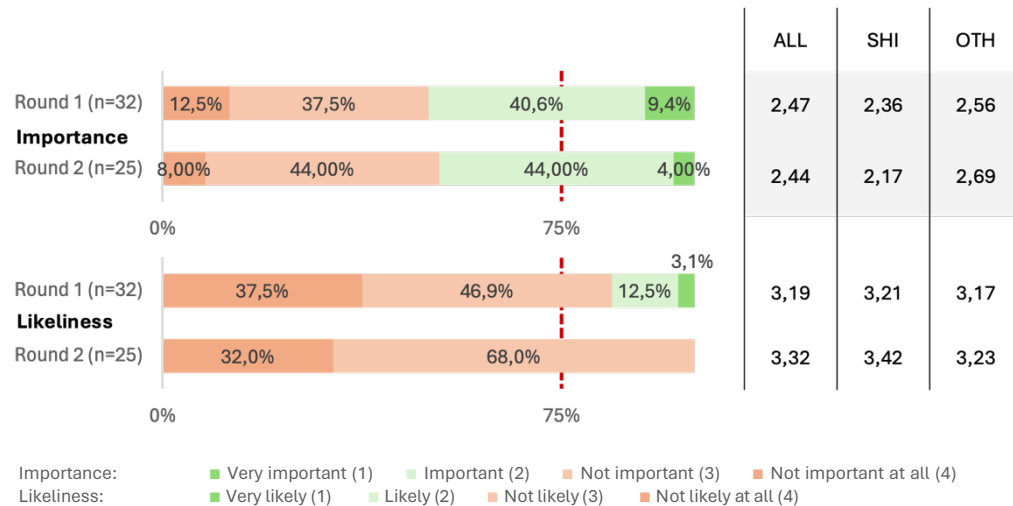
Figure 73: Assessment of the thesis "By 2030, the SHI system will have a user-friendly digital ecosystem (...)."



Note: Author's elaboration.

In addition to the availability of a digital ecosystem as a framework structure for promoting dHL, the experts were also asked to assess, whether the use of such an ecosystem will be mandatory for SHI insured people by 2030: "By 2030, insured persons in the SHI system will be obliged to use a comprehensive digital ecosystem". With regard to the importance of this development, both rounds of the survey revealed an indifferent opinion among the experts, which is visualized in Figure 74. In both survey rounds, around half of the experts considered the measure to be not important (at all, R₁: 50.0%; R₂: 52.0%). Accordingly, the other half rated the development as (very) important (R₁: 50.0%; R₂: 48.0%). It is striking that the SHI experts rated the development as more important on average in both survey rounds (MV_{SHI}: 2.36 and 2.17) than the other participants (MV_{OTH}: 2.56 and 2.69). A clearer picture arises with regard to the likelihood of implementation.

Figure 74: Assessment of the thesis "By 2030, insured persons in the SHI system will be obliged to use a comprehensive digital ecosystem."

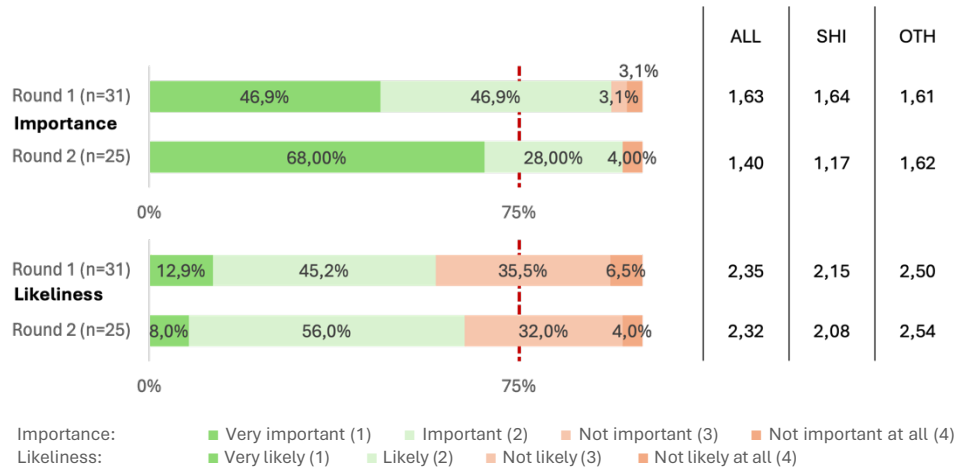


Note: Author's elaboration.

In the first round, the majority of experts assessed the development as not likely (at all, 84.4%). In the second survey round, all experts (n=25) assessed the development as not likely (at all). In contrast to the high importance and likeliness of the basic availability of a user-friendly, digital ecosystem, the experts neither see a mandatory use by insured persons as important nor as feasible.

In line with the user-friendliness of digital information and applications, the experts as well as the literature suggested insured persons to be more involved in digitalization processes in the healthcare sector. For example, health apps could be developed with greater involvement of insured persons in order to take their needs into account and thus indirectly contribute to the promotion of dHL. Based on this, the following thesis had to be assessed: "By 2030, insured persons will be increasingly involved in digitalization processes (e.g. in the development of health apps)". The survey results are shown in Figure 75.

Figure 75: Assessment of the thesis "By 2030, insured persons will be increasingly involved in digitalization processes".



Note: Author's elaboration.

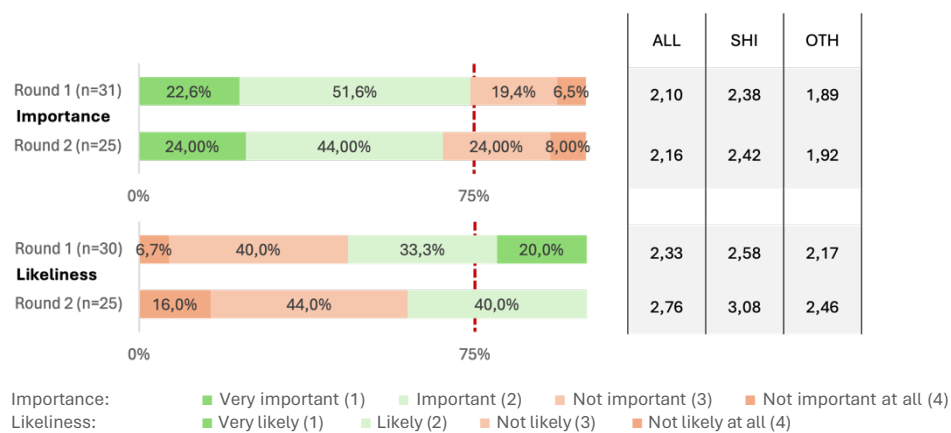
A stable opinion on the importance of this measure became evident in both survey rounds. More concisely, 93.8% (R₁) and 96.0% (R₂) of respondents consider this development to be (very) important. In the second round of the survey, the SHI members in average assigned a higher importance to the measure than the other participants (MV_{SHI}: 1.17; MV_{OTH}: 1.62).

The experts' opinion on the likeliness of implementation is rather indifferent and there was no stable opinion in either survey round. Although the experts mostly state that an implementation is (very) likely (R₁: 58.1%; R₂: 64.0%), almost a third of the experts believes that an implementation is not likely (at all). On average, the group of other participants considers the implementation to be less likely the group of SHI employees (MV_{SHI}: 2.08; MV_{OTH}: 2.54).

In the expert interviews, the use of health kiosks as a low-threshold access point for insured persons for advice on dHL issues was suggested as a further structural measure to promote dHL. Accordingly, the experts were asked to assess the following thesis in terms of its importance and likeliness of implementation:

"By 2030, health kiosks will be used as a low-threshold access and advice point for insured persons in matters relating to dHL". Figure 76 visualizes the survey results.

Figure 76: Assessment of the thesis "By 2030, health kiosks will be used (...)."



Note: Author's elaboration.

The majority of respondents consider it (very) important to establish health kiosks as a low-threshold access and as an advice point for people with statutory health insurance. Even though a stable opinion on this did not emerge, the experts rated the measure in both the first (74.2%) and the second round (68.0%) as (very) important. It is particularly striking that the other professions rated the importance as higher than the SHI employees (MV_{SHI} : 2.38 and 2.42; MV_{OTH} : 1.89 and 1.92). Regarding the likelihood of implementation, the opinions are rather indifferent. In the first round, 46.7% of respondents assumed that implementation was not likely (at all). In the second survey round, this proportion was 60.0%. Regarding the subgroups, SHI members assessed the development as less likely than the other participants (MV_{SHI} : 2.58 and 3.08; MV_{OTH} : 2.17 and 2.46). This development may have been influenced by the political discussions about health kiosks that took place at the time when the Delphi study was conducted. Health kiosks are currently being

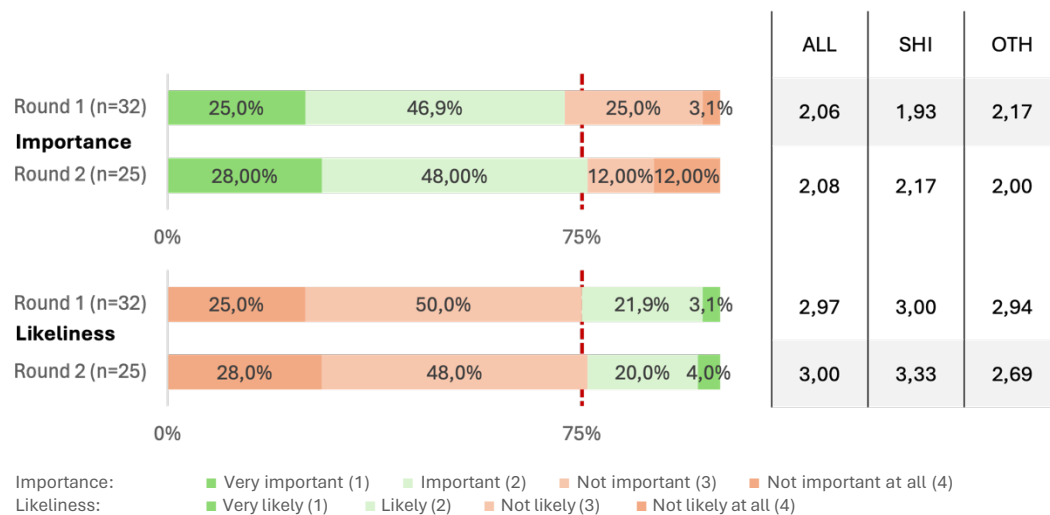
piloted in various regions in Germany and were discussed to be established by law as a new low-threshold care structure in the municipality. Shortly after the first survey round was completed in May 2024, a new cabinet law draft was presented, from which the implementation of health kiosks was removed. This development may have had an impact on the assessment of the likeliness of implementation.

In order to encourage SHI policyholders to engage with digital health information and services, the experts in the interviews suggested offering so-called "digital first" insurance tariffs. These oblige insured people to use digital resources before traditional healthcare services for a lower premium. Such tariffs are already common practice in countries such as Switzerland and could be implemented in a similar way to this model. The thesis to be assessed was **"By 2030, insured persons in the SHI system will be able to choose more cost-effective digital insurance tariffs (e.g. "video consultation first") to encourage them to engage with digital health services"**. The result is shown in Figure 77. Consequently, the majority of experts rated the offer of cost-effective digital insurance tariffs as (very) important for greater engagement with digital health services as enabler for a higher dHL. After 71.9% agreement in the first round, the second round showed a narrowly stable importance (76.0%). Despite the high importance of the development, the experts predominantly rate it as not likely (at all, R₁: 75.0%; R₂: 76.0%). On average, the SHI members rated the development as less likely than the other professions.

In the overall assessment of the fourth thematic block, the experts' opinions regarding the measures to be implemented in the future to promote dHL are still diverse in some areas. However, the majority of the experts consider both measures that strengthen the individual's dHL as well as measures that improve the structural framework conditions as important for the promotion of dHL in the German SHI system. With regard to the promotion of individual dHL, measures that address individual needs are important as well as measures that promote a general level of dHL.

In terms of specific measures to be taken, however, there is a heterogeneous range of opinions as to which approaches should be pursued. In general, the importance and likeliness of measures that tend to be less innovative and have perhaps already been discussed in the context of dHL are higher.

Figure 77: Assessment of the thesis " By 2030, insured persons in the SHI system will be able to choose more cost-effective digital insurance tariffs (...)."



Note: Author's elaboration.

The experts' opinions on the feasibility of individual measures are in particular heterogeneous, even though some approaches were rated as very important or important for the successful promotion of dHL.

Essentially, a clear gap between the importance and feasibility of measures becomes clear: the high relevance of certain support measures for the successful promotion of dHL was confirmed in many respects, but implementation is seen as more difficult, at least in the period up to 2030. For example, remuneration structures for the provision of services to promote dHL, the greater involvement of insured persons and the establishment of health kiosks are seen as important, but hardly feasible measures for the promotion of dHL.

In addition, it is noticeable that measures that can be easily integrated into existing structures in the SHI system were considered particularly feasible. For example, the promotion of dHL could be included as a funding item in the Innovation Fund or the topic itself could be integrated into existing setting approaches. At this point, the results of the Delphi study show that the promotion of dHL should not

be treated as a special topic with extra resources but should be considered as an integrative topic in existing structures and established as a kind of new normal.

VI – DISCUSSION AND RECOMMENDED ACTIONS

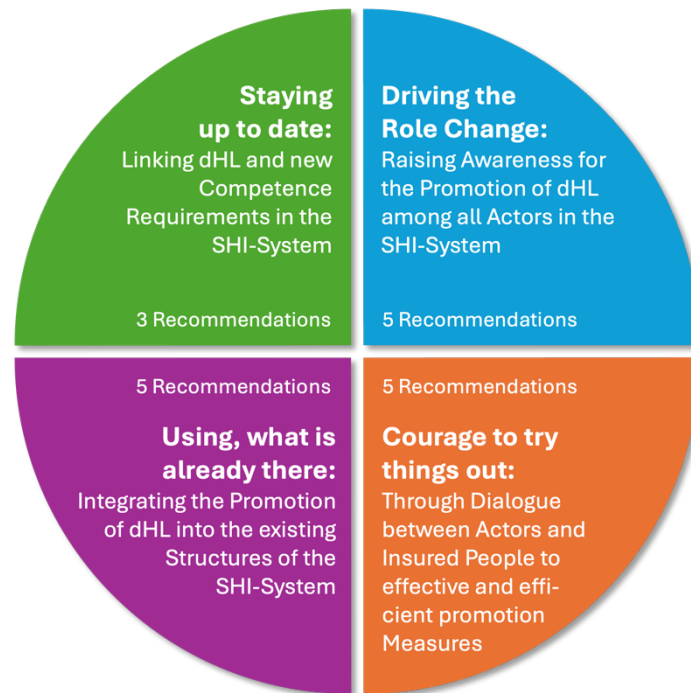
VI -DISCUSSION AND RECOMMENDED ACTIONS

6.1. GENERAL PROCEDURE AND STRUCTURE FOR DERIVING RECOMMENDED ACTIONS

In addition to presenting the expert panel's opinion on the research question, the aim of the dissertation is also to derive specific recommendations for the future design of framework conditions, responsibilities, and measures to promote dHL in the German SHI system. Based on the results of the Delphi study, the recommendations for action are structurally based on the four research facets and the four thematic blocks of the Delphi survey. The recommendations are presented in the four following chapters. The findings from the two online survey rounds as well as the findings from the literature research and the expert interviews were taken into account when formulating the recommendations for action. Special attention was paid to the opinions generated by the experts. For example, theses with a stable opinion could be easily transformed into concrete recommendations for action. However, theses with a heterogeneous opinion among the experts can be seen more as an impulse for discussion and stimulate further research on the topic. Figure 78 presents an overview of the derived recommendations.

All in all, 18 recommendations for action were generated. Three recommendations for action in chapter 6.2 relate to the future skills required by insured persons in the German SHI system. In the second topic area, or chapter 6.3, five recommendations for action were developed on the future roles and responsibilities of key players in the SHI system with regard to the promotion of dHL. The key message here is that all stakeholders in the SHI system must become more aware of the need for and their role in promoting dHL. In addition to the SHI funds, the involvement of other stakeholders is relevant and their organizational dHL must also be promoted. Chapter 6.4 presents five recommendations for action on the conceptual understanding of dHL in the context of the German SHI system. It has been shown that the discourse on a uniform understanding and homogeneous funding objectives is an essential prerequisite for the implementation of effective and efficient funding measures.

Figure 78: Overview about the derived recommendations for action



Note: Author's elaboration.

In addition to the intrasystemic anchoring of dHL in the SHI system, inter-systemic anchoring in the sense of a HiaP approach is also of essential importance. In addition, chapter 6.5 presents a total of five recommendations for action on specific educational and structural measures to promote dHL in the German SHI system. Finally, the research results were embedded in the theoretical framework of the work, which led to a further development of the model presented at the beginning for promoting the dHL of SHI insured people in Germany. The adapted figure is presented in chapter 6.6. Overall, the recommendations for action present a complete set of practical approaches and discussion points for the optimization of framework conditions, responsibilities, and measures for the successful promotion of dHL.

6.2. STAYING UP TO DATE: LINKING DHL AND NEW COMPETENCE REQUIREMENTS IN THE SHI SYSTEM

Due to the increasing digitalization in the healthcare sector, it was shown at the beginning of the work that the competences needed by insured persons in the German SHI system are also changing. The experts are of the opinion that future competences could be promoted within the framework of dHL. This implies a comprehensive understanding of the competence facets of dHL, but also a continuous further development of the concept. The Delphi study investigated which competence requirements will be relevant for SHI insureds in the future and to what extent these should be promoted in connection with dHL. Three recommendations for action were developed in this context.

Recommended Action No. 1: Strengthen Discourse on Required Skills and Further Establish § 20k SGB V as a Place of Promotion

Within the literature research, it became clear that a large number of changes will occur in the healthcare sector in the coming years. Due to key developments such as demographic change, the shortage of skilled workers and digitalization, the SHI system must become increasingly efficient, which can among other things be achieved through technology. However, this also results in many new skills requirements for SHI insured people in order to be able to participate in digital healthcare. The Delphi study showed that the experts consider a large number of skills to be relevant for SHI insured people. For example, the use of electronic patient files, an independent navigation in the healthcare system and understanding one's own health data clearly show that the experts of the Delphi study expect a high level of personal responsibility and diverse skills from insured persons in the future.

According to the experts, the majority of these competencies should be associated with the promotion of dHL according to § 20k SGB V. Almost all of the competence requirements surveyed were considered as relevant in connection with the promotion of dHL. In part, this covers the competencies that fall under the promotion of the GKV-SV guideline. In some cases, however, the survey results exceed and specify the previous guideline content and common dHL definitions. This

shows on the one hand, that the conceptual understanding of dHL is still very heterogeneous among the experts. On the other hand, it also shows that new competence requirements that arise in an increasingly digital SHI system require a place of support and that the existing framework offered by § 20k SGB V could be used for this purpose. It therefore makes sense to always discuss the concept of dHL and the content to be promoted in the context of changing skills requirements and to establish a close link between the skills that insured persons really need in the SHI system and the promotion of dHL in accordance with § 20k SGB V. This implies a basic understanding of dHL as an evolving concept that must be constantly developed further.

The results of the survey have shown that the content outlined in the GKV-SV guideline is seen as relevant skills for insured persons in the SHI system in the coming years. Accordingly, this scope of support should be maintained. However, it also became clear that the skills requirements could change or even expand in the coming years. Due to disruptive technologies such as AI, the experts assume that in future, for example, the identification of individually relevant information or the recognition of reliable information will be a particularly important skill, rather than searching for, finding, and evaluating information per se. It is already apparent today that AI chatbots such as ChatGPT are changing people's information-seeking behavior (Dathe et al., 2024, p. 36). In line with these developments, it is once again advisable to continuously monitor relevant skills for SHI insured people based on environmental influences. Furthermore, it is advisable to define with the help of expert opinions which of these fall within the scope of dHL funding in accordance with § 20k SGB V in order to best prepare insured people for upcoming competences needed. The conceptual understanding of dHL itself is a relevant framework to be considered in this case.

In practical terms, this new task could fall within the remit of politics or a national action plan, at least in terms of the coordination. More precisely, the task

would be to transform sound findings into framework conditions.³⁶ In a joint discourse with relevant stakeholders or their representatives, it should be determined which competencies are relevant for the promotion of dHL. The findings should then be incorporated into the GKV-SV guidelines in order to ultimately align the funding measures with the required skills and thus remain in the grip of time. Specifying the guidelines could also lead to greater efficiency and effectiveness of the support measures as this makes clear to all stakeholders what they are actually intended to achieve. The results of the Delphi study with regard to new skills requirements could be an initial starting point for this.

Recommended Action No. 2: Close Monitoring of Weak Signals Regarding New Skills Requirements and Taking Them into Account Today

The experts considered a large number of skills requirements to be relevant for SHI insured people and for funding within the scope of § 20k SGB V. However, opinions differed regarding skills that are less recognizably relevant today, such as technology-related skills. For example, the experts were of different opinions as to whether insured persons need to be familiar with specific technologies such as AI, big data, or sensors by 2030 and whether these should then also be taken into account as part of the dHL support measures.

To date, the teaching of skills for the use of technologies has not been part of the GKV-SV guideline for the promotion of dHL; it is even stated that the enhancement of general digital skills is explicitly regarded as a task for society as a whole. Therefore, it does not constitute a service provided by SHI funds in accordance with § 20k SGB V. Nevertheless, with increasing digitalization and technological developments, insured persons are also faced with ever more and new skills requirements that require the appropriate use of technology. Closely related to the fundamental understanding of dHL, the relevance of technological skills or skills for SHI-insured persons that are generally only weakly recognizable today should be closely monitored and, if appropriate, transformed into corresponding support

³⁶ The experts see a strong role for politics as a "framework provider". Additional information on the roles and responsibilities in connection with the promotion of dHL can be found in chapters 4.3.2 and 5.3.

measures either within the framework of § 20k SGB V or as a task for society as a whole (also) in other policy areas.

Recommended Action No. 3: Act Holistically by Strengthening General Competencies in all Relevant Areas of Life

In addition to recommendation number 2, there is a further recommendation to see skills development from a more holistic perspective. dHL is a combination of various skills that are specifically relevant in the healthcare context. In addition, fundamental skills such as reading and writing skills are needed. These are skills that are also relevant in other life situations and circumstances in their respective contexts and must be applied accordingly anywhere. In this context, many experts have therefore made clear that the promotion of relevant skills cannot only be the task of the SHI system or specifically the SHI funds, but that promotion should also take place in other areas of life in the respective context in the sense of a HiaP approach.

6.3. DRIVING THE ROLE CHANGE: RAISING AWARENESS FOR THE PROMOTION OF DIGITAL HEALTH LITERACY AMONG ALL ACTORS IN THE SHI SYSTEM

In accordance with § 20k SGB V, the SHI funds in Germany are currently the only legally obliged institution to promote dHL for SHI-insured individuals. Especially the expert interviews have shown that other stakeholders should be involved in the promotion of dHL. The resulting ideas were transformed into corresponding theses and presented for evaluation as part of the Delphi study. Five recommendations for action in this area were developed on the basis of the resulting opinions.

Recommended Action No. 4: Expanding the Roles and Responsibilities to Promote dHL Using Existing Structures

A key recommendation for action that can be derived from the Delphi study is the expansion of the roles and responsibilities of the stakeholders in the SHI system for the promotion of dHL. According to the current legal situation, only the SHI funds are currently obliged to offer services to promote dHL for SHI insured

people. In the opinion of the experts involved in the study, further roles and responsibilities should be defined. The experts assume that job profiles in the healthcare sector will change in the coming years due to increasing digitalization and the associated new skills requirements, and that the promotion of dHL will find its way into the daily tasks of healthcare professionals in various dimensions. New job profiles such as a digital nurse, who specifically supports insured persons in dealing with digital information and services, are also considered as realistic.

The stakeholders' awareness of their contribution to promoting dHL among the insured must be raised and become a reality in their daily activities. This can be achieved through an intensified discourse on the topic of dHL, or even at the statutory-regulatory level by adapting the GKV-SV guideline. Greater consideration of dHL in the National Action Plan for Health Literacy was also seen as relevant by the experts and could ensure greater attention for the topic. In the Delphi study, it became clear that the roles and tasks for the promotion of dHL are not about developing new structures and tasks. Rather, it is about making a better use of what already exists in the SHI system in the interests of efficiency. In particular, all the many points in the system where professionals are in contact with insureds represent possible starting points for the promotion of dHL. Each professional can contribute a piece in the puzzle in its own area. Self-help groups and patient organizations could, for example, expand their existing services to include low-threshold services to promote dHL. The role of pharmacies in the context of promoting dHL should be discussed further, as no clear opinion of the experts has emerged during the Delphi survey. In terms of a holistic approach, stakeholders from other policy areas should also be involved in the promotion of dHL or certain sub-skills.³⁷ Specifically, adult education centers and schools in general were identified here.

Recommended action no. 5: Using the Health Insurance Contact Point for Individual Support Also in the Area of dHL

The literature research has revealed a beginning change in the role of SHI funds to a more service-oriented player. Specifically, SHI funds will no longer only

³⁷ See also the explanations in chapter 6.4.

take on the passive-reactive role of approving healthcare services and paying for them; instead, they will take on a supportive and advisory role as guides through the complex SHI system, not least to leverage efficiency reserves and provide the right healthcare services to the right insured person at the right time.

In the Delphi study, the experts considered the individual support of their insureds to promote dHL as the most important task of the SHI funds. This was even ranked before the task of financing services in accordance with § 20k SGB V. This task can be easily linked to the fundamental further development of the role of SHI funds. In contrast to other players in the healthcare system, SHI funds have many different points of contact and opportunities to provide advice to insured people. A lot of health information comes together at this point. At each point of contact between the health insurer and the insured person, individual and targeted efforts could be made to strengthen dHL, for example by pointing insured persons to trustworthy digital health information, digital services or, if necessary, suitable training courses to promote dHL or the use of certain digital structures. The SHI funds could act as analogue guides to digital structures and provide reliable support to policyholders, taking into account individual needs and skill levels. In the regulated SHI market, this can become a competitive factor and, in an increasingly digital world, a natural requirement of insured people towards their health insurer. SHI companies that already incorporate dHL into their services and advisory standards can set new standards and set themselves apart from other SHI companies.

In addition, the health insurance funds should continue providing their insureds with training and information material to promote dHL. Besides the general information predominantly given today, the many existing points of contact between the insured and the health insurance fund can also be enhanced with appropriate, target group-specific offers for this purpose. Health insurers should also make it easier for their insured people to access digital health information and services by creating more transparency about their service portfolio and making clear which services actually can be taken. Personalized recommendations, for example generated by AI, can create additional added value here and help to promote dHL.

To successfully promote dHL among their insured people, SHI funds should focus in particular on the actual points of contact with policyholders and take on

an advisory role here. Political activities, such as bringing together the players in the SHI system for a stronger joint approach to promoting dHL or positioning themselves more strongly as the main responsible players, should rather be seen as secondary tasks.

Recommended action no. 6: Establishing Doctors as Promoters of Digitalization and Digitally Health-Competent Insured Persons

As part of the research work, it became clear that doctors also play an important role in promoting the dHL of insured persons in the SHI system and that their tasks should change accordingly in the future. It can be concluded that doctors should take on a more guiding role and consciously steer insured persons to suitable digital services and structures. Thereby, the use of digital health information and services increased and insured people become more and more familiar with it. This role emerges in particular due to the high level of trust that usually exists in the doctor-patient relationship. In everyday practice, doctors should promote more digitally health literate and empowered insured persons who can make self-determined health decisions based on digital health information and applications. In the long term, their own resources will benefit from this, which becomes increasingly important due to demographic change and the shortage of skilled workers. Like the tasks of SHI companies, doctors should therefore also examine the extent to which they can provide support in their contact with insured persons. A point that became clear in this context is, that overloading doctors with tasks such as giving training courses on dHL is not effective due to the existing resource issue.

An important prerequisite for performing these tasks is that doctors themselves have a high level of dHL and are familiar with digital health information and services. As practice owners, they should also ensure that the practice staff also have a corresponding level of knowledge and that the processes in their own practice are designed to be able to offer digital information and services. The use of digital infrastructures in the SHI system is important for this. The overarching aim is to raise doctors' awareness of their role in promoting dHL and to drive forward a kind of cultural change to discard the traditional doctor-patient relationship. Pro-

professional associations and representatives such as the associations of SHI physicians should set a good example here and support doctors in a future-oriented manner.

Recommended Action No. 7: Strengthening and Specifying the Role of Politics as a Framework Provider

At a political level, the role of the legal basis setter should be kept in order to provide the necessary framework for the promotion of dHL in the SHI system. In addition, however, this role should be specified to enable a more target-oriented promotion of dHL. Based on the research findings, it is clear that politics should primarily play a more formative role in the field of dHL. The existing provisions of § 20k SGB V and the supplementary statements in the GKV-SV guideline should be supplemented with additional responsibilities to raise awareness among stakeholders for the relevance of the topic and their individual contribution. For example, doctors, professional associations, self-help groups and patient organizations could be integrated with specific tasks in order to create more clarity here. The further development of funding content and the understanding of dHL in the German SHI system should also be discussed on the basis of the research findings. The creation of relevant framework conditions for the successful promotion of dHL also includes the expansion of digital structures in the SHI system as a relevant prerequisite for the provision of reliable digital health information and services.

Overall, a balance must be found between framework conditions that provide guidance and control mechanisms that are too restrictive. The framework regulations should be designed in such a way that they emphasize the relevance of a high dHL and raise awareness of this. Policymakers should take a partnership approach here rather than controlling the implementation of regulations and impose sanctions. This could have a demotivating effect and make the promotion of dHL seem like an unpleasant compulsory task.

Recommended Action No. 8: Implementation of Measures to Strengthen Organizational dHL in the SHI System

The successful promotion of dHL among insured persons also requires a correspondingly high level of dHL among the various stakeholders involved in promoting dHL. If insured persons are informed about dHL-related topics in personal consultations, the actors in the SHI system must have a good knowledge of the content to be communicated. Accordingly, a strong focus should also be placed on promoting organizational dHL in the SHI system. Adapting the training and study content of healthcare professions was seen as an important starting point for the successful promotion of dHL. Content on dHL should be integrated into the curricula right from the start of a professional career to make the topic the new normal. It should also be discussed whether and how (mandatory) training courses for professionals already in employment can contribute to the promotion of dHL. The necessity of a high level of organizational dHL could also be integrated into existing quality assurance standards to encourage engagement with the topic. As all the points mentioned were predominantly considered important, but for the most part not feasible by 2030, a joint discussion should be held with those affected, such as doctors and their professional associations, to discuss whether and how implementation should be made possible and thus contribute to the promotion of dHL.

6.4. USING, WHAT IS ALREADY THERE: INTEGRATING THE PROMOTION OF DIGITAL HEALTH LITERACY INTO THE EXISTING STRUCTURES OF THE SHI SYSTEM

A more uniform conceptual understanding emerged as a central starting point for the successful promotion of dHL in the German SHI system, both in the interviews and in the literature research. Only if all those involved are clear about what the promotion of dHL contains and what objectives are associated with it, a successful promotion can take place. The following five recommendations for action are aimed at anchoring the conceptual understanding of dHL more firmly in the German SHI system and its structures.

Recommended Action no. 9: Strengthening the Discourse on a Common Understanding and Objectives of dHL in the SHI System

It is no new evidence that the understanding of dHL is very heterogeneous and that many different definitional approaches are used to describe the concept (Ulbrich & Matusiewicz, 2024, p. 239 f). The initial definition by Norman & Skinner (2006) is still used particularly frequently, even though it is often described as outdated and outmoded. As part of the Delphi study, the experts also selected different definition approaches which, in their opinion, best describe the concept of dHL. However, it is noticeable that the definition by Samerski & Müller (2019b) was predominantly chosen as a definition approach. The main reason named for that was that it includes a very comprehensive understanding of dHL which goes beyond simply searching for, finding, understanding, and using digital health information. The understanding of dHL has changed. In addition to digital health information, this understanding also encompasses the use of digital technologies in the healthcare sector. The aim of a high dHL is particular to have future-oriented skills and to strengthen the self-determination of insured persons. In addition to a high level of individual dHL, a high level of organizational dHL is also relevant in order to create a framework for promoting dHL skills. The second most frequently selected definition by Kolpatzik et al. (2020) also understands dHL as an interplay of individual, social and technical skills and resources and as a dynamic, constantly evolving concept. Even if the definition approach has a different focus than that of Samerski & Müller, dHL is now understood as more than the Norman & Skinner covers. The GKV-SV guideline contains the essential components of both definition approaches, and the objective of the services in accordance with § 20k SGB V is also reflected in the results of the Delphi study. However, a uniform conceptual understanding of dHL has not yet been achieved across the board and different stakeholders are placing different emphases on it. The GKV-SV guideline is a guideline for the granting and design of promotion services. However, if a common and uniform understanding of dHL has not been established, there will always be different nuances and priorities as well as a lack of clarity in implementation and the threat of an efficiency loss. At the same time, there are many opportunities for synergies by closely aligning the conceptual understanding of dHL with the understanding of health literacy and integrating the topic more closely into existing discussions and initiatives such as the National Action Plan for Health Literacy. It may also be

helpful for a common understanding to specify the components of the GKV-SV guideline and to make it even clearer what exactly should be part of the promotion of dHL. For this, an interdisciplinary panel of experts should work on a common understanding and disseminate it. The research results of the Delphi study regarding the conceptual understanding of dHL and the objectives to be pursued can form a basis for this.

Recommended Action No. 10: Strengthening the Individual and Systemic Prerequisites for the Successful Promotion of dHL

The promotion of dHL must take place on several levels and in different systemic surroundings. Both individual and systemic requirements must be considered. As the present study shows, the eHealth literacy framework can be used as a starting point for the SHI system. The experts interviewed emphasize that the optimization of both individual and systemic conditions is crucial for the successful promotion of dHL.

Systemic prerequisites include clearly defined responsibilities, a common conceptual understanding of dHL and concrete support measures within the SHI system, for example in relation to services that are taken on. In addition, other policy areas must be included in the design and implementation to enable a holistic skills development. The individual requirements relate to the skills that insured persons need to navigate in a digital healthcare system. To promote these skills, the experts consider both specific individual measures and broader general approaches to be relevant. However, a standardized approach based on a one size fits all principle, which exclusively focuses on skills, is from the expert's point of view too short. A successful promotion of dHL can only be achieved if other systems and levels are also taken into account. Proactive measures are particularly important here, an assessment shared by the majority of experts. At the same time, a certain learning process in the sense of learning by doing also plays a complementary role.

Recommended Action No. 11: Anchoring of the dHL Concept in the SHI System Integrative

The concept and promotion of dHL should be better anchored in the SHI system. It became clear that in order to successfully promote the dHL of insured persons, both the framework conditions in the SHI system and individual skills must be considered and further developed. To this end, the processes and procedures in the SHI system must be better interlinked. The basic idea of promoting dHL should be integrated into every possible point of contact between stakeholders, the system, and insured persons in order to exploit all opportunities for promotion. For better interlinked processes, all actors must take responsibility: for example, a health app (DiGA) must not only be a service of and financed by the SHI funds, but doctors must also proactively prescribe it and use it in everyday treatment. Additionally, manufacturers must ensure that insured persons understand the application and recognize the added value through a user-friendly design. This example clearly shows that every stakeholder can make a relevant contribution to digitally health literate insured persons with their individual level of competence by creating the appropriate framework conditions.

The promotion of dHL should furthermore be integrated into existing structures in the SHI system by linking dHL topics to the given contact points of the actors involved. In this way, dHL could also become a topic in workplace health promotion and be communicated by the SHI funds to insured persons or employees of the relevant companies. Other prevention approaches can also be used for this purpose. Chapter 6.4 lists further structures that can be used for dHL topics. Taking into account the available resources, it is therefore not necessary to establish large extra structures for successful promotion, but the existing ones can be developed further. This shows that even combined low-threshold measures can be helpful and that it is more important to strengthen the relevance of the topic and anchor it in people's minds than to establish large structural changes or funding programs. A mindset that is open to digitalization is an important prerequisite for this.

Recommended Action No. 12: Thinking dHL in Terms of a Health in All Policies Approach

In addition to an intrasystemic integration of dHL promotion within the SHI system, it also became clear that other policy areas are also required for strengthening skills that are part of dHL in the sense of a HiaP approach. Certain skills such as assessing the reliability of (digital) information, for example, are also necessary in other areas of life, meaning that they should already be taught at school. To this end, school curricula need to be further developed with regard to the skills that will be required in the future. The topic of dHL itself could also be integrated into school curricula, as is already the case with health literacy-related topics, for example. The topic of dHL should therefore also be integrated intersystemic into existing structures in order to reach as many target groups as possible and to successfully promote the necessary skills.

Recommended Action No. 13: Developing the Conceptual Anchoring of dHL in the SHI System Continuously

As already described in chapter 6.1, the SHI system will be subject to a large number of changes in the coming years, which will also have an impact on the skills relevant to insured persons in the SHI system. Against this background, not only changing competence requirements should be monitored and taken into account in the dHL concept, but the anchoring of dHL in the SHI system should also be continuously developed. For example, it should be examined whether the structural framework conditions in the SHI system could be further developed to have a positive impact on the promotion of dHL. The political framework conditions in § 20k SGB V and the further regulations of the SHI system should also be further developed if necessary.³⁸ In order to identify the need for change, a panel of experts could address these issues and define corresponding recommendations for action.

³⁸ See also the explanations on evolving competence requirements in an increasingly digital SHI system in chapter 6.2.

6.5. COURAGE TO TRY THINGS OUT: THROUGH DIALOGUE BETWEEN ACTORS AND INSURED PEOPLE TO EFFECTIVE AND EFFICIENT PROMOTIONAL MEASURES

Recommended Action No. 14: Utilization and Further Development of Existing Structures in the SHI System for the Promotion of dHL

With regard to specific measures to promote dHL, both structural and educational measures should be discussed as part of a holistic approach. Even if there is still no consensus among the experts in many areas regarding support measures, the results of the Delphi study can be used to contribute initial ideas to the further discussion. Overall, measures that can be integrated into existing structures in the SHI system or are related to them were considered particularly important and realistic. It therefore appears that the establishment of special structures is not necessary for the successful promotion of dHL.

From a structural perspective, primarily relevant is the creation of conditions for the provision of digital health information and technologies. This means that the digital ecosystem should be further expanded, focusing in particular on user-friendliness. However, the mandatory use of digital structures by insured persons seems unrealistic and also not conducive to increasing dHL: less digitally savvy target groups must not be left behind by digital structures and disadvantaged in terms of equal opportunities in healthcare.

In order to encourage the use of digital structures in the SHI system, the SHI financial system could be further developed like in other countries by offering "digital first" tariffs. These require insured people to first consult digital resources such as symptom checkers or video consultations before visiting a doctor in person and are therefore more cost-effective for insured persons. These tariffs presuppose a certain level of dHL and must not lead to health risks or disadvantages arising from the digital first regulation. It must also be avoided that a division of the medical system is established and that the benefits of lower costs only accrue to those with a high level of dHL. In addition, the legal framework would first have to be clarified to be able to introduce these tariffs in the heavily regulated SHI system.

Another measure for the further development of structures in the SHI system with regard to the promotion of dHL relates to the existing remuneration structures. Chapter 6.2 made clear that the roles of the players in the SHI system will

evolve in the coming years and that tasks to promote dHL should be performed. These tasks generate workloads, for example when practice staff supports insured persons. As part of the research, it became clear that these efforts should be remunerated in monetary terms in line with the changing roles and that it is therefore important to further develop the remuneration structures.

The expansion of health kiosks has been a recurring theme in the health policy debate for a few years now. When further developing these low-threshold advice services in socially disadvantaged regions, it is advisable to also consider the promotion of dHL as a possible task. This could especially work out as a structure for informing insured persons about dHL issues. Especially insured persons with a lower social status have a lower dHL and require special support, which can be ensured through personal advice in a trustworthy environment. Health kiosks were recently removed from the law that was intended to make them part of standard care. To date, there have been seven health kiosks with a project character in Germany. With the additional task of promoting dHL, there would be a further argument for establishing the kiosks nationwide.

At an overarching level, following on from chapter 6.3 "Using what is there", many of the structures already existing in the SHI system should be used or developed further in a targeted manner in order to optimize the promotion of dHL.

Recommended Action No. 15: Identifying and Eliminating Implementation Hurdles.

Overall, the experts considered the structural measures described to be highly relevant for the successful promotion of dHL. Accordingly, the measures derived from the expert interviews and the literature could provide a good basis for the successful promotion of dHL. At the same time, there was often a heterogeneous range of opinions regarding the feasibility of the measures. This implies that, despite their high relevance, many barriers to implementation are still seen for individual measures. Some of these were mentioned in the free text comments of the Delphi study and in the expert interviews. In particular, a missing awareness of responsibility or a lack of actual willingness to implement measures to promote dHL appear to be obstacles. In addition, the time horizon of 2030 set in the Delphi survey may have been too short to achieve implementation of the measures. As the

analysis of the background to the low assessment of the feasibility of measures was not part of the Delphi study's research scope, it is recommended that this be followed up. For example, further discussions on the feasibility of the measures could be held in the form of interdisciplinary expert workshops. This might help to increase their applicability in practice.

Recommended Action No. 16: Consistent Alignment of Educational Support Measures at Individual and Global Level to the Needs of Insured Persons.

As part of the research work, the approach of establishing measures to promote dHL at both an individual level and a global level was consolidated. Global promotion refers to general dHL topics that are relevant for all insured persons, while individual promotion refers to specific measures geared to the needs of individual insured persons.

With regard to individual support measures, both the literature review and the Delphi study made clear that the success of support measures is closely linked to their acceptance by and appropriateness for the respective target groups. A support measure can only be effective if it meets the respective needs of the people using it. As the dHL differs greatly in different groups of insured persons according to socio-demographic criteria, different needs must be taken into account with regard to skills development. Accordingly, it is essential to use a wide range of support measures that are as individualized as possible, both in terms of the target groups to be addressed and the distribution channels used. To concretize this, the core of the offers should always communicate the added value of utilization and a high dHL in order to explain the "why" to policyholders and provide an incentive for utilization. Innovative methods such as storytelling should also be used to increase the involvement of policyholders. The concerns of insured persons can be addressed in a particularly personalized way during consultations. As already mentioned, a bridge between analog and digital structures could be provided by SHI funds or doctors as personal guides or intermediaries in digital structures at the respective point of contact. This hybrid form should be considered especially for target groups with little digital affinity in order to facilitate access to the digital world.

Insured persons should furthermore be more closely involved in the development of individual support measures. This could be implemented using UX tests or agile development methods to make incremental product improvements and meet the needs of the insured in the best possible way. Together with the relevant stakeholders such as SHI funds, politicians, IT experts and patient representatives, it should be discussed how the inclusion of insured persons in the development of support measures in accordance with § 20k SGB V can be improved. With regard to the intended goals of promoting dHL, the inclusion of the various perspectives of the insured can also increase equal opportunities in the SHI system in the digital age.

Regarding the promotion of dHL on a more global level, the main aim is to draw more attention to the topic of dHL by prominently placing relevant topics for all policyholders. In particular, mass communication media such as social media, television advertising or educational campaigns should be used for this purpose. Advertising campaigns on the electronic prescription, for example, already exist. The implementation of further measures and suitable topics should be focused.

Recommended Action No. 17: Creation of Innovation and Testing Areas for Effective and Efficient Support Measures

The promotion of dHL in accordance with § 20k SGB V is still a new service in the SHI system. To date, there have been few concrete measures or offers, which have also hardly been evaluated. In this research study, the experts were also unsure in many areas as to which support measures are effective. Taking the research results into account, so-called innovation and testing spaces should therefore be created to identify really helpful measures to promote dHL. Existing structures in the SHI system can be used for this purpose. For example, funding waves of the Innovation Fund could be used specifically for projects to promote dHL. In addition, pilot projects could also be used as a test structure. Thereby, it is important that the costs coming up are remunerated. Continuous monitoring and the implementation of evaluations can be used to determine the effectiveness of certain measures and analyze their transferability to standard care.

Recommended Action No. 18: Using Technologies such as AI as an Enabler to Leverage Efficiency Reserves.

In addition to the further development of framework conditions and responsibilities to promote dHL in the SHI system, technology-based measures can also be used to empower policyholders. It became clear in the research work that AI-based applications in particular have the potential to have a positive impact on the dHL of insured persons through the provision of individually required knowledge. The prerequisite for this is, of course, that insured persons know how to use these technologies and especially that the information is used properly. Consequently, a certain level of user competence is always required for the transfer of information and an ambivalent role of technologies comes into play. As a result, teaching skills via new, AI-based technologies will not be effective for all policyholders. At the same time, however, it can be helpful for a certain proportion of policyholders and thus relieve the burden on human resources. AI could therefore be used as part of specific support measures and answer individual questions using tools such as chatbots. To ensure a high level of user acceptance, the design guidelines defined as part of the research work should be taken into account. On the other hand, the use of AI in the processes of the actors in the SHI system could also lead to routine activities being dispensed with and more time being created for personal, individual support in dHL issues.

6.6. INTERIM SUMMARY: PROMOTING THE DIGITAL HEALTH LITERACY OF SHI-INSURED PEOPLE IN GERMANY IN A MORE HOLISTIC WAY

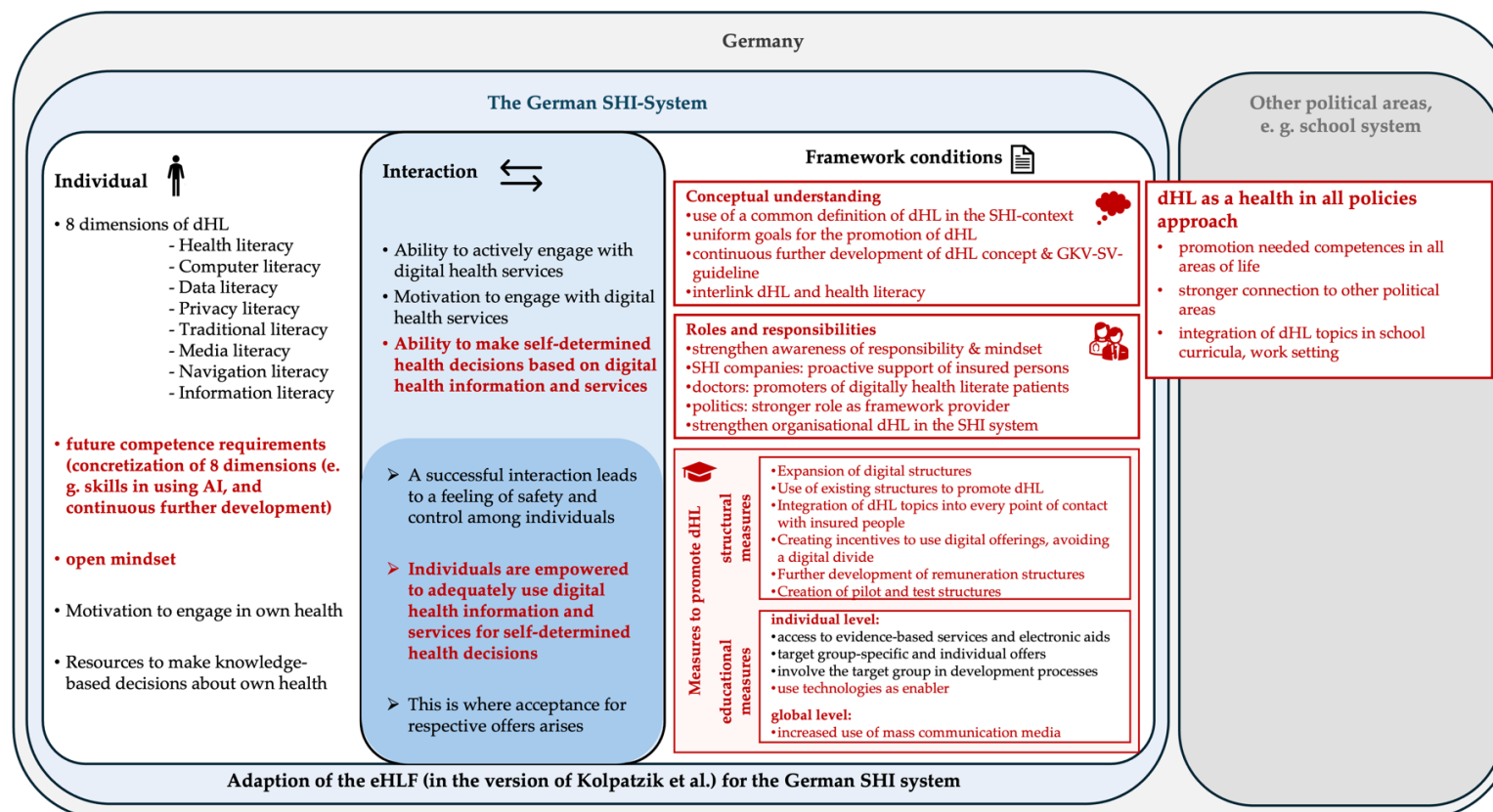
The promotion of dHL is of great importance for the German healthcare system from several perspectives. Digitalization is advancing in the healthcare sector, bringing with it new processes, treatment options and forms of communication. For all stakeholders in the SHI system, but also for the insured, this requires a build-up of skills to be able to participate in modern healthcare and make self-determined decisions for their own health. At an overarching level, digitalization is seen as a key to increasing efficiency in the healthcare system. This development is not only desirable, but urgently needed due to the diverse environmental influences such as the shortage of skilled workers, rising treatment costs and demographic trends. A

high level of dHL among the insured is seen as an essential prerequisite for realizing this potential, as the objectives described can only be achieved if digital health information and services are used appropriately. As part of the Delphi study, comprehensive recommendations for the future design of framework conditions, responsibilities, and measures for the successful promotion of dHL in the German SHI system were developed and presented in the previous chapters. It became clear that the promotion of dHL should be thought and implemented in a more holistic way and broader than today. The current statutory regulations in Germany include in particular the strengthening of the individual prerequisites for a high level of dHL. Thereby, the SHI funds are mainly obliged to support their insured people with appropriate services. The implementation status of this legal requirement is heterogeneous and often follows the one size fits all principle without taking individual needs into account. To present possible starting points for a concrete improvement of the situation, the results of the research will lastly be embedded in the theoretical framework of the work. Therefore, the visualization presented at the beginning of this work will be further developed based on the core findings of the Delphi survey.

The model assumes that both individual and systemic conditions must be considered to increase the dHL of people with statutory health insurance in Germany. Based on the findings of the Delphi survey, both sides could be concretized and transferred to the German context. The corresponding adjustments are highlighted in red.

On the individual side, it was added that the competence facets of dHL should not be understood as a fixed construct. Rather, the diverse environmental influences and the resulting new competence requirements should be observed and taken into account in the conceptual understanding of dHL. In addition, certain developments, such as the increase in AI-based digital health information and applications, should be discussed as concrete possible subjects for promotion. A positive mindset of people towards new technologies and innovations in healthcare could also help opening up for dHL topics.

Figure 79: Adapted model based on the research results



Note: Author's elaboration.

The majority of the recommendations for action developed relate to the systemic requirements for the successful promotion of dHL in the German SHI system. Since the systemic framework conditions are hardly the subject of the specific legal regulations for the promotion of dHL in the German SHI system, the research results can provide the greatest gain in knowledge and a therefore make a contribution to possible optimization approaches at this point. Based on the results of the Delphi study, it was possible to derive recommendations for the future design of framework conditions, responsibilities, and measures for the successful promotion of dHL in the German SHI system. At the level of the conceptual anchoring of dHL, the recommendations for action in particular relate to a stronger discourse to create a uniform understanding of dHL and a uniform objective for promotion in accordance with § 20k SGB V. In the area of roles and responsibilities, recommendations were derived as to which actors in the SHI system besides SHI funds should be involved in the promotion of dHL in the future.

Additionally, more open-mindedness considering digitalization and the promotion of organizational dHL turned out as important prerequisites. The recommendations regarding specific measures to promote dHL can be further subdivided into structural measures, which focus on the framework conditions for promotion, and educational measures, which include specific ideas for promotion measures. According to the research results, there is also a further subdivision into individual-related and more global support measures. As it was emphasized in the study that the promotion of dHL should not only be considered more holistically in the SHI system, but also in other policy areas, this level was also included in the model. To this end, the system level of the SHI system was supplemented by other policy areas in Germany and a further development of dHL in the sense of a HiaP approach was undertaken. Further research results were included in the area of interaction between individual prerequisites and systemic framework conditions. In addition to the ability to use digital health information and applications, making self-determined health decisions on this basis was named as a relevant goal of high dHL.

Based on the model, it becomes clear that a successful promotion of dHL of SHI-insured persons in the German SHI system can only be achieved through the

integrative cooperation of several abstraction levels and stakeholders. Insured persons are dependent on being taken along with regard to a high dHL and require suitable systemic framework conditions. In addition to technical developments in the context of digitalization, the human resource, and especially vulnerable groups, must not be forgotten. This complex interplay makes clear that dHL in the German SHI system deserves more attention and must be anchored more deeply in the SHI system than this has been the case to date by § 20k SGB V. dHL is not a stand-alone competence that individuals can train. Rather, the corresponding framework conditions of the surrounding system and other policy areas must be designed in such a way that the skills can be adequately applied. The results of the Delphi study have shown that an integrative approach using existing structures in the SHI system could contribute efficiently to the promotion of dHL. In addition to the recommendations for action, the expanded model thus represents a condensed summary of the results for the successful promotion of dHL among people with statutory health insurance in Germany. Together with the detailed recommendations for action, it can serve both as a basis for deriving specific measures for the promotion of dHL and as a basis for discussion for the further development of the opinion surveyed in the Delphi study.

VII – LIMITATIONS AND FUTURE WORK

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7.1. LIMITATIONS OF THE RESEARCH DESIGN

With the Delphi study, the research work is based on a mixed methods approach. This was chosen because mixed method approaches attempt to minimize the weaknesses of individual survey instruments by combining several research methods. With the combination of qualitative expert interviews and the two quantifying Delphi rounds, theses for the future further development of framework conditions, responsibilities, and measures for the promotion of dHL of insured persons in the German SHI system were initially drawn up. These were subsequently evaluated by experts in the quantifying Delphi rounds with the aim of presenting the diversity of opinions on the topic and deriving practical recommendations for the future design of framework conditions, responsibilities, and measures for the promotion of dHL of insured persons in the German SHI system. The research design took into account the research interest and the available resources. Nevertheless, the mixed methods approach used here has its limits and can be expanded to include additional survey instruments in order to achieve further research results.

Within the work, it was possible to present the fundamental diversity of opinions of the experts on the research question and derive practice-oriented recommendations for action. However, further relevant research results could be achieved with the help of additional expert workshops. For example, it would be possible to discuss theses on which the Delphi study had not yet reached a consensus and to explore concrete arguments for the respective points of view. In addition, some theses were judged to be highly relevant for the successful promotion of dHL, but with a low probability of implementation. In these cases, further workshops would help to identify implementation hurdles and take these into account regarding the implementation of relevant measures. The recommendations for action derived are also often at an even higher level. This was the aim of the work to cover the broadest possible range of topics and opinions within the research area. In expert workshops, however, these approaches could be explored in greater depth and broken down to a smaller level to further increase the practical applicability of the recommendations for action.

With regard to the panel of experts of the Delphi study, the size and composition of the group should be brought into context of the results of the work. The selection of experts was a well-founded but self-made selection based on specifically defined criteria. There is no generally valid definition of who is an expert in the field of dHL. This criticism is generally inherent to the Delphi methodology. For this reason, a well-documented composition of the expert panel and all methodologically relevant conceptual steps was ensured. In addition, all experts were asked a question at the beginning of each thematic block regarding their subjective assessment of competence in the respective thematic area and these results were considered within the interpretation of the results.

The selection process showed that it is generally difficult to find expertise on the topic of dHL and if, that this is primarily to be found among SHI companies. As a result, employees of a SHI company made up almost 40% and thus a large proportion of the panel of 32 experts. It can be assumed that this is primarily due to the novelty of the topic and the statutory mandate of the SHI companies to promote dHL according to § 20k SGB V. It is advisable to expand to the search for experts after a certain time and, in particular, to consult other professions on the topic. This would enlarge and broaden the expert panel. To avoid a one-sided orientation of the research, this circumstance was addressed in the research work in such way that all survey results were also analyzed separately for health insurance fund employees and other participants. Conspicuous differences in the opinions were indicated at the appropriate points. In the composition of the expert panel, it was not possible to obtain comprehensive expertise from the area of representatives of insured people. However, since the research question revolved around the promotion of dHL of insured persons and the results clearly showed how important it is to involve them in the topic, this circumstance represents a further limitation of the work.

The research results have also shown that the understanding of what dHL is very heterogeneous, in the German SHI system as well as among the experts interviewed and the participants in the Delphi study. Even though the definition of dHL on which the research work is based was presented to the respective experts at the beginning of the interviews and the online survey, each participant is likely to have had their own definition of dHL in mind when answering questions or assessing

theses. The research results must therefore always be seen in this context. In addition, an expert workshop following on from the Delphi study could also strengthen the discourse on a common understanding of dHL in the German SHI system. As already described within the introduction, the research focused on the context of the German SHI system and particularly statutorily insured persons. This was due to the existing legal regulations and the sharp framework set by them. Even though 90% of the German population has a statutorily health insurance, a high dHL is important to every citizen. The applicability of the results to people without statutory health insurance should therefore be further analyzed. In general, measures should be researched that strengthen the dHL also of this group.

Last but not least, the topicality of the research results represents a further limitation of the research work. Against the background of the fast pace of our times, it must be taken into account that the process of research work was subject to many complex changes, which also influenced the survey results. In the last three years alone, the topic of AI has developed from a rather abstract topic to an absolute megatrend with high everyday relevance through tangible developments such as ChatGPT. These developments could only be partially considered in the hybrid Delphi study and may play an even more important role in the future, which should be taken into account with regard to the topicality of the research results.

7.2. OUTLOOK: FURTHER RESEARCH APPROACHES

Based on the research results and the future trends that are already emerging, it can be assumed that a high dHL will become increasingly important in the German healthcare system in the coming years. Therefore, it must develop accordingly. Digitalization in the healthcare sector will continue in the next years and new technologies may result in further new competence requirements for insured persons. Overall, the use of electronic patient files, the prescription of digital health applications and the search for health information on the internet will continue to increase. Technologies such as AI and those who are still unknown today will additionally set new demands. Insured persons must increasingly be able to make self-determined health decisions based on digital health information and technologies. The need for a high dHL will therefore continue to grow.

It is to be hoped that stronger initiatives will be taken to promote dHL. At present, the majority of insured persons still faces difficulties in dealing with digital health information. This is particularly true for people with a low level of education, advanced age, and low social status. In order to avoid a digital divide, support measures will especially be relevant for these patient groups. At the same time, it can be assumed that subsequent generations will increasingly learn to use digital technologies from an early age. Here, it will be important to promote digital skills from the beginning on in all relevant areas of social life, to link them to health and to take into account new skills requirements due to evolving technologies. On the one hand, advancing technology will increase the demands on insured persons and their dHL, but on the other hand it will also offer opportunities for more intuitive and user-friendly solutions. Developments such as AI-based approaches should be seen as an opportunity for individual support and not be blocked. In addition, increased research activities on dHL are to be expected in order to identify effective support measures and monitor developments.

Due to the fast pace of developments, it is not possible to make an exact forecast of the future. Nevertheless, it is to be expected that the competence requirements for insured persons in the healthcare sector will be increasingly shaped by digital and technological influences - not least to make better use of the bare resources in the healthcare sector. dHL must therefore be seen as a central aspect of healthcare policy and the digital transformation of the healthcare system in Germany. The further development of framework conditions, responsibilities, and measures for the successful promotion of dHL as one of the most essential future skills in the healthcare sector is essential. Not only to achieve a high level of acceptance and use of digital healthcare services but also to realize efficiency gains and, above all, to equip insured persons for self-determined healthcare decisions in the digital age. All the more, this makes it important to start today and give more weight to the implementation of appropriate measures. This is the only way to resolve the paradox that dHL is considered highly relevant but there are hardly any initiatives to improve it.

The research work provided important insights into the future design of framework conditions, responsibilities, and measures to promote the dHL of insured persons in the German SHI system. The results relate in particular to how

structures in the SHI system must change and are therefore primarily attributable to a macro level. Concrete support measures or implementation proposals at the micro level were deliberately not included in the scope of the research. Based on the research results and the outlook presented above, further work is needed, for example, to develop concrete effective and efficient training programs to successfully promote the dHL of SHI insureds. A research gap becomes evident that should be closed by further research approaches.

On top of that, the task to promote dHL should not be limited to the SHI system and its insured people. Although SHI covers 90% of the German population in the healthcare context, the remaining 10% are covered by the private health insurance system and a high level of dHL is also important for these people. The basic questions of the hybrid Delphi study should therefore be applied to the whole of society and also cover people with a private health insurance to successfully promote their dHL too. The research results have also shown that other policy areas, such as the school system, should also be included in the promotion of basic skills that are relevant for high dHL. There is currently a research gap on how exactly school curricula can incorporate relevant skills and thus prepare SHI-insured individuals for relevant requirements in the SHI system at a young age.

The topic of organizational dHL was also only marginally addressed in this study, as the focus was on promoting the dHL of SHI insured people. At the same time, it became clear that a high level of organizational dHL is highly relevant for promoting the dHL of insured persons, so that the actors in the healthcare system can actually perform new tasks in connection with the promotion of dHL. It is therefore advisable to initiate further research about the successful promotion of organizational dHL. Overall, the research work only makes a small contribution to the overarching topic of digital transformation in the healthcare sector. This topic will not be fully researched for a long time yet and is also subject to continuous change, so that new fields of research are constantly emerging. The research work is therefore also intended to encourage further research into the topics of digital transformation and dHL from various perspectives.

VIII – CONCLUSION

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Megatrends such as digitalization, the demographic change or the desire for individualization affect all areas of society and are causing diverse and complex change processes. The German healthcare system is also affected by these changes. It must deal with challenges such as the shortage of skilled workers, an ageing population and rising treatment costs. Digitalization is often seen as a key to increasing efficiency and quality and to use decreasing resources where they are needed to contribute to better medical care. Various digitalization measures have therefore been initiated in the German healthcare system in recent years. Since 2019, for example, doctors have been able to prescribe health apps to their insured patients to supplement their medical treatment. The use of electronic prescriptions has been mandatory since 2024. The electronic patient file has been available since 2021 and was created for all insured persons who have not rejected to its use in 2025. In addition to new digital health services and forms of communication, health information is increasingly available in digital form and used accordingly.

The combination of skills required to use digital health information and applications is united in the concept of dHL. The most commonly used definition dates back to 2006 and describes dHL as the "ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (Norman & Skinner, 2006a, p. 2). In addition, many other definitions have been developed in recent years that demonstrate the complexity of the concept of dHL. For example, dHL is now understood as a more relational concept that is closely linked to influencing factors such as systemic framework conditions. A high level of dHL is essential to enable patients to make self-determined health decisions based on digital health services. On the other hand, the adequate use of digital health services can also help to increase efficiency in the healthcare system and thus meet the described challenges (H. Müller, 2022, p. 114 f).

Despite its great importance for making self-determined health decisions and with regard to digitalization in the healthcare sector, the German population's dHL

is weak. Studies show that the majority of the population has problems using digital health information and applications adequately with regard to their own health. Especially the trustworthiness and neutrality of digital services is considered difficult. In particular, groups of people with many points of contact with the healthcare system, such as elderly or chronically ill, tend to have a low dHL (Kolpatzik et al., 2020, p. 14). The consequences are serious: diseases are misdiagnosed or not recognized, digital applications are used carelessly, and medication intake is changed without consulting the doctor. The result is digital malpractice with far-reaching consequences for people itself and the entire healthcare system (Langkafel, 2021, p. 4 f).

Nowadays, only the SHI funds in Germany are obliged by § 20k SGB V to promote the dHL of their insured people with special services. The implementation of these offers is very heterogeneous and mainly comprises support measures based on the one size fits all principle. This approach runs counter to both the conceptual understanding of dHL and the needs of the population. Central points of criticism, identified with an extensive literature review, are among others a diverse conceptual understanding, insufficient promotion measures, missing responsibilities and a lack of research and funding. The study therefore aimed to generate expert opinions and recommendations for the future proactive and structured design of framework conditions, responsibilities, and measures to promote the dHL of SHI insured people in the German SHI system. The central research question was

"How must framework conditions, responsibilities, and measures for the successful promotion of dHL of statutorily insured people in Germany develop?".

To answer the central research question, a Delphi study was conducted using a mixed-methods design. This initially comprised a pre-study comprising a literature review and expert interviews. As part of the expert interviews, twelve experts from the German SHI system familiar with the topic of dHL were interviewed. The key findings of the pre-study were transformed into theses on the future design of framework conditions, responsibilities, and measures for the successful promotion of dHL for people with statutory health insurance in Germany. The developed theses were evaluated by 32 experts in two rounds as part of the Delphi survey. The

Delphi survey was intended to gather opinions among the participating experts. Specifically, possible future developments in the framework conditions, responsibilities, and measures to promote dHL were to be assessed in terms of their relevance and feasibility.

Overall, there is a high level of agreement among the experts that something needs to happen in the area of dHL, but there are still some heterogeneous views and many implementation hurdles that need to be considered with regard to concrete implementation. This became particularly evident in the Delphi study, as many of the proposals were rated as highly relevant but unlikely to be implemented. With regard to the promotion of dHL, the dilemma identified in the literature review is therefore confirmed: despite the high importance, there is clearly an implementation problem in Germany.

It became clear that the promotion of dHL for people with statutory health insurance in the German SHI system should be expanded and broadened. In the area of **framework conditions**, a uniform and more holistic conceptual understanding of dHL should be discussed and established. The experts had different priorities and a heterogeneous understanding of dHL. In addition, the current legal regulation for the promotion of dHL in Germany relates primarily to strengthening individual skills for the promotion of dHL. However, the research results show that systemic prerequisites for the successful promotion of dHL should also be taken into account. However, this aspect has tended to be neglected in implementation to date. The conceptual understanding of dHL therefore should not only include the individual skills of insured persons, but also systemic framework conditions and influencing factors that can have a positive effect on a high level of dHL. The various levels and systems should therefore be considered in an integrative manner when it comes to promoting dHL (Figure 79). The current one-size-fits-all approach does not yet meet this requirement. A broader conceptual understanding also means that the promotion of dHL skills should not only take place in the SHI system, but that other German policy areas should also be included in the sense of health in all policies. In schools, for example, the necessary skills could be taught at an early stage in order to strengthen dHL from the outset. Having in mind the complexity and dynamics of today's world, a further framework condition for the successful promotion of dHL is that the content and skills facets are continuously

reviewed and, if necessary, further developed. Technological developments could, for example, lead to the conceptual understanding of dHL undergoing further development, as has already been observed in recent years. The corresponding skills should then also be taken into account as part of support measures. One concrete example of this is the handling of AI-generated information and AI-based healthcare applications.

In the area of **responsibilities** for the promotion of dHL of people with statutory health insurance in the German SHI system, new insights were gained regarding the actors to be involved and their roles. Above all, the experts' opinions show that an expansion of responsibilities from SHI funds to further players in the SHI system is desirable. Basically, every stakeholder can contribute to the promotion of dHL. This sense of responsibility must be anchored even more firmly in the minds of the people involved. Self-help groups, patient organizations and adult education centers were identified as specific actors that can contribute to the promotion of dHL. The roles of the National Action Alliance for Health Literacy and pharmacies could also be discussed in this context. In addition, specific tasks could be defined for the three central players - SHI companies, doctors, and politicians - which they should each take on with regard to promoting dHL. The SHI funds should expand their primarily information-based offering to promote dHL and act more as analog guides to digital structures. In this way, each point of contact with the insured could be used individually to place dHL topics. In doing so, the individual level of knowledge and needs of the insured persons could be taken into account using specific examples and generate concrete added value for the insured persons. Doctors should also integrate the promotion of dHL more strongly into their everyday practice by encouraging and demanding digitally health literate patients. They can do this, for example, by using the digital structures of the healthcare system and offering corresponding services. Specific training in how to use these could then be provided by practice staff with a digital focus. Increasing digitalization therefore also implies a change in the existing job profiles in the healthcare sector and requires the players themselves to develop a high level of organizational dHL. In future, politics should play a more creating role in the field of dHL in order to underpin the high relevance of the topic with practical improvements. According to the experts' opinions, the regulations of § 20k SGB V and the corresponding guideline should be made more specific. On top, other stakeholders

should be included in the promotion of dHL. The further expansion of digital structures in the SHI system and the continuous conceptual development are also seen as relevant tasks for politics. At an overarching level, a more positive mindset considering digitalization topics can also contribute to greater acceptance and ultimately a higher dHL.

Regarding concrete **measures** to promote dHL, the Delphi study generated a wide range of highly relevant ideas. However, it at some points also revealed a high uncertainty regarding the feasibility of the defined measures. This implies further research activities and concretization. In general, it became clear that support measures are most likely to be feasible if they are integrated into existing structures of the SHI system. This means that no explicit special structures are required to promote dHL, which also benefits efficiency. It would be conceivable, for example, to use the health kiosks currently being discussed in the health policy debate as contact points for the promotion of dHL. Measures that focus both on the individual competence of each insured person and on global measures that raise general awareness of the topic of dHL should be established. This approach goes beyond the current implementation of § 20k SGB V, as the SHI funds have so far primarily offered training programs and information material based on the one size fits all principle. In order to be able to test which measures are really helpful for the successful promotion of dHL, new test areas should be created in the SHI system. The Innovation Fund could be a suitable setting for this and issue funding waves for projects on the topic of dHL. Even if dHL is a competence that relates to handling of digital health information and applications, technologies can also be used as enablers for insured persons. If designed in a user-friendly way, technology-based applications could help to answer individual questions from insured persons and thus provide them with competent support.

Based on the results, 18 recommendations for action were derived for the future proactive and structured design of the support environment for dHL in the German SHI system. These are based on the four research facets and include recommendations on the skills required by insured persons in the future, the future roles, and responsibilities of key players in the SHI system, the conceptual understanding of dHL and specific educational and structural support measures:

- **Staying up to date:** Linking dHL and new Competence Requirements in the SHI system (3 recommendations)
- **Driving the Role Change:** Rising Awareness for the Promotion of dHL among all Actors in the SHI system (5 recommendations)
- **Using, what is already there:** Integrating the Promotion of dHL into the existing Structures of the SHI system (5 recommendations)
- **Courage to try Things out:** Through Dialogue between Actors and Insured People to effective and efficient promotional Measures (5 recommendations)

Finally, the recommendations for action were integrated into the theoretical framework of the thesis and thus enabled the further development of the theoretical model used at the beginning of this work to promote dHL in the context of the German SHI system. In summary, this thesis contributes to closing the existing research gap in the area of promoting dHL in Germany. The results adapt theoretical approaches and models of dHL to the context of the German SHI system. The results of the Delphi study offer practical recommendations for action and a basis for discussion for the further development of framework conditions, responsibilities, and measures. The integrative cooperation of different levels and actors, taking into account both individual and systemic requirements, is considered crucial for the complex challenge of the successful promotion of dHL in the German SHI system. The thesis illustrates that dHL is a dynamic concept whose promotion requires continuous adaptation to changing competence requirements and technological developments. The results of this dissertation can therefore serve as a basis for the derivation of concrete measures and the further development of the discourse on the promotion of dHL in Germany. This becomes more and more important in a more and more digital world and in view of the current implementation status. As the focus is often on what digitalization and technology can do, developing people further must not be forgotten. "You can have the most technologically advanced device in the world, but if you don't know how to operate it, it will be as useful as a jumbo-jet without a pilot" (European Health Parliament, 2016, p. 1).

IX – BIBLIOGRAPHICAL REFERENCES

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X – APPENDICES

X - APPENDICES

APPENDIX 1. Transcription Rules

The transcription of the guideline-based expert interviews was carried out taking into account the transcription rules presented below.

No.	Rule
1.	Each speech contribution is transcribed as a separate paragraph.
2.	Transcription is verbatim, i.e. not phonetic or summary. Dialects are not transcribed, but translated as accurately as possible so that the texts can be studied well.
3.	The language is slightly smoothed, i.e. approximated to the written language. Word order is retained, even if it contains errors.
4.	Clearly longer pauses are marked by ellipsis points "(...)" in brackets.
5.	Fillers such as "um" are only transcribed if they have a meaning in terms of content.
6.	Incomprehensible words and passages are marked with "(?)". Words and passages where the wording is only assumed are bracketed and marked with a question mark at the end "(dream?)".
7.	Speech contributions are marked with time stamps.
8.	Names are anonymized with [X].
9.	Company names are anonymized with [company].

APPENDIX 2. Expert Interview 1

Expert Interview 1 (EI1)

Profession: Adult education center

Date: May 22, 2023

Gender: female

1. 00:00:02
Interviewer: Okay, then the first question would be: what factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany?
2. 00:00:15
Speaker 1: Hm, so the first thing I would say is that legislation is of course responsible, because the framework for the use of digital health services can then be set at a political level by creating appropriate laws and regulations, and this also includes, for example, data protection or quality assurance for health apps. So you need clear guidelines and regulations, so to speak, and then the issue of funding and services, because politicians can of course provide financial support to include and promote digital health services in the range of services offered, for example by statutory health insurers, for example by covering the costs of digital health applications, health apps or also facilitating access to other health solutions, and all of this would then also contribute to the promotion of digital health literacy. The third point is education and training. Of course, politicians can always support the implementation of educational programs, for example to integrate digital health literacy into the school curriculum, which I don't think has even been discussed yet. I would find that very, very important, but I would also like to see the split between digital literacy and health literacy itself. You always have to see them independently of each other, and a high level of health literacy is also important in the first place. Exactly, and then of course also for adults. So that's the school curriculum, but then in adult education, for example at adult education centers, you could of course also look at who you reach there. From my point of view, it definitely needs to be in schools, but then the target group of pupils is reached, so to speak, and that is very, very challenging here, because you don't just have one target group perhaps, but you actually want everyone to have a high level of digital health literacy. In other words, it's a huge challenge to find out how we can reach all target groups, or do we focus on just a few? Yes, and then there's the issue of providing information, creating information portals and hotlines and digital platforms that insured people can use to get information. And

what politicians can also drive forward is the issue of interoperability and data protection, so that health data can be exchanged between the various digital health services. Of course, politics can also contribute to this, to trust actually.

3. 00:03:25
Interviewer: And do you think that these factors that you mentioned, do you think that they are already well implemented and promoted? Or do you think they need to be optimized?
4. 00:03:36
Speaker 1: Well, I believe that this needs to be optimized, because I also say that a holistic approach is always propagated, it is said that political decision-makers should work together, health insurance companies, educational institutions, all other actors, in order to achieve this. That is also true. But I often still lack such an overall strategy. There are lots of small individual projects that run for a while. But I have the feeling that everyone is somehow fighting their way through the thicket on their own. And so, independently of the insured persons, Smart Hospitals, for example, also plays a role for me in that doctors, hospitals, etc., also have a high level of digital competence, or we as employees of health insurance companies, for example, so it's so extensive, so to speak, and I think there's definitely room for improvement, that you look a little more at how the individual players can interact or come together, or who gets what role now, and who has to do what?
5. 00:04:43
Interviewer: Actors and roles is a good keyword. That would be the next category of questions. Which players in the healthcare system are responsible for promoting digital health literacy among people with statutory health insurance in Germany?
6. 00:04:55
Speaker 1: Well, perhaps the first thing I think is the Federal Ministry of Health as the supreme health policy body. As the BMG, they are also responsible for shaping and implementing health policy and can develop strategies, programs and measures. Then, in any case, I see the health insurance companies. Surveys have also shown time and again that insured people and so on would prefer to receive advice and so on from the health insurance funds, and I think they could definitely do a lot more to provide advice, offer training and provide information materials. I see huge potential in the electronic patient file, which can definitely also help to increase digital health literacy if many people use it. Then there are the associations of statutory health insurance physicians, who in my view are still doing far too little. They definitely play a role in communicating digital health literacy to their members and could do a lot more to support the implementation of this in practices. Another group for me are the self-help groups or

the national contact and information point NAKOS, because this is an independent institution, and it promotes self-help in the health sector and could perhaps also offer a lot of training for its members and then perhaps patient organizations or foundations, the Healthcare Foundation, which also provides well-founded information on such topics. The important thing is, and here again the question is, how do you get this information to the target groups? I think that's the big challenge.

7. 00:06:58

Interviewer: Um, do you also see a responsibility for doctors or patients?

8. 00:07:04

Speaker 1: Um, for yes, so for doctors in the sense that they themselves, through further training and so on, perhaps also that this is enriched or promoted through further training points, so that they increase their own digital health literacy, so to speak. In an ideal world, it would of course also be cool if they could also advise patients. But I think there's very, very little time for that in day-to-day practice, which is why I sometimes think: okay, maybe I'm too tired of life if you impose on doctors that they're responsible for this, so to speak, but they're responsible for themselves in any case. And what I do see them doing is acting as mediators, so that they can see when someone has a need, so that they know, okay, where they can direct them or where the patient can get more information. The patients themselves actually do too. I think some of them are in a good position. But there are also many who haven't dealt with it much and where I think you first have to push them a bit so that they are empowered to know about it themselves.

9. 00:08:16

Interviewer: Mhm.

10. 00:08:17

Speaker 1: Mhm.

11. 00:08:17

Interviewer: And among the actors mentioned. Who do you see as occupying a key position? Or are there actors who occupy a key position?

12. 00:08:27

Speaker 1: For me, that would definitely be the health insurance companies, and the schools, of course I'm not involved enough now, but I would definitely like the schools to say: Okay, this simply has to be included in the, in the, in the education plan or in the school plan, so that the topic, I would then call it: Health literacy and then perhaps digital health literacy as a sub-aspect.

13. 00:08:53

Interviewer: Okay, I think you've actually already answered the next question quite well. It's about what roles and responsibilities the individual stakeholders have to take on to promote digital health literacy. I think you've already defined that quite well for everyone. But I would like to ask

one more detailed question. How do you think awareness of this role can be raised among the stakeholders?

14. 00:09:22

Speaker 1: I believe that this must actually be done through legislation, just like the 20k, that politicians have simply said, you have to do this now, you have to do it, you are now responsible for it, you have to think about how you want to increase digital health literacy. You have to spend money on it, i.e. via the rail, in any case, and you have to think about it. Can you repeat your question again?

15. 00:09:53

Interviewer: How can awareness of the role of shares be raised?

16. 00:10:00

Speaker 1: Hm, well, you just have to say again that this is actually the, the necessity, also that this is the be-all and end-all for the, if the future, it is becoming more and more digital, also in the healthcare system, and if we are then, if there are these digital health applications and apps and the electronic patient file and more and more digitized, then it must simply be clear that you have to deal with it in order to take everyone with you, and you have to prioritize it, so to speak. That's a difficult question, in any case.

17. 00:10:45

Interviewer: The fourth question would be, how can the promotion of digital health literacy among people with statutory health insurance in Germany succeed?

18. 00:10:55

Speaker 1: Um, so basically again as a joint task of all the institutions involved, then what I just said, that I think that the ePA would be a super good approach for it to become an action management platform, so to speak, for the doctors, for the health insurance companies, but also for the patients. Mhm, and then through these classic stories, such as the provision of information and training, for raising awareness of opportunities and risks, that one also explains what are actually advantages and possibilities through the active involvement of the insured in the process, that they can perhaps also communicate their needs and experiences, give feedback through the training of health personnel in any case, so that this topic is integrated into the training and further education of health personnel, then through cooperation between the actors again in order to simply create these synergies. And one point, which I don't think I've mentioned yet, is evaluation and quality assurance, that you simply look continuously, so since a few, I don't know, since 2019, that the health insurance funds have also been obliged to provide the 20k, I think that you then also look, okay, what has happened so far and how, what kind of output has it had, and that you then simply look and make adjustments, So who have we already achieved, what was good, so to speak, what was good, what do we perhaps

need to do differently, i.e. that you really regularly review something like your doctoral thesis and give feedback on how effective it is, how user-friendly it is, how secure the applications are and things like that perhaps.

19. 00:13:07

Interviewer: And how would this cooperation between institutions and actors ideally look from your point of view?

20. 00:13:16

Speaker 1: Hm, well, I think that you have to either say it legally, so to speak: Okay, just do it now, as it was with the cash registers or for example in adult education centers it was that with the topic, is now a different topic, but with integration. It has simply been said okay, these integration courses are now simply provided by the adult education centers, so that one is legally required to do so. Or it's also down to the commitment of the individual people involved, that you don't just think in terms of your own company, but that you start to network. And that's what I did at some point when I was responsible for the topic at the AOK, for example, when I said, okay, I'll just contact the MHH and see what they have, or call other health insurance companies and see if we can do something across the board. So, I think there's a need for individuals who say, hey, I can see that this has huge potential, that we need to do something about it and who then venture out and establish networks. I think that's a very, very important point, and that people do it and start doing it, and then also the issue of funding, because I think that's important, because who wants to do it, who pays how much for it, and who can do it? Because I think that's always a question of how you can become active.

21. 00:14:50

Interviewer: Okay, and then I have one last question. This relates to specific measures. What measures, for example training and so on, should be established in the future to promote the digital health literacy of people with statutory health insurance in Germany?

22. 00:15:08

Speaker 1: Hm, I've already mentioned a few measures: Educational programs, definitely training courses, workshops, etc., cooperation with educational institutions, i.e. with schools, with universities. Maybe that's something like this, you work for a health insurance company and now you're writing your doctoral thesis at a university on this topic. So it's now coming from everyone, it's slowly becoming a bit interlinked here, so to speak. But it's important to make it part of the school curriculum so that younger generations are familiar with it at an early stage, then you can run a lot of awareness campaigns via various channels, TV, radio, the internet, social media, to reach a large target group. The health insurance companies can, well, I actually think the topic of personal advice is extremely important in this area, because a lot is already done online or is written somewhere, but

this transfer from somewhere, which is first to find this information and then to apply it or, um, so, that is, that is also a higher hurdle again. So, sometimes it would be easier if you just knew, okay, you can call a hotline, or you can go there and get good information about it, so to speak. Quality standards will also be important measures, simply so that they are trustworthy and high-quality applications, so to speak, where the insured simply feel safe, and also so that the effectiveness of implemented measures can be checked again and adjusted if necessary. So the topic of research and evaluation again. I'll think about whether I can do something else, yes, you can of course also work with others, well, there are also many companies that are involved in this topic, to try to form partnerships again, perhaps as a topic. And what I think would be important is to look a little bigger, i.e. outside the company, but then perhaps also beyond European borders. The European Commission is also promoting this a little. They have this EU4health program. I don't know if you've heard of it? Exactly, and there are also various research and innovation projects. In other words, you could look into it to see whether you can get funding for projects or develop and test new solutions, and I always find that really exciting. I think we could do much, much more of that and simply look at what is actually happening in the UK. What is the Netherlands doing? They once had an eHealth Week where they promoted the topic in a big way, so to speak. Sweden has the eHealth Competence Center concept, and Estonia is known for its advanced digital health infrastructure. They already have this eEstonia, i.e. digital health services, and they're already doing a lot with prescriptions, ePA and online appointments. I think that would also be really good if someone were to join in. These would be important measures to look again at what is actually happening in other countries.

23. 00:18:41
Interviewer: And what do you think are the biggest challenges for these measures to be successful?
24. 00:18:50
Speaker 1: Hm, I think the biggest challenge is always to reach people. Well, I think there are really good ideas and things, but to place them where there is a need, that is the biggest challenge, so to speak. I think a lot is being done, but I don't know if it's really effective, and that's why it's really important to monitor it closely and try to do things quickly and then check whether it's actually getting through or whether we need to take a different approach. That is the biggest challenge of all.
25. 00:19:26
Interviewer: So you would also say that the measures must be very target group-oriented and needs-based?
26. 00:19:31
Speaker 1: Hm, and then of course there is a need for a lot of offers, because

there is actually a desire for everyone to have a high level of digital health literacy. It's not an issue where you can say that it only affects diabetics or only people with high blood pressure and so on, but it actually affects everyone, yes, mhm!

27. 00:19:56

Interviewer: Right, okay, then I have one final statement, which I would ask you to complete the following sentence, and that would actually be the last question, so to speak, today, if you had to complete the sentence now, in ten years the digital health literacy of those with statutory health insurance in Germany.

28. 00:20:28

Speaker 1: Mhm, um, it has increased because the topic is gradually becoming more and more relevant. More and more people understand that this is a topic that is difficult to grasp, but which is immediately, in other words, incredibly relevant in order to have a high level of health care, and that it is also important, so to speak, in order to live healthily and have a high standard of health. I am therefore very confident that this will become more relevant in the coming years and that the measures will also become more successful. I think you need to see how you can shorten this sentence.

29. 00:21:30

Speaker 1: I think that's a good final word in any case, exactly. Is there anything else that is important or that you would like to say about the topic that has not yet been addressed?

30. 00:21:44

Speaker 1: Nah, I think it's just, is that sort of yes.

31. 00:21:49

Interviewer: Yes, then I would stop the recording for a moment.

APPENDIX 3. Expert Interview 2**Expert Interview 2 (EI2)****Profession: Research****Date: July 13, 2023****Gender: female**

1. Interviewer: Okay, the first question would then be, what factors at the political and social level are important for promoting digital health literacy among people with statutory health insurance in Germany? #00:00:12-8#
2. Speaker 1: Okay, there are several things. Firstly, of course, we need the ability to be digital at all. In other words, we need an appropriate internet connection. That is not yet the case everywhere in Germany. Then, of course, it is important that doctors, for example, are not only connected to the telematics infrastructure, but also use it proactively, and of course that they are competent enough to use it, so that they can then ultimately make it accessible to patients. Because they won't be able to avoid some patients asking how it works or what it is. Then, of course, it is important that the health insurance companies and health insurance employees also understand what is actually in this ePA. It's all still very new at the beginning, these are small things. So, training is actually necessary at all levels. Training materials also need to be developed that address the different sections of the population, i.e. people with a migration background, perhaps also people with learning disabilities. So, there needs to be something in easy language, in different languages, not just Turkish and Russian. And of course at different levels. In other words, people who have studied probably need a different language than tradespeople or someone who has dropped out of school. It must be accessible, it must be visible at all, and it must not only be visible on the Internet that the ePA exists, but the entire digitization strategy and what you actually intend to do with it and how it is, that must of course also be transported in the various media, because not all people are online. In other words, you have to be able to use television to say what is actually available, what possibilities do I have and what are the limits? Print media is still an issue, even if it is perhaps declining. But when I'm perhaps 75 years old, and I've mainly been a housewife in my life, then I might be able to order from Ottoversand or Amazon. But that doesn't mean that I've fully understood all this and the idea that I can manage my own health and everything that goes with it isn't even in people's heads yet. So let's think about eighteen-year-olds, they're healthy to begin with. They

wouldn't think of saying, well, I already have a patient file on my shelf anyway. If you're not chronically ill, that means you have to be implemented first, that's a thought. So we in our community say, of course, it's important to strengthen the patient's autonomy and empower them to manage their own health. But we do that within our own sphere. But if we look at the population as a whole or look at young people, they would say, "What do you want? I'm healthy, I go to the (?) every now and then when I have the flu, but what should I do then? Why should I create the folder?". In other words, what you don't have in your presence, why should you do it digitally? Well, I mean, this transformation has to take place in people's minds first, and I think various players have to be involved. Whether it's the BZgA, it's not just a matter for the health insurance companies, but digitization strategies run through all training courses, and there's such a nice word Health in all Policies, you have to look at that. Since this is not yet really present in the municipalities or among doctors, i.e. it has a rather negative connotation, it is of course even more difficult. I can probably think of more now, but I have to take a break. #00:05:26-9#

3. Interviewer: Okay, but that's a good lead-in to the next question. It's a bit about the players and responsibilities for promoting digital health literacy. You've already mentioned a few relevant players in the form of the Bzga, doctors and so on. Could you perhaps elaborate on this a little more and then perhaps explain again what exact role you see for these players? #00:05:48-9#
4. Speaker 1: Well, first of all, one thing is clear, the health insurance companies are obligated. That makes them one of the main players, and I would say that because that's where the money is, it has to come from them in principle, and then they actually have to address the various multipliers. Of course, a hospital also has a digitalization strategy per se. But this takes place at other levels. Then it's more about how you communicate within the hospital, they are also connected to the telematics infrastructure, but it's not just about the ePA. It's only a small area for them, which means that they also have to see, um, they have to learn how to deal with this ePA. Of course, this also includes health insurance fund employees. But it would be much more interesting to expand this, to say: Okay, we also give them hospital discharge letters in understandable language, that could be digitized, that could also be fed into the ePA. So that's even broader. So the hospital is similar to the outpatient facilities, and not just the GPs, but also the specialists, and this interaction, with which a GP actually reads the doctor's letters and then says: Okay, how can we dovetail this? What is important for you? And then regulate this in a joint decision-making process with the patient, which is already documented in theory, but it is not yet a living world. As far as other players are concerned, I think the public health department is

actually a good place for this. In the municipality, a health authority is active in various circles. Whether it's at a round table or whether they have a health conference, as in North Rhine-Westphalia. There are also round tables like this elsewhere, there are others too: Hospital associations, physiotherapists, psychotherapists, so they all have to learn. I always say that it's actually pioneering work, and it's actually an interesting story as soon as you tell people where it has a benefit for them. So if you only ever tell people that it's a lot of work and that it only costs a lot of money, then you won't get anywhere. At the end of the day, it's the people who have to implement it, and if they block it, then you can impose as much as you like from above. That won't achieve the goal it was supposed to. Schools might also be interesting. But I'm a bit out of my depth here. Of course there are already projects like this to strengthen health literacy in schools, the ePA, I don't even know if that's already an issue. But of course it would also be one thing to have the idea in the first place. So if you want to strengthen your health literacy, then it would also make sense to have this tool. So what do they put in the toolbox to increase health literacy? I don't know now, so I wouldn't exclude anyone at all. #00:09:24-4#

5. Interviewer: Okay, what would they say? The patients themselves? Do they also have a certain amount of personal responsibility? And how far can they go? #00:09:30-9#
6. Speaker 1: Well, everyone is responsible for themselves per se. Nobody would deny that if they asked someone. So, you can't go and say, now you're going to do this, because every child complains when their mother says you have to do this now without explaining the meaning. Self-responsibility is right at the top, because it is also self-determination. But it has to be said that, of course, personal responsibility can only really be practiced in our sense if you are informed, if you can weigh up the benefits and harms, if you know where to get information. This is also more of a social task, providing health information that helps me to make an informed decision. Our healthcare system is so fragmented that we ourselves need a whole degree to understand it all. We also have to be able to read legal texts with all the social codes. You can't expect patients to do that. In other words, there has to be a kind of navigation system where I know when I can find which information where. I mean, we are in the process of creating such health portals, but my neighbor doesn't know that. I'm asking how I can actually get the news across so that it reaches people, and that's not even happening yet. So, everyone knows that the Tagesschau exists, but not everyone knows that gesund.de exists, or that there is an independent patient advice service, even though it has been around for 20 years. But not everyone knows that. #00:11:30-8#

7. Interviewer: Yes, okay, if you perhaps go through the points we have just discussed again, what do you think are the key points for the promotion of digital health literacy to succeed? #00:11:43-5#
8. Speaker 1: Well, what is being done today is that the various health insurance companies are developing different concepts to increase digital health literacy. There are a lot of projects to promote health literacy in schools, among adults, among people with learning disabilities, so there are surveys. You have to collect data first. There are training concepts that are being developed by various health insurance companies, information materials are being produced, videos are being created, and all this in different areas. When you say that you want to increase health literacy, what does that actually mean in each area, i.e. increasing health literacy in finding health information, that is one task, then understanding it. Society has a different task to prepare health information in an understandable way, so this is still in its infancy. And that doctors, for example, can also present it in an understandable way, that they are given materials to help them understand it properly. Judging will be even more difficult, so that we enable the population to recognize fake news, that we enable them to look at the criteria by which you can judge whether something is good or bad, and then the application, that's where opinions differ as to whether this is perhaps health promotion or not, but the application, the life afterwards, to change behaviour. Each time we come back to different project structures, different requirements, different actors involved. Translation science comes in, so the educators come in. So you can only really do it by working together inter-professionally, otherwise it won't get down. So, information has to be passed on. In other words, especially when it comes to patients, it is of course also important that patient organizations are involved. I think the word of the day in research is participation, without participation nothing works at the moment. And the second word is patient orientation. And you can only achieve this by integrating them as equal partners. Sometimes that doesn't make it easy. #00:14:34-4#
9. Interviewer: Okay, thank you very much. There were already many, many important points in there, I think. I have one more question. It's a bit more specific about measures to promote digital health literacy. Do you have any ideas about what measures should be established in the future? #00:14:52-7#
10. Speaker 1: Well, I've already mentioned a few things, so training, that's one thing, offering courses like this. You could also set up e-learning programs, you could create videos, apps. Links to health information, to address databases of doctors, pharmacies and so on, that's already being done, and I think it's also very important, especially if you look at the age structure of German society, to focus again on older people, to strengthen their digital

skills a little first. And even if you're completely honest, not everyone will be digitized, they won't say, I've always wanted to have one, or I wanted to have an expensive cell phone so that I can make cashless payments and use my ePA, but some will say, I don't have a cell phone and I don't want one. You can only ever be as strong as your weakest link. In other words, we need support facilities, and analogous ones at that, to help people navigate this process, and that didn't just end up at the doctor's office, but rather at counseling centers. If these health kiosks really were to exist, they would also be a good place, for example, where people could say, "Here, you can talk to them again about the advantages and disadvantages of this. Independent patient advice could become another focus of digitization, if it works again at some point. Because at the moment we're in a bit of a limbo, we don't know what will happen on 01.01.2024. Then in the municipality itself. You have to look at what's available locally. You could do that in health stores, I think we need these analogue support facilities until everyone is fully digitized, in the sense that they have Internet access. What are they doing on the outskirts of Bavaria, for example? I just spoke to someone today who said, yes, if I want to have an online conference with the doctor, he'll drive 30 kilometers, but he can't do it. I mean, and this is really a hinterland issue, it works better in all other countries than in Germany. So these things are systemic issues and you can't say that the patient should look after themselves. How can they do that if the basic requirements are no longer even met? And actually you have to say, of course I also need Internet access. So give me a protected framework so that I can do that. Why do I always have to pay when I go to an Internet café? There must be terminals where I can surf for free, where I can choose. #00:18:26-4#

11. Interviewer: If there are still any internet cafés at all, that is no longer taken into account. #00:18:30-8#
12. Speaker 1: So of course, how can you assume that you always have a cell phone that I can access at any time? And then it has to be so powerful that I can access it at any time? That has to be a given in the first place. I mean, they're in a better position in the States, where they don't talk about it so much. Here, the Internet tends to be throttled. Why is that? Well, the screws have to be turned in other places. #00:19:09-5#
13. Interviewer: Mhm Okay, well, I'm actually done with the questions for now. But I still had one final statement that I would ask you to complete. I would just start, and you are welcome to continue. In ten years' time, the digital health literacy of people with statutory health insurance in Germany. #00:19:28-8#
14. Speaker 1: To be somewhat increased. Well, let's put it this way, we've developed a measure, we've already carried out training courses, and it doesn't take much to increase health literacy, because it's all such interesting

information that they get that they always have the feeling when you ask them that they can now navigate better, that they understand it better. So if you can reach people, then you have a good chance of showing them the picture and showing them the benefits and also telling them that you have to pay attention, and that's where the limits are, the only question is, you have to reach them, and of course you first reach those who are interested, and at the moment it doesn't matter what a health insurance company offers when it comes to digital health literacy, which is usually the ePA for them. The population is very interested. The only question is, how will it be financed in the long term? #00:20:47-0#

15. Interviewer: It remains to be seen. Do you have any other points that we have not yet addressed that you would like to share with me? #00:22:34-4#
16. Speaker 1: No, not really. Otherwise, I would be happy if you could send me your work, because I am interested. #00:22:43-0#

APPENDIX 4. Expert Interview 3**Expert Interview 3 (EI3)****Profession: Research****Date: July 14, 2023****Gender: female**

1. Interviewer: So, the recording is running, and the first question would be, what factors at the political-social level are important for promoting digital health literacy among people with statutory health insurance in Germany? #00:00:13-4#
2. Speaker 1: First of all, the appropriate technical prerequisites must be in place, i.e. the corresponding digital services must be available, i.e. they must also be health-related and meet certain qualitative requirements. However, it must also be ensured that the users have the appropriate digital prerequisites, both in terms of device technology and user skills, so that they can use these digital health services at all. And actually, and I think there is still a gap here, we need transitional solutions, because of course it is not enough if we simply create the digital conditions now, because we will still have those who will then be left behind. We also have to think about how we can get some users to switch from analog to digital or see added value for themselves. #00:01:36-8#
3. Interviewer: Mhm, okay, thank you very much. I would then move on to the next question. This is about the players and responsibilities for promoting digital health literacy. From your point of view, who is responsible for promoting digital health literacy? #00:01:52-0#
4. Speaker 1: Um, I found your question interesting in that it focused on those with statutory health insurance, so I thought: Okay, does that actually make a difference? And you also pointed out in your introduction that the health insurance companies are obliged to take care of the health literacy of their policyholders. That's why I thought, okay, is it really about those with statutory health insurance, or is it broader than that, or are there differences? If it's about those with statutory health insurance, I would say the health insurance funds first and foremost, and then, from my point of view, the Federal Ministry with all its subcommittees, committees and players that report to it. But for me, these would definitely be the two central players who should ideally steer the measures that are planned. #00:03:06-2#
5. Interviewer: And from your point of view, should there still be actors involved, for example doctors? #00:03:11-9#
6. Speaker 1: Of course they play a role. So, it wouldn't work without the doctors. But when it comes to who has the responsibility, I would see the other

two at the forefront. But of course, ultimately, when it comes to implementation, ideally everyone involved in the healthcare system needs to be involved. Doctors, but also pharmacists, for example, play a not insignificant role now, especially when it comes to the e-prescription, for example, and if you look at it more broadly, there are of course other players who are more concerned with patient information, or consumer protection associations, etc. So in the end, you have to be very careful. So ultimately, you have to look very closely at where users actually come into contact with digital health services, and the stakeholders who are involved in this must of course also be included, which would make sense. So they are also involved to some extent, so there are already a few, a few initiatives. #00:04:44-5#

7. Interviewer: What do you think about patient responsibility? Do you believe that patients have personal responsibility? Exactly? So? Do you believe that patients themselves are also responsible for increasing their digital health literacy? Their own? #00:05:01-9#
8. Speaker 1: An interesting question. First of all, I would say that they should be involved. So first of all, I would say that they should also have the right to offers that are conducive to digital health promotion. Whether they are responsible for this themselves is something I find rather difficult, because that would completely overwhelm certain patient groups. If they have to take care of how they get health information themselves or how they have to evaluate it, no, they need support from other sources. #00:05:57-3#
9. Interviewer: Okay, then you just said that the health insurance companies and the Bmg play a relevant role. Can you perhaps specify this role a little more? So what would such a role look like in concrete terms, and what role might the other players that you see on the periphery of implementation play? What role do they play? #00:06:16-3#
10. Speaker 1: As far as the two actors mentioned are concerned, I would say that it is their socio-political task to ensure that the services provided in the health sector are accessible, understandable and useful for different population groups and also for those with statutory health insurance, and in this respect the actors must then also consider the measures that support this, ideally involving the other groups of actors. So, it would be a bit of a shame, let's be careful, if this were to be imposed in theory only, but it would make sense to look at it together with the other stakeholder groups and with a view to different target groups: Okay, what are the actual prerequisites in terms of health information behavior, health condition and ultimately also the competence in dealing with digital media and digital health practices, that we take a look at this and then see: Okay, where else do we need to start, what are the objectives and how can we increase digital health literacy in relation to this? #00:08:10-3#

11. Interviewer: Mhm, okay, thank you very much, that helped again to concretize. If you now summarize the points that we have just gone through, what do you think? How can the promotion of digital health literacy succeed with statutory health insurance in Germany? #00:08:25-6#
12. Speaker 1: Um, I think it can only succeed if you pick people up properly. But that also means that before you start somehow, you have to take a closer look at what the individual prerequisites are, what I just meant, in terms of health information needs, health information behavior and also the relationship to digital media, let's say, digital affinity or also user competence. This is very important, and in my view it can be successful by first developing good information services that also take into account that there are also groups that don't just access information somewhere. In other words, it's not enough if I put it on some portal and hope that people will be interested in it and search for it and then acquire it, but other information services must also be prepared that show the insured persons or the various groups what the added health value of this information or the digital services actually is. So I think that's definitely key. What strikes me is that the topic of digital health literacy is really in focus right now, now that all these services are to be made even more widely available, and from my point of view, a lot of things get a bit mixed up or are lumped together, and I think it would be advisable to think very carefully about this. Okay, why is this actually happening? Is it that we just want to provide information, and is it about communicating to users what evidence-based, trustworthy information is, how you can recognize it, etc.? Or is it actually also about users changing their attitude towards digital health services, i.e., I don't know, that they then also agree to use the ePA or any digital health applications for therapeutic purposes, i.e., is it also about changing health-related behavior? And in the current discussion, I think a lot is being loaded onto the term digital health literacy, which sometimes comes to nothing in practice because the objective and the prerequisites of the target group and then the chosen communication channels do not fit together well. So, this can definitely be better coordinated, and the other thing is, and this also depends on what the objective is, that you perhaps have to think again, okay, what are actually good incentives for those with statutory health insurance? I'll stick with your example of the narrower target group. What are the incentives for this group to engage with the topic of digital services or even to shift certain things to digital health applications as a next step? And that's where we realize, as we have also conducted interviews with older users on this topic, that there is no need at all. That's why a lot of things are aimed at some groups, because they don't benefit from it, on the contrary, they even say why should we do certain things digitally? Then all the work is practically shifted to me, and the health insurance company should do it or something. There are still

a lot of reservations and ultimately also technical or user-related hurdles that need to be overcome by motivating the insured to get to grips with it, and in the one project we are currently working on for the [company], we have also tried to pick up the users in an analog way and say that this is an interesting topic for them. We started with flyers, we have a person in the hospital in Kiel, we called her a pilot, who hands out these flyers, but who should also establish contact even better, also find out to what extent people have actually already had contact with the topic and then refer them to the digital offer, so to speak, if they are interested, then they should look at the website, and we have also provided digital cafés where people who are a bit more insecure, because they might actually use a smartphone to make phone calls but don't do anything else with it, have a contact point where they can go with all their questions and so on. So I don't think you should underestimate that. Many older policyholders are still digital beginners, and you have to pick them up in a different way, or you have to give them the opportunity or set up contact points where they can meet people with their issues who can classify or explain certain things to them. So, from my point of view, it's still very important at the moment that there are people like that who have a key position. #00:16:20-0#

13. Interviewer: Okay, great, thank you very much. Then we come to the last question, which also relates a little bit to measures. You have already mentioned this to some extent, for example that it might be an idea to use pilots, that my offer is hybrid, i.e. still has the link between the analog and digital world. Can you think of any other measures that should be established to promote digital health literacy? #00:16:44-6#
14. Speaker 1: So what I think are good offers, at least that's what I noticed a bit myself during our research. These are actually the offers that take place in already established facilities. So, we looked at the older target groups, and I came across quite a few offers from senior citizens' education, for example, that offered a course on how to use a smartphone, but where there were also offers on how to use health services, for example, or I mean, if you explain the smartphone, you could do that using the example of health services. You don't always have to explain the ePA or anything like that, but in principle you can address people in their contexts and pick them up. For example, we did a project ages ago. It was about the health information behaviour of migrants, and we conducted interviews with Russian and Turkish migrants, and it was really exciting because we noticed that the cultural venues, for example the senior citizens' cafés, had a very important function because it was mostly those who organized them who acquired the information and passed it on to their community. In other words, they were really like a door opener to health-related topics. It wasn't about digital topics at all, but for example about topics such as fall prevention or how I can claim

something from the health insurance company and so on, and we noticed that for both nationalities, these cultural centers were really a good point of contact for communicating such topics or getting into conversation with people and discussing such topics. Because it's not a one-way communication, you also have to offer opportunities for people to get to grips with it, to try things out, to ask questions, to express doubts and to reduce their insecurities. And in other contexts, we have noticed that self-help groups also have a similar function, that they also discuss such issues and overcome prejudices. And in my view, these discussions also contribute a great deal to a better understanding of digital health literacy. #00:20:11-6#

15. Interviewer: Okay, very good, that was another really exciting approach, which I haven't heard before. So thank you very much for that. I would now ask you once again to conclude. We have finished with the questions, but I have prepared one more statement that I would ask you to complete. It wasn't in the questions either, so I would ask for a bit of creativity. I would simply start the sentence now, and you are very welcome to finish it. Yes, in ten years' time, the digital health literacy of people with statutory health insurance in Germany... #00:20:42-9#
16. Speaker 1: Some subgroups will be better developed than today, but we will still have to work on some major issues #00:21:03-2#
17. Interviewer: kay, but that's at least a somewhat optimistic view of the future. Is there anything else you would like to mention or give me? In conclusion? #00:21:13-0#
18. Speaker 1: Well, perhaps that fits in quite well, because it's actually a question of what, what you look at when it comes to digital health literacy, and if you take these very narrow definitions, where it's primarily about searching for and understanding health information, then I would say that we're already quite a bit, we'll be quite a bit further along. But we are now also seeing that there are simply many more digital health applications that require completely different skills, which have more to do with being able to understand the extent to which this application, be it just a smartwatch or an app, is able to understand how it works, or what influence such an application actually has on our health behavior. And that's one facet of digital health literacy that I feel is missing from many definitions. Well, it does crop up occasionally. But we're really in an exciting situation right now, and there will be many other and new requirements in terms of digital health literacy that go far beyond what we're actually looking at right now when it comes to searching for and understanding health information. #00:23:32-9#

APPENDIX 5. Expert Interview 4**Expert Interview 4 (EI4)****Profession: Interest group health IT****Date: July 31, 2023****Gender: female**

1. Interviewer: Okay, the first question is, what factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany? #00:00:12-8#
2. Speaker 1: Yes, the question is quite complex in itself, and you first have to feel your way around it a bit. The political and social level also includes virtually everything when we talk about people with statutory health insurance. I think that when we talk about digital health literacy, we can also differentiate between digital literacy and health literacy, which then have to come together, and I think we have to look at the two areas separately before bringing them together. For example, if we look at a level such as the age of the insured, the younger the insured are, the more digitally literate they are on average due to social conditions. Of course, you can't generalize like that when it comes to health, but in some cases it's true that older people have dealt with health in a different way, perhaps reading the pharmacy review or something like that more. These may not always be 100 percent evidence-based tips, but they are simply more interested in health issues and their own health aspects due to their age and state of health. At other levels, it is perhaps not quite as clear-cut, but there are also slight tendencies to be seen. We also have gender, for example. It would be a bit prejudiced to say that men are more interested in digital issues and women are more interested in health issues. You can also look at this, perhaps through studies, to see whether this is really the case. Level of education is of course also a factor. On average, the higher the level of education, the more people are interested in health and medical aspects. But digitalization can also be an issue, i.e. digital literacy, which also has a bit to do with social class. There is still a bit of competition between having better parents and a higher level of education. If the parents have studied, it is more likely that the children will also study and will then naturally be even more engaged with topics such as health and digital tools. An important aspect that always plays a role is, of course, background in terms of language barriers. What language skills do they have? It's probably also about migration by generation. The first generations tend to have poorer language skills, but in the later generations it's very mixed. (Cell phone rings) Excuse me, I have to mute my cell phone for a moment. In the end, I think you can see many aspects that deal with the importance of your own health. As I said, where health literacy

and digital literacy come together and then, of course, in the next sense, if both are present, then also digital health literacy. There are also aspects that you might not yet see in the individual competencies. So where it's about how trustworthy information is that is made available to me digitally, where it's also a lot about assessing and reflecting on new information, because that's what brings the aspect of health and digital together. #00:04:05-4#

3. Interviewer: Mhm, okay, thank you very much, that was already very, very detailed, so I don't have any questions at the moment. I would move on. As far as the next question is concerned, which players in the healthcare system do you think are responsible for promoting digital health literacy among people with statutory health insurance in Germany? #00:04:24-0#
4. Speaker 1: So of course I would also start with the stakeholder, the self-administration, which is also responsible according to SGB V, that at some point the statutory health insurers, who are responsible for their policyholders, really need to be involved much more here in my opinion. However, we always have these double-sided views with the statutory health insurers, as they are also responsible for financing the tools and are required to keep their financial resources as low as possible. That's why I'm also of the opinion that we now have this situation where the health insurance funds should actually be doing much more, but in the end they prefer to invest in things that give them a market advantage over other health insurance funds, and these are really mainly preventive measures that are permitted for health insurance funds. Everything that really comes down to billing and the like is very much capped. There are selective contracts where this is done, but unfortunately, I don't think the health insurance companies are interested in this themselves. Simply because of the need to save money on the other side. I think that the legislator should put a lot of emphasis on this and that this role of patient representation cannot be taken away from the health insurance funds. So there must continue to be an interest in representing patients. Apparently, the legislator takes a similar view. It's not for nothing that we now have the independent patient representative body, which is now to be created, where there is still a lot of back and forth. Of course, this is also another way of saying, okay, in addition to the interests of the health insurance funds, we'll make an extra point, which will then also be kept public and linked to the BMG, which could of course also do something great. Free evening courses, some kind of event for pensioners. Of course, the best way to break this down to the individual countries and regions is to show, for example, how a smartphone works and how I can use a health app, how I can use sensor technology to measure my own parameters and not have to go to the doctor. Of course, a lot of training needs to be provided for older sections of the population in particular, and this is

really a matter of fine-tuning, but also of providing information across the different social classes, perhaps especially in areas with a greater affinity for digital technology. Of course, an independent patient center can do this, but I mean a lot of financial resources to carry out such nationwide campaigns. The BMG has already done this for itself when it came to vaccination or something like that, of course you could also do something like that. But I think that in the end, the role will end up back with the health insurance companies and that's where the main thing has to happen, a bit of aspects like education in schools and things like that, something that needs to be thought about more, of course, but of course you start with the children, which is also important, but you don't ignore them, but then you don't pay attention to the majority of the population where it really becomes relevant. That really means multimorbid people, older people, chronically ill people.
#00:07:53-4#

5. Interviewer: Mhm and do you think that in addition to the health insurance companies and somehow also politics or independent patient counseling, that other actors play a role, for example doctors? #00:08:05-8#
6. Speaker 1: This is a sensitive issue. Especially when you ask the doctors' representatives, we quickly get into the discourse: We don't have a newspaper to look after our patients anyway. How am I supposed to provide digital information in the three minutes I have per patient as a GP? So, I don't think it will be possible in the short term to give this to the doctors. However, it would be possible to create a new job description for a medical assistant, or whatever, to offer a kind of digital support service in practices and say that we offer this in large GP practices or in medical care centers or even in hospitals with extra staff, with expertise that can help, or even in pharmacies. For example, there is now a lot of talk about telemedical care, which is to be included in the Care Act. To start there and say, let's put someone there to help, is of course an option if you get the funding.
#00:09:13-9#
7. Interviewer: Mhm, okay, and do you think that patients themselves also have a responsibility? #00:09:19-1#
8. Speaker 1: I think the cat bites its own tail with a question like that. If I don't know what I don't know, I don't know what I don't know. So that's always the issue. Of course, everyone has a responsibility for their own health, and if it's in your personal interest, you deal with it. But you very quickly run the risk of getting the wrong information, becoming very unsettled yourself and ultimately having more training than you did beforehand. So of course, the responsibility lies with everyone, but I need somewhere where I can gather really experienced knowledge. If I don't have that, then there's a greater risk of getting the wrong information, being unsure or perhaps acting incorrectly. First of all, there has to be a supply so that demand can arise.

Even if there is a range of training courses on offer, it is of course up to each patient or person with statutory health insurance to decide for themselves whether to take advantage of them. So of course there is still a certain motivation that lies with the insured. But I believe that this will also exist, especially among those who are very interested in their health. That's why we employ people, there is a responsibility, but something has to be offered so that they can ask for it. #00:10:39-9#

9. Interviewer: Okay, very good, thank you very much. I think you have already answered the third question to some extent. That would be what role and responsibilities the individual players would have to take on to promote digital health literacy. So, if you don't have anything to add, I would skip it, so to speak. I think that's fine. Okay, then the next question would be, if you just think again about what we've just talked about, how can the promotion of digital health literacy among the legally ill, which I had, succeed in Germany? #00:11:11-0#
10. Speaker 1: I think this is also an issue for digitalization as a whole, and a good plan is needed. So, it won't work if everyone starts a little bit at every corner, but if you say, okay, we want to make it work for Germany, for all insured persons, you really have to start with the legislation, award a contract, and then of course that can be broken down to the regional health center. But that requires planning. It is also an issue that health literacy not only plays a role for the insured, but also for the people receiving treatment. You can then go about training and things like that, otherwise you have this difference where the insured persons know about it, but the prescribing person doesn't know what added value it has if you have digital monitoring, for example, and we run into the same problem. So, in addition to the insured persons, we need to look at everyone involved, and coordinating this is not trivial. So I think we need an upper level. Nationwide would be ideal, of course. But it will be difficult if it is then broken down to state level, because there are also insured persons who simply seek care in other federal states. This is not abnormal, especially in the border area, and you will always encounter problems there. So the dream scenario would of course be a corresponding national campaign to increase digital health literacy in all areas, but also with a focus on the insured. #00:12:51-8#
11. Interviewer: Mhm, okay, thank you very much. The last question now would be, what measures such as training should be established in the future to promote digital health literacy? #00:13:04-6#
12. Speaker 1: So of course we would have started with pre-school support, where a lot is already done with nutrition and so on. That's before school, so that you're already looking at what a healthy diet is, even in kindergarten. I wouldn't start with digital tools just yet, but I would start with one aspect and create a certain understanding of health at school. In whatever

subject. I think there are 10,000 ideas for new subjects that would be useful to integrate into schools, or that if there are days dedicated to digital health, you should deal with such topics and really incorporate them into the relevant school curricula. Then we come to studying. There, of course, it's more about the health professionals, that it's included. Overall, in training, studies, everything that comes after school, and then you would be in the area where it's about adult education centers or the like, where you offer evening programs, where you might also offer things for older people in regional centers, where there really is someone on site, so a person who deals with it regionally and trains something like that, and then of course you can also train something like that digitally. Of course, this is also an offer, and there is another aspect that I just wanted to point out: a contact person at the relevant service providers, for example in the pharmacy, so that you have a digital nurse or something like that, so that information is available there. That you have people in practices, large centers, medical care centers or even hospitals who are familiar with this and can provide support, especially when it comes to long-term therapy after treatment, to really be able to suggest offers and look at them. So it all goes in the direction of disease management programs, which are now also to be designed digitally, but to work something out sensibly. #00:15:47-3#

13. Interviewer: But a bit away from the resource of the doctor, so to speak? #00:15:50-2#
14. Speaker 1: I would definitely advise this in the medium term. Of course, they have to deal with such issues themselves, what makes sense to prescribe. And how I can really create added value in treatment. But I don't think it's going to make anyone happy to say that doctors have to sit down with patients for another half an hour and train them. That won't be realistically feasible with the current system we have. There's not time for that. #00:16:27-9#
15. Interviewer: Okay, thank you very much, then we are done with the questions for now. I have one final statement that I would ask you to complete. It wasn't in the questions, but I don't think it was. I would just start reading it out and then you are welcome to complete it. In ten years, the digital health literacy of people with statutory health insurance in Germany. #00:16:51-9#
16. Speaker 1: The basis for a functioning supply of the population even then. #00:16:59-9#
17. Interviewer: Okay, thank you very much. Are there any other points or topics you would like to share with me that we have not yet addressed? #00:17:07-0#
18. Speaker 1: I think that's it for me. #00:17:09-3#

APPENDIX 6. Expert Interview 5**Expert Interview 5 (EI5)****Profession: Consultant digital health****Date: July 10, 2023****Gender: male**

1. Interviewer: All right! Then the first question would be: what factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany? #00:00:11-3#
2. Speaker 1: Well, what I thought was good about what you wrote in the introductory sentences is that it is a holistic task for society as a whole. I believe that focusing only on the statutory health insurance providers in general is the wrong approach. This also needs to be driven further out of politics. I also advise health insurance companies and what I hear from 80 percent of health insurance companies is that as long as there are no penalties, as long as there are no sanctions or other motivations for the health insurance companies, but only paragraph 20k, not much happens with 80 percent. 20 percent are intrinsically motivated and say, okay, we'll tackle the issue, also for the benefit of our policyholders. The others say it costs money. I don't actually have to do it, and I'll wait and see how the whole issue develops, and of course it can't be regulated by the health insurance companies alone by trying to motivate them, but it has to be communicated at a political level, I think simply in the direction of the health insurance companies, but also in the direction of other stakeholders. I think that's pretty important. #00:01:32-5#
3. Interviewer: Mhm, okay, do you have an idea of how this whole society could work? #00:01:40-3#
4. Speaker 1: Yes, well, I mean, I try to solve it on a small scale, so to speak, which I can do myself now, because the topic is also close to our hearts, I am chronically ill myself and I do it, for example, through lectures at university clinics or clinics, hospitals and where I get very good feedback from adult education centers. And the point alone is that you have to meet people where they are, and if I try to teach someone who doesn't have such a high level of digital health literacy, digital media, digital learning methods, then that's simply a threshold that most people simply won't cross. That's why, as time-consuming as it may be, I believe that on-site lectures are much more effective than online lectures, where I can of course potentially reach more people and where I could simply have greater coverage with a meeting. But that's not where I can pick up the people who have a lack of digital health literacy. And adult education centers, for example, are definitely

trustworthy, trustworthy channels for older people, if we reduce it to that, where I can of course reach them very well. #00:03:13-5#

5. Interviewer: It's also very exciting. I've actually already interviewed a lady from the adult education center on the subject and I see good potential for linking the whole thing more closely. #00:03:26-3#
6. Speaker 1: Well, I've been offering this for four or five years, and I have to say that demand has skyrocketed in the last six months, both from the adult education centers that have approached me directly, i.e. I now work at eight or nine adult education centers in the Munich area, and also from the audience. This is now also being asked, although it has to be said that many people know at most the term e-prescription or electronic patient file, for example, but are unable to classify it. There are very few people who really know anything about it and who go there purely out of interest and say, I have no idea, let me tell you something about it. #00:04:07-6#
7. Interviewer: Yes, okay, then I would like to move on to the next question, which is this actor level I mentioned, i.e. which actors in the healthcare system are responsible for promoting the digital health literacy of people with statutory health insurance in Germany? #00:04:23-0#
8. Speaker 1: Well, I think, as I said at the beginning, you have to spread it over several shoulders, not just the health insurance companies, although the doctors would of course be a good point of contact, but that's not really realistic due to the lack of time that doctors have. But I think that the focus, which is why I mentioned doctors, must be on people in whom the insured have confidence, where they can say that this is not, let me put it bluntly, an aloof start-up entrepreneur who says something nice, but someone I can trust and who can motivate me. For example, the advantage I have as a chronically ill person is that I use storytelling to explain where something happened to me where a digital solution would have helped me, to convey the benefits, to convey the advantages, and not just to say, I explain to you now how it works, but I also explain to you why it might make sense for you to use it, and in doing so I pick them up again not only in the spatial-local sense, but of course also motivationally, where they are, namely by making it clear. Think about whether you could also use it to make your everyday life easier, to benefit your health or to manage an illness! #00:05:42-9#
9. Interviewer: If you could be a little more specific, what do you think? What could the role of health insurance companies or doctors look like? #00:05:54-0#
10. Speaker 1: So theoretically, with the health insurance companies, I think you are already in the right place, and they are certainly also organizations, now in the place that the insured trust, which is why that would fit my description again, that is a trustworthy actor, that would be trusted, and then, why

shouldn't a health insurance company make appropriate on-site contributions, lectures in their branch, for example, offer the insured? I think you can also try to address this in writing, every health insurance company has a monthly or quarterly sheet that is distributed, either in terms of content, how does something work? Or to say that there are the reasons to use it, or to give presentations at the branch. The first step is to make this known, I recently heard someone who had put forward the idea of providing appropriate support "before the news". I believe that, especially in connection with the Tagesschau, you can reach many people from the age group affected by the topic. In conjunction with the Tagesschau, it might also be a good, trustworthy setting in which to reach them. And why not something like the BfArm or Gematik, an organization from the healthcare sector that is trustworthy, even if Gematik is less well known now, but why not someone like that as an addressee here, or what is the name of the Federal Centre for Health Education? I think that's the one that most people really know and is considered a trustworthy organization in the healthcare sector. Why shouldn't someone like that be used as the sender of such a motivating message, not an explanatory message, but a motivating message "deal with it, and there are such and such possibilities" before the Tagesschau? #00:08:01-2#

11. Interviewer: Then I have another question. As a patient, you are also affected yourself. Did you say what, what responsibility do you see for yourself? As a patient, you say that patients have to somehow deal with the issue themselves. How great is the responsibility, how great can it perhaps be? #00:08:19-7#
12. Speaker 1: Yes, having to is one of those things. They should, that's exactly what I'm trying to motivate them to do with the stories where it has helped. Can you force people to engage with it, no, not really. I think you really have to go about transporting the benefits and advantages in order to motivate them. #00:08:34-4#
13. Interviewer: Mhm, okay, then I would go further. How can the promotion of digital health literacy among people with statutory health insurance in Germany succeed from your point of view? #00:08:49-6#
14. Speaker 1: Yes, in principle, I've already said that I do it by example, so to speak, if there's no other way, I do it in my own circle, in my small circle, so to speak, to act as a role model and keep raising the issue and telling people about the benefits. Um, I think that's essentially the way to make it tangible, to make it clear. #00:09:23-8#
15. Interviewer: Mhm, okay, and do you have any ideas on what measures should be established to promote the digital health literacy of people with statutory health insurance? #00:09:33-8#

16. Speaker 1: So what I actually do in the presentations is also use screenshots, for example, to make it really tangible how easy it sometimes is to communicate and also to lower the threshold for getting involved with it. I think it also makes sense to hold some small workshops or bring your cell phones together with her now and then we'll do it together, download the app together and see how to use it to make the start, the first step so to speak, of raising digital health literacy by using digital tools easier. I think it's always easier if I take the first step together with the insured persons as a role model, as a trainer, to motivate them to take it further themselves afterwards. So that's also a bit like starting the theoretical part, the practical part. That's also a certain hurdle, and I could reduce that with something like this, for example. #00:10:38-0#
17. Interviewer: Okay, well, then we've actually got through the questions relatively well. However, I have one final statement that I would ask you to complete. I would start the sentence right away and you are welcome to complete it. In ten years, the digital health literacy of people with statutory health insurance in Germany. #00:11:01-2#
18. Speaker 1: No longer an issue. So I'm an optimist. Because it will have become part of everyday life, we will have lived with it long enough for everyone to have come into contact with it, and at least for themselves, if they don't use all the digital tools, they will simply be used to dealing with the essential ones, such as an electronic patient file or an e-prescription. We are currently discussing how they got there. But in ten years' time, I don't think that will be an issue. #00:11:33-6#
19. Interviewer: Okay, that's a good outlook for the future, and let's hope it turns out that way. My final question is whether you would like to raise any other issues, whether there is anything else you would like to tell me that we have perhaps not yet addressed. #00:11:45-7#
20. Speaker 1: Yes, it only fits in halfway, but when I thought a bit about your interview beforehand, I remembered my original motivation for starting my own business five years ago. I'm a digital health consultant and my original motivation was that this doesn't apply to the healthcare organizations in Germany or the political players or anything like that. But this is now moving towards the topic of start-ups. I would like to see those who offer digital solutions, and perhaps this also goes in the direction of gematik, for example, which is at the forefront of eRzept. That they don't always just try to take the next step and become big due to economic motivation, that they don't always just look at what else I have to do, what can I do better, where can I stand out from others, but that they communicate what has already been achieved technically more and more intensively to those who benefit from it. Ask a startup, what is the most important thing for you? Say, most statuses, I want to be a unicorn, I'm looking for the next big leap

instead of helping people who already have an advantage from the perhaps not quite perfect solution, and I wanted to close the gap back then, and I think that's still the gap that needs to be closed, and that's what I try to do in my presentations, i.e. use what's already there. #00:13:23-9#

21. Interviewer: Yes, yes, there's already a lot there, that's always a point. #00:13:28-3#

22. Speaker 1: Exactly! #00:13:29-4#

23. Interviewer: Yes. #00:13:29-9#

24. Speaker 1: Well, it's more in the direction of digital health applications and apps than general or important topics such as ePrescription and ePA. That's another category, of course. #00:13:43-4#

25. Interviewer: Yes, but that is perhaps another exciting role that can be included. Well, it's also this overall social aspect that you mentioned. Everyone has to somehow take the whole issue into account and anchor it and think about it, I think that somehow results in an overall picture. Everyone has to find their role somehow and make a small contribution, like in a 1000-piece puzzle, so there are also different pieces that make up a big overall picture, and maybe that's how it can work. Okay, very good, yes, then that's it from my side. If you don't have anything else, I would stop the recording now. #00:14:19-9#

APPENDIX 7. Expert Interview 6**Expert Interview 6 (EI6)****Profession: Interest group health IT****Date: June 09, 2023****Gender: female**

1. Interviewer: Good, then the first question would be: what factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany? #00:00:13-3#
2. Speaker 1: So I think it's important that every patient and every insured person in Germany knows about the possibilities of digital healthcare solutions in the healthcare system, that they have the information about what solutions are available. This can be in the area of prevention, as there are also digital prevention services. It can be in the area of care, digital care applications, it can be in the area of DiGA. Hopefully there will also be the option of an e-prescription in the near future. That already exists, but with the added factor that I can also use it. Then the ePA, to know that it exists at all, i.e. to know what offers I have in the digital area in order to know the scope of possibilities and at the same time the rights. So I'm talking about something like the European health data space and also everything that comes into play in terms of health data use, perhaps as regulation, so that you know, and the laws are still being made, for example, the right to have my data available digitally, so that I am informed about these rights at all. At the same time, when we talk about factors, the next point is of course that I have to know them and I have to be able to use them, and I have to be able to assess whether I want to use them. And I have to be able to do it, and that of course includes the ability to get the applications in the first place. That is the route to the applications, which must be user-friendly, and the applications themselves, which has also been taken into account by the legislator, for example with DiGA and DiPA, must be barrier-free: In the area of DiPA, age-appropriate usability, in general the application must have a high level of usability, and in my view this should be a factor, a criterion for all digital solutions that we bring into the healthcare system. On the way there, I'll talk about things like electronic identities, for example, and perhaps we can go into more detail later about how data protection and regulation come together with a user-friendly way for everyone and for every type of device. In other words, when I look at factors, it has a lot to do with communication, with transparency regarding offers and then with appropriate, tailored information and training opportunities. In other words, the offer alone is not nearly enough to enable the insured to use this application. And I think it worked particularly well with the Corona Warn

app that, for example, pharmacists were used as an analog touchpoint that is easily accessible for everyone, and this also resulted in very high download and user numbers. Even among people who have not yet come into contact with digital health products, to take this as an example of how it could work for further launches, which we are currently facing or which are already underway. In other words, a mixture of on-site and, of course, digital services for other target groups, so that you somehow have a homepage where you can always find out how to activate the ePA. And that this is then as easy as possible for policyholders to access. #00:04:26-7#

3. Interviewer: And do you think it's already going well or is there potential for optimization? #00:04:32-4#
4. Speaker 1: Well, I think the user numbers speak for themselves. I believe that there is a lot of room for improvement, we can see that now in the DiGA area, the digital health applications are one of the first digital products, so to speak, solutions that are on the market, and it is to some extent the case that the companies are of course trying to inform doctors as well as possible, that is also part of it, to inform service providers and psychotherapists about it, and also to inform patients about the path. But the fact that it is a huge task to provide information on data protection principles, access routes, interoperability requirements, i.e. how this is then linked, for example with the ePA and things like that, is a huge task, and I believe that this is a task for society as a whole, because DiGA are now only part of the whole, and this digital ecosystem that is emerging is, in my opinion, more likely to be known in a bubble and otherwise only as "doesn't work" in a larger public perception, as far as e-prescriptions and so on are concerned. I think a lot more educational work needs to be done. I also think it would be interesting to see whether the Federal Institute of Public Health could take on a stronger role, which is what the law says should happen, and which the BzGA might also include. In other words, professionally, you say you're going to do a big communication campaign. There are posters at every bus stop that say, here are the options you have now, and this is how you get there. Um, I think a lot more is needed. And if we go back to the topic of data and the use of data, we have seen in the pandemic that we are lagging behind other countries, so we have to look at other countries to see what the vaccination rate is like in order to be able to extrapolate it to Germany. So we may have had a bit of an eye on vaccination rates, but mutation variants and so on, we had to look at other countries. That can't be the situation. We have to get to grips with this, and when we do, we also have to educate people about "what's the benefit for society, what's the benefit for each individual if we have this data", which really has a lot to do with patient safety. Many of these digital applications have to do with transparency and

patient safety. People are still dying in Germany because of drug interactions, and it would be much better if one person knew exactly what the other had taken. In this respect, patients need to know that "I'm actually safer if this data is available in different places", and that hasn't reached the population at all. So, there is a lot of talk about the risks. Now I'm back to the first point: communication, education and then empowerment, and a lot more needs to happen here. Well, there are individual initiatives, for example the Senior Citizens' League or something like that, where people get together and look, okay, how can I actually download this? What do I need for it and so on, and I think there are far too few. Well, I don't know exactly what the health insurance company offers, but it hasn't reached me, even though I also have statutory health insurance. #00:07:49-2#

5. Interviewer: Then you have already mentioned doctors and therapists, etc., who should perhaps also be involved. That would be my second question in this direction, which actors in the healthcare system are responsible for promoting digital health literacy from your point of view. #00:08:12-2#
6. Speaker 1: So from my point of view, it's a transformation that we're undergoing, and it's such a big, really a kind of revolution that's taking place in the healthcare system. In my view, all players should contribute to this and play their part, and of course, in the best case, in a coordinated way, so that everyone takes on a part somehow. From my point of view, this definitely means the health insurers, who are already legally on board, and the manufacturers. It is, of course, in their own best interest that patients are able to use these applications in the first place, that they are familiar with them. But then also the self-administration. So I would also include the Joint Federal Committee, ministries and also the representatives of the estates, i.e. the associations of service providers. And that's why the digitalization strategy existed to a certain extent, because they said, okay, we have to somehow agree on a path and um also agree that we want to work on it proactively. It's just one thing that you have on paper, so to speak, and another thing that happens in practice. You know that yourself. Then there are the health policy debates, where things are brought in after all because they could perhaps bring supposed disadvantages for the individual professional associations, which then lead to a standstill or things not being implemented in the same way. This is of course somehow difficult and has led to us lagging as far behind as we do. I think it's twofold: in Germany, there is generally a bit of skepticism towards technology, which has somehow crept in a bit. So perhaps we need to look at how we can communicate technology, openness, i.e. the added value that this solution brings, at a meta level. And at the same time, I believe that every professional association and every trade association must also consider what role they want to play. This must also be clearly stated. And the problem is, perhaps the last sentence, I think that

sometimes it looks as if... so no one stands up and says we don't need digitalization, but it's then wrapped up under a different guise. And the end result is that digital solutions don't make it onto the market by acting in a certain way. So now I'm not in favour of just pushing in digitalization per se without looking at the benefits. So from my point of view, we should of course evaluate it and carry out studies and do exactly that. But if we were to carry out an analysis of where we currently stand, it would take a bit more courage and then perhaps a correction rather than the other way around. #00:11:15-3#

7. Interviewer: Then again briefly on the subject of roles. How would you define the roles in concrete terms? Are there also actors who occupy a key position in the construct? #00:11:29-7#
8. Speaker 1: Well, I do think that health insurance companies should promote digital health literacy. It wasn't included for nothing. I think that makes a lot of sense. They have access to the insured, but I don't think it will work that way. Some of these tasks will have to be transferred to other service providers, who will then also be remunerated for them. So, nobody can do this on top, it's a huge educational task. Um, and I'm talking about pharmacies, for example, or something like that, if they provide some form of support, for example with activation, with an eID or something like that, because it's simply low-threshold on site, then of course this must be reflected in some form of remuneration. Nobody can do that on top. And yes, I don't think much of these on-site contact points at the health insurance companies, some of which still exist. If you have to go there now to activate the ePA, I think it's somehow totally out of date. Now, of course, I'm also from a decade where this is somehow seen as totally strange. It may be an option for the older population. But I don't think it's a solution for the majority of insured people to offer such things on site. So I think you also have to look a little bit, quite clearly, at defining patient segments, insured segments, and see how you can reach them in a way that is not so difficult in terms of costs. I don't think there's much point in building a huge bureaucratic apparatus around it. Then there are the manufacturers, who can help with patient training and also with applications, i.e. the applications are all based on UX design concepts with patient involvement. They already have the patient perspective during development. I think patient organizations also have an exciting role to play. They are often very interested in new developments, so you can also see whether they can take on a more active role. But the message is very clear: no one is going to do this on the side, it needs resources and employee skills, and it's no use trying to get people who may have previously worked in completely different positions at the health insurance funds to do it somehow. So, I think you can perhaps outsource that,

and then it's just someone who brings the content across that's needed.
#00:14:37-4#

9. Interviewer: Do you still see patients or doctors taking responsibility for informing their patients? #00:14:42-5#
10. Speaker 1: Yes, well, I definitely see a responsibility on the part of service providers to ensure that they use the options available in the system, i.e. the tools they have, so to speak, medicines, remedies, aids and digital therapies, and that they don't... Some people say that I'm now two years away from retirement and I don't feel like getting stuck in anymore. For me, that's a work ethic that's difficult, because if it's right for the patient, then, in my view, service providers have to make the most of what's available to them. I think it is also clear that it is not possible to explain how the application works in an educational way in a brief consultation with a doctor. But this is also regulated by law, at least in the case of the DiGA. There is also a 24-hour support service from the manufacturers, which means that all the technical information ends up with the manufacturers and not with the doctor, because they can no longer deal with it in the practice. But I think it's really important that they inform themselves about what's available and what I can offer my patients, not just doctors, but also other service providers, (physio?) therapists and so on. #00:15:55-4#
11. Interviewer: And with the patient too, so that they also inform themselves? #00:15:59-0#
12. Speaker 1: Yes, so exactly, I think one thing is being able to do it yourself, and so it's always a bit of a question... So that also depends on the area of application, I think, i.e. what illnesses do I have, and of course: many patients already inform themselves on the Internet. Nevertheless, digital health applications, for example, are now certified medical products with an evidence concept, and it can make sense to address patients directly. But a lot of it simply goes through the doctor because it is an indicated therapy. And yes, I believe that the more confident the patient is and the more they look at what could work for me, the better. So I'm an absolute fan of that. Can I make it compulsory for everyone to be able to enter their illness precisely on the Internet and then filter it accordingly? Probably not. #00:17:06-7#
13. Interviewer: Okay, if you briefly go through the points you have just mentioned again, perhaps in your head. What would you say? What are the key points? How can the promotion of digital health literacy among people with statutory health insurance in Germany succeed? #00:17:24-4#
14. Speaker 1: Yes, start campaigns, spend money on communication, provide training and offers tailored to the target group and, in my opinion, also align political activities. It's no good if, on the one hand, a fund says politically that we don't want all this, we think it's stupid, and at the same time,

yes, they have to offer webinars on it. So you also have to somehow align the entire communication concept of the health insurance funds. That doesn't mean that you can't express criticism, but that you have to look overall at what you communicate to the insured, how you communicate an active creative role in favor of "We promote digital health literacy" and I don't see it that way at the moment. Yes, and at the same time to consider, also in draft legislation, who can be a partner? For example, is it a local pharmacy? Is it a federal institute for public health, for example, that provides information? Who can be a partner? #00:18:49-7#

15. Interviewer: Yes, okay, then you've already mentioned the topic of measures. Do you have any ideas as to which measures, such as training courses to promote the digital health literacy of people with statutory health insurance, should be established in the future? #00:19:04-2#
16. Speaker 1: Yes, so training courses, and I actually think we should perhaps also consider whether the insurance companies are also measured by this: How many patients take part, how many insured people take part? Because you can see that measures alone are not enough, just like in the area of prevention, where less than one percent of those insured take advantage of individual prevention offers. But it actually makes a lot of sense to start earlier, before the illness is even there. Yes, and that's no use if everything is there and is somehow supposed to sink into a drawer. There should be an incentive for as many insured persons as possible to take part in training and then also to include bonus-malus regulations in this context, because otherwise I think it's easy to get lured out of this task. And it's also too big, it's important, and I believe that it has to be on the lists of the top decision-makers, that you push this, exactly. #00:20:18-9#
17. Interviewer: We are now through with the questions. But I have one more sentence that I would like you to complete. This was not included in the questions, so how would you complete it? In ten years' time, the digital health literacy of people with statutory health insurance in Germany... #00:21:02-7#
18. Speaker 1: To be there. Yes, that's perhaps a humble goal for now, but it will be there, and it's not there now, and I think there's a long way in between, of course, and I think it's somehow also super exciting how society will change. So those who are 70 now, (the future 70-year-olds will grow with it?) and I think that's also very exciting, how that will shift socially, so to speak. #00:21:45-1#

APPENDIX 8. Expert Interview 7**Expert Interview 7 (EI7)****Profession: Interest group healthcare professionals****Date: July 20, 2023****Gender: male**

1. Interviewer: So, the recording is running, and then the first question would be, what factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany? #00:00:15-7#
2. Speaker 1: Well, that's more of an overarching question, at least that's how I understood it, which is aimed more at the framework conditions, and I thought about it in advance, of course it starts a lot with general education and skills development, and I see something like school education on an overarching level, not specifically health literacy. First of all, education on health issues through schools, for example through other educational institutions. So, before I would start in the narrower area of health, so to speak, I would first start with general health education and education and first and foremost see the education system, so to speak, that you start there at a higher level and then deal more with the specific health issues and health literacy. #00:01:29-1#
3. Interviewer: Mhm, okay, then I would move on to the next question. Which actors in the healthcare system are responsible for promoting digital health literacy among people with statutory health insurance in Germany? #00:01:43-0#
4. Speaker 1: Yes, well, I would say that the statutory health insurance companies are the first ones who should be responsible or who should take care of this. Ultimately, it's also about the people with statutory health insurance that they have to keep an eye on. But I would also include other state actors in this, such as the BMG, i.e. the Federal Ministry of Health, and I also see the state ministries as being somewhat responsible. And yes, then of course also other players, such as us now, the National Association of Statutory Health Insurance Physicians, i.e. what we can contribute and do within the scope of our possibilities, i.e. issues of health literacy that now relate to the statutory health insurance system, for example, that we can provide assistance there. So I also see institutions like the [company] as having a certain amount of responsibility here, even if we are not the first point of contact or the first actor. I would actually see something like government agencies or the health insurance companies. #00:03:04-3#
5. Interviewer: Mhm, would you say that patients themselves also have a responsibility? #00:03:10-3#

6. Speaker 1: Yes, definitely. Yes, so everyone certainly has a responsibility, of course. So there is personal responsibility, of course. Ultimately, you can't delegate everything to government agencies or health insurance companies. Everyone has to deal with it themselves and take care of it to some extent. And ultimately, everyone is responsible for their own health and health literacy. So, of course, I also see it as the responsibility of the insured themselves. #00:03:48-4#
7. Interviewer: Digital health literacy is still a relatively new topic. Do you think that the insured are capable of doing this on their own? #00:03:58-2#
8. Speaker 1: Well, it's the same as with other topics. There will be quite a few people who are naturally able to do this and others who are not, so to speak. And it's probably the same as in other fields, for example in prevention, those who are well able to do it probably don't need too much support to find their way around and do it on their own and are interested. And the others just need support and are perhaps a little less interested. And then it's a question of how do I get to these groups, how do I reach them? #00:04:34-8#
9. Interviewer: Mhm, then I would like to go back to the other players you just mentioned and then be a bit more specific. You said that the [company] can help, for example by providing support and so on. Could you perhaps be more specific? How exactly do you see your role there, and how exactly do you see the role of the health insurance companies, for example? #00:04:57-3#
10. Speaker 1: Well, I see our role first and foremost as supporting the insured or patients in questions relating to the care provided by panel doctors. For example, how does the panel doctor system work? How do you find your way around the contract doctor system, how does it work, how does patient management work there? Who is the right contact person where? Well, I see the [company] as being responsible here. Um, the health insurance companies, I would say, should of course be the first point of contact, because as a person with statutory health insurance, the health insurance company is, so to speak, my contractual partner in quotation marks. As the [company], we are not, but everything that concerns, for example, arranging appointments or anything like that, bringing the structure of contracted doctors closer. It is often the case that patients turn to us with all kinds of questions and concerns. However, we are often not the first point of contact. So I see it as more of a task to show once again what the [company] actually does, what questions are they in the right place to ask us? As I said, I see us as responsible for everything that concerns the care provided by SHI-accredited physicians. But I don't see us as the main point of contact or actor for the promo-

tion of health literacy when it comes to those with statutory health insurance. I really see the health insurance companies as the first point of contact for all questions and issues relating to healthcare. #00:06:44-5#

11. Interviewer: Your members, the doctors, also play a central role somewhere in the whole construct, in that they are also a kind of first point of contact for the insured in acute treatment cases. How do you see the role of doctors, and what role do they perhaps already play in promoting digital health literacy among their doctors? #00:07:05-0#
12. Speaker 1: Doctors are of course often the first point of contact when it comes to health issues. Of course, especially in primary care, for example. GPs are often the first point of contact, and of course they do that. Advice on health literacy issues and so on. That's their day-to-day business, so to speak. I don't know to what extent digital health literacy, to what extent doctors should provide advice. It's certainly still a topic for the future, and I don't see it as a top priority, so to speak. But it certainly plays a role in questions. Where can patients perhaps find reliable and good information about their concerns? I see doctors as having a certain amount of responsibility here, and of course they already do that in their day-to-day business. #00:08:11-8#
13. Interviewer: Okay. #00:08:14-1#
14. Speaker 1: And now you had the question of how we can promote digital health literacy among doctors. Yes, that is certainly also a topic for the future, so to speak, dealing with digital applications in general. This has also increased more and more in recent years, from video consultations to digital tools, applications and so on, it's developing and it's certainly also a process of dealing with it. We are also in a transition, so to speak, with doctors. Many of them are certainly older, they won't be as involved with it. But for the future, so to speak, I see a great need for it, and this is a gradual process, and we are of course also looking at individual areas where we can provide support in terms of health literacy and are also involved through the Health Literacy Alliance and are looking at where we can also place projects that perhaps don't run directly under the label of digital health literacy, but of course also include such issues. #00:09:36-2#
15. Interviewer: Mhm Okay, thank you very much. If you go through the points we've just discussed, what do you think? How can the promotion of digital health literacy among people with statutory health insurance in Germany succeed? #00:09:48-3#
16. Speaker 1: How this can succeed, well. On the one hand, I would say that the stakeholders we have talked about should of course promote digital health literacy to some extent in their own areas of responsibility and make it an issue, and then of course we could also consider whether there should

be further legislative action. There is the paragraph 20k. Perhaps model projects could be set up there again as part of the further development, or perhaps it would also be possible for health insurers to make appropriate offers in the area of prevention, also in paragraph 20. Perhaps this could also be extended to the topic of health literacy, so that there are also projects to promote health literacy among the insured. That would be a starting point. On the one hand, the players in their areas of responsibility, and on the other hand, you could think about doing this through pilot projects, or testing things out again, or using prevention as a model? There are already some very good approaches as far as the health insurance funds are concerned. #00:11:16-1#

17. Interviewer: Do you have any concrete ideas about which measures could be useful, for example, or should be established in the future? #00:11:25-3#
18. Speaker 1: Well, I'm just thinking about prevention services. There are also things like courses and training that you can do in behavioral prevention, but also setting offers, and perhaps such things could be transferred to the topic of health literacy. That would perhaps be a starting point. #00:11:54-8#
19. Interviewer: Mhm and from your point of view, are there any points that should be taken into account when designing these measures? #00:12:02-2#
20. Speaker 1: What do you mean? #00:12:06-1#
21. Interviewer: Mhm, well, we also said at the beginning, for example, when it came to the responsibility of the insured persons themselves, that there are always insured persons who are perhaps already concerned with health anyway and are therefore fit in terms of health literacy, but also those who are perhaps not really yet. So, I always have different target groups that I want to reach, for example, you have to take that into account when you're offering measures, and are there perhaps other points that need to be considered? #00:12:32-9#
22. Speaker 1: Um, yes, of course I should do that. First of all, I have to give everyone the opportunity to do something like this. But if certain target groups are particularly difficult to reach, then there should also be some interest in making it a bit target group-oriented and trying to reach these groups, whatever you call them, vulnerable groups et cetera. Something similar is also being attempted in prevention, and I could imagine doing the same here. But basically, I would say that all insured persons should of course be given the opportunity to do something like this. But a target group orientation would of course be important. Well, and this could also be done, for example, through setting-oriented projects, which the health insurance funds sometimes also do through pilot projects in schools or neighborhoods, so to speak, so that digital health literacy is perhaps already a topic there, but where is it also connectable with other, everyday topics.

So, I certainly wouldn't see digital health literacy as completely detached and isolated, and you could perhaps look at whether such a setting approach fits, whether you can make the topic connectable to other topics, I could imagine it along these lines. #00:14:13-5#

23. Interviewer: Very good, thank you very much. Then we are actually through with the questions. However, I would like to conclude with a statement that I would ask you to complete. So, I would start reading out a sentence right now and then you can finish it. In ten years' time, the digital health literacy of people with statutory health insurance in Germany. #00:14:35-1#
24. Speaker 1: Well, hopefully better developed than today. #00:14:42-0#
25. Interviewer: Okay, thank you very much. That's an optimistic view of the future. I would now like to conclude by asking you if there are any points that we have not yet addressed but that you would like to share with me. #00:14:56-6#
26. Speaker 1: Mhm, um, no, I think that was basically what I thought of first. #00:15:06-3#

APPENDIX 9. Expert Interview 8**Expert Interview 8 (EI8)****Profession: Social health insurance****Date: July 19, 2023****Gender: female**

1. Interviewer: So, the recording is running. Then the first question would be, what factors at the political, political and social level are important for promoting digital health literacy among people with statutory health insurance in Germany? #00:00:15-9#
2. Speaker 1: Exactly, I think you just mentioned an important keyword in your introduction, namely that it is not expedient to only hold individual players in the healthcare system accountable for increasing digital health literacy, but that it must be anchored in the entire healthcare system in a much more comprehensive, comprehensive and structural way. The payers, the health insurers, naturally play a role here because they have relatively many touchpoints with the insured, but usually only when someone is already ill and has a specific concern, which can also be done in the preventive field. Health insurers usually don't catch people in time. In other words, I look above all at the service providers themselves, the doctors, but also the non-medical staff. So I think it's very important to always bear in mind those who provide remedies, the pharmacists, then of course the doctors in the outpatient and inpatient sector, but also groups that you might not primarily have on your radar, but which, I believe, are already providing very important support today. I'm thinking of the self-help organizations in particular, whose almost original mission is to enable patients to better deal with their illness, and in some cases also to address relatives, but my impression - we have an insight into this through the self-help support that we are allowed to provide as statutory health insurance funds - is that many self-help organizations still have room for improvement in this digital competence area, what do I need navigationally, what do I need to really search for information, to be able to understand it. This applies to the healthcare system itself, and I would think even bigger, politically and socially, I think it's really high time that health as a whole was given a higher priority. So, we often talk about a health in all policies approach. We are currently focusing a lot on the topics of sustainability, climate change and health, and this is a similar issue to the one here. What do we need in order to be able to develop this kind of general competence, this kind of key competence, everywhere, and I think that looking only at the healthcare system is not enough; we need to look at other policy areas. I would mention education policy, for example. I believe that it would be very, very helpful if

this topic of "how can I empower people, how can I develop health literacy and digital health literacy, navigational skills, how can I build these up? So start as early as possible and don't make this the sole isolated task in a healthcare system, but think much, much more broadly. #00:03:52-5#

3. Interviewer: Mhm Okay, great, thank you very much. You've just mentioned a few players that perhaps need to be more involved. Which of them do you think are mainly responsible for promoting digital health literacy among people with statutory health insurance in Germany? #00:04:08-3#
4. Speaker 1: Well, I don't think one person is more responsible than the other, but it's the sum of the parts and the comprehensive establishment of this topic that makes it our task to think about this topic everywhere in a treatment pathway, if we disregard the preventive area. For example, I recently took a look at the content of patient education in the disease management programs, in the structured chronic disease programs, and they are a bit outdated. They are only ever slightly revised, if at all, and it struck me that this would be a wonderful starting point, so to speak, to add modules on digital health literacy to such patient training courses, which are mandatory for everyone enrolled in a DMP. In other words, in addition to the individual service providers, who really have to embrace the topic and make it their own, all self-governing bodies, the Joint Federal Committee, etc., are of course addressed here, as they set the guidelines in the DMP programs and have to develop them accordingly. And yes, we are strong in the service provider sector. And if I had to set a focus, I would even say that it is not realistic to burden doctors, who have relatively little time to communicate with patients and provide information, with this, but rather to use the potential that all the professional groups around them have, who often also have a more explicit remit: Patient guides, practice management staff, nursing staff. In other words, to really use all these professional groups to reach people. #00:06:36-3#
5. Interviewer: Mhm, and what responsibility do the patients themselves bear from their point of view? #00:06:40-8#
6. Speaker 1: Responsibility must be assumed by both sides, the service providers themselves or all the stakeholders in the healthcare system must, as I said, make it their business and must see it as their mission to train and promote digital health literacy. At the same time, their organizations must also build up organizational health literacy, so to speak, and of course there is then a personal responsibility of the people, the insured, although this is also the dilemma in prevention, so to speak, that I must of course first awaken this need, the realization of why such a competence is important for me. And that is the crucial point that I have to create. In other words, I have to make really attractive offers. I have to start from the individual's needs and say what they need in the field of digital health literacy. And then

we can't get any further without personal responsibility, because it's such a dense network with so many information points and possibilities that a stakeholder can't in principle guide the patient through it, but I need my own expertise to be able to at least roughly classify in the first grid, where can I get really valid information? What is helpful for my situation? And as I said, I believe I can only awaken this personal responsibility if I can communicate the benefits and purpose of good digital health literacy well, and I am convinced that the earlier I start, the better. Hence the keyword education system again. As company health insurance funds, we've been calling for some time for there to be something like a health subject at school, and for me this would naturally include the digital area in addition to the many specific skills, nutrition skills, exercise skills. #00:09:16-3#

7. Interviewer: Mhm, okay, great, then you've already addressed the third question yourself. It's about rolling responsibilities. Perhaps you could elaborate on that a little more, also from the points you just mentioned. What roles and responsibilities do the individual players have to take on to promote the digital health literacy of people with statutory health insurance in Germany? #00:09:38-5#
8. Speaker 1: As health insurers, we have conducted a major survey on this and asked people, regardless of whether they have statutory or private health insurance, regardless of which health insurer they are insured with. What expectations do they have in terms of digital health literacy? And the most sobering thing for us was that many people don't even realize that their health insurance company offers services, that it has a mandate to provide services, and they don't even think of seeking support from their health insurance company. The market research institute that accompanied us said something different to us: you are not the relevant set, the relevant set of information that they are looking for, depending on their age group, they get their information from social media, they are in their bubble, which means that even if you as health insurance companies start to somehow use Instagram accounts or TikTok or something else, they won't find you at all because you are not in this bubble where people get their information. In other words, I believe that a realistic mandate for health insurance companies is actually linked to a specific need, such as "I have a certain acute illness or I have a chronic illness, I have a certain life event, such as my mother needing care". There is a point of contact, a touchpoint with the health insurance company, with the long-term care insurance company, and then we look at exactly what information the insured person needs, what digital support options are available, is the patient aware of the entire range of services and benefits? I believe this is efficient because these are times when people naturally think about their health insurance and explicitly ask for information. The same applies to service providers, of course, whether it's

my physiotherapist, the hospital or the midwife. There are always very specific reasons for contact, and I think it works to provide really good and broad information and to strengthen and train digital health literacy for these occasions. But then there is still the area of building up generalized digital health literacy, and the most effective thing would be for this to become more of a public health issue. The coalition agreement, now of the coalition government, provides for the further development of the Federal Center for Health Education into a Federal Institute for Public Health. Among other things, they are also to be responsible for health information and communication, and I see a huge opportunity here because it is so bundled and state-run, which has a very high level of seriousness and trust. At the highest federal level, from the Federal Institute of Public Health to every public health service in a district, city or municipality, if the task is to promote digital health literacy, then you have the best chance of really reaching a lot of people. We always cite this "Don't give Aids a chance" campaign by the BZgA as a prime example, with billboard advertising at every train station in Germany and huge cinema advertising campaigns at the time, so that everyone really gets the message in a fun, attractive way that is also appealing. And as far as I know, this is also the approach in other countries, to really look, in addition to what can be conveyed individually between patient and service provider or what the health insurance company or what schools or something like that can convey, that there is a very broad-based information campaign that starts at the macro level, and then something else happens at the micro level, in every doctor's office or in every service center of the health insurance company. #00:14:56-4#

9. Interviewer: Mhm, great, thank you very much! Well, I have to say, that's another very exciting input for me, which hasn't come up in the other interviews either, but which I can really understand very, very well and also consider it very useful that you really split again between increasing generalized competence and the specific treatment case, which would be worth pursuing at the beginning. Thank you very much. Then I would like to move on to the next question, perhaps if you could summarize a bit based on what you have just said, how can the promotion of digital health literacy in Germany with statutory health insurance succeed from your perspective? #00:15:36-3#
10. Speaker 1: So, as I said, I think it's there, as they say, the whole is more than the sum of its parts? If this is really understood as a task by all players in the healthcare system, but also by other policy areas, that this is a very important key competence for people and to navigate this complex healthcare system, an ever-growing gray healthcare market. We need to differentiate between digital literacy and digital health literacy. There is sometimes a wide gap between people with a very high level of digital literacy and those

who are young, fit and healthy and have hardly any contact with illnesses or the healthcare system, and then they receive a diagnosis, and then they start googling and perhaps get it wrong at the first point of contact because they have been misinformed. So, a certain broad generalized competence has to be trained and made possible, and then, however, and we have also heard this in our surveys, or that is what the health insurance companies, our company health insurance companies, report back to us. Then people don't actually want generalized offers such as a basic training course on "digital health literacy, what is it and how can I achieve it?", but they want it to be specific to their concerns. So, I'm in my early 30s, I've been diagnosed with multiple sclerosis. What kind of offers are there, or let me give you an example. One [company] has now trained a specific team and they have analyzed which insured persons suffer from long Covid and are starting to actively approach these insured persons on their own initiative, because they know that they are often completely at a loss. There are still relatively few good offers of help, there is a lot of bad information on the internet, and people urgently need help, so nothing is done digitally, they write to the insured person and ask, is it okay if we contact them? Fortunately, health insurance companies have recently been allowed to do this on the basis of Section 68b, i.e. carry out a data analysis and then actively approach specific clients. They say that they have not yet had one objection from the insured. In other words, either they don't get back to me, but many say it's great that you're approaching me about it, because I'm really at a total loss at the moment, and then there's an intensive telephone consultation where they look at what care the insured person is receiving and whether they know the Fimo app, This is a DiGA for fatigue syndrome, does the person also need respiratory therapy, and this is probably so well received, because you look specifically and see, because Fimo is one of the few DiGAs approved by the BfArM and, so to speak, specifically trains competence and, to a certain extent, digital health competence. And so many examples. We have a very small company health insurance fund that can't set up huge programs for paragraph 20k like a large substitute health insurance fund, but which has simply informed its policyholders, so to speak, "if you need support, if you have a specific reason, please contact us and we will look at your specific case, what can we do and how can we help?". So I don't know if that was focused enough on the question here. Of course, I was very focused on the statutory health insurance companies. #00:20:24-7#

11. Interviewer: It's also their perspective, so I incorporate other perspectives from science, from the medical profession and so on, and then I try to create the overall picture. That's why it's really exciting to see what the individual players have to say about the individual points. Exactly, you have already mentioned a few measures that are conceivable. Do you have any further

ideas on what measures should be established in the future to promote digital health literacy among people with statutory health insurance in Germany? #00:20:58-8#

12. Speaker 1: Well, I think you really have to try out a wide variety of things, and the policyholders will then vote with their feet. In other words, either they ask for it or they don't. We have some company health insurance funds that actually offer a digital patient driver's license. There are others, other health insurance companies, not only in the company health insurance camp, who have written in a certain amount as a statutory benefit, up to so and so many euros, we reimburse them for digital health literacy services and hope that the market will develop as many offers as possible that are clearly visible for every target group and for everyone. I also think it makes a lot of sense to provide specific training with a concrete link to a disease pattern, or I see that a patient would like to have a certain DiGA or something, because this is then often much better accepted, because the insured person has a very specific need and then also has a higher motivation to develop this personal responsibility, so to speak, and has an interest in it themselves. And we have a very, very big opportunity in the so-called settings in which we are active in prevention. I'm putting it in a slightly nasty way, but I don't mean it like that, where people can't get away from us, to use this first contact opportunity to point out the importance of this topic and the benefits it has for everyone. We are active in prevention, in daycare centers, in schools and, and this would be the most important point for the company health insurance funds, and they are already very active in this, they use their proximity to their sponsoring companies, to their customer companies and to the infrastructure available there. There are often links between the company health insurance fund and the people in the company who are responsible for workplace health promotion, who are responsible for workplace integration management, who are responsible for occupational health and safety, in large companies the company medical teams, plus ideally personnel development, who of course also have to do with the subject area, so that the topic of digital health literacy is incorporated much more specifically into the preventive health promotion offers. Because the workforce listens to you. There is often a high level of trust when they say that it's our company medical team, our employer and our health insurance company that are offering services and providing information, and if you manage to arouse interest and you have the first point of contact, then this can also flow into further services. Exactly plus that as the very last tip. I think we really need to look systematically, not just at patient training in the DMP programme, at the funding criteria that we set up for the self-help organizations, in our prevention guidelines for health insurance companies, in every training curriculum, from nursing assistants to highly specialized

nurses in the study courses for doctors, and so on. It really has to be incorporated everywhere, and then I believe that, overall, by anchoring this topic everywhere, we could really, if [X] or her successors continue this survey at some point, perhaps we would finally see the curve go up. #00:25:20-5#

13. Interviewer: Yes, okay, great, thank you very much. Then we are actually through with the questions. Finally, I have one more statement that I would like you to complete. In other words, I would start reading out a sentence right now and then you are welcome to complete it. It doesn't have to be. There's a bit of creativity in the questions now, but it won't be too difficult. Okay, the sentence would be, in ten years, the digital health literacy of people with statutory health insurance in Germany. #00:25:48-2#
14. Speaker 1: Be as natural and important as the annual dental check-up itself. #00:25:59-4#
15. Interviewer: All right, thank you very much. Then I would like to end the recording, so if you have any points you would like to make that have not yet been addressed. #00:26:09-4#
16. Speaker 1: No, I actually think that if everyone got all the points that I had in mind. Yes! #00:26:19-7#

APPENDIX 10. Expert Interview 9**Expert Interview 9 (EI9)****Profession: Social health insurance****Date: June 09, 2023****Gender: male**

1. Interviewer: What factors at the political and social level are really important for promoting digital health literacy among people with statutory health insurance in Germany? #00:00:10-5#
2. Speaker 1: Yes, well, I would say that there are three aspects that are important for this. First of all, in general, you probably have to assume that digitalization is perceived as something that is happening, will happen, will happen progressively, something that has not been chosen individually somewhere in an organization, in an industry, in an area of individual people. That is such an important basic perception that you have to take into account, that is an important factor. There are often three variants of the general political picture: the Chinese variant, which is always warned against, i.e. an authoritarian apparatus, an authoritarian state structure, which basically forces everyone into a kind of transparency, which then and so on and so forth, I don't need to go into the images associated with this now. I'm not talking about foreign policy here, but about the image that is being created. Of course, this doesn't just apply to China, but people are worried about transparency, being spied on, being monitored and so on and so forth. The second image is the ultra-liberal one. The USA is somehow a striking example of this, i.e. very strongly privatized systems. Everyone offers something. So there's a cornucopia of things that are all marketed and then end up being expensive and somehow nobody can see through it and everyone can do what they want, to put it bluntly. And then, that's the political picture, the EU is the best of all worlds. The EU is, so to speak, data security, data protection very strong, individual liberties very strong, yet relatively strong social security and collective guarantees, universal coverage and so on. The European social model and so on and so forth. So we have to work on that now, and then it will become very strong... But digitization, that all sounds good, and there are many initiatives at EU level, of course in the member states, then (?) and at the same time everything is becoming very complicated in the health data space and in parallel, but in principle we are committed to the European model. But there is also a commitment "from outside" in quotation marks, in a sense from outside above somehow, because it is always said that we have to do this, otherwise the American companies will come or something worse. So that's one important factor, and I think the second, which is more about the individual

perspective of the respective subjects, is to say, well, I think everyone uses digital, everyone has a smartphone, and of course that's not true either. But of course that is somehow progressively true, somehow even senior citizens use it perhaps for shopping, for information, for travel bookings, and let's say the age groups that now provide and are of course initially particularly relevant use it, and at the same time everyone is somehow afraid and uneasy about it, I say, NFA, Snowden, Chancellor's cell phone tapped, and now you see the ChatGPT story, so at the same time there is always a high potential for concern when the AI guarantors say that this is the downfall of the West. Then somehow it's all very paradoxical, very contradictory, it's very, very difficult to get your bearings, that's a second point, so to speak. But a third point is, where is the healthcare system in all of this? Ultimately, it is somewhere dependent on this digitalization and has high hopes for it. It also has great concerns about it. It's not so different there than in other areas. At the same time, I think you have to bear in mind that there are, I think, "historically" in quotation marks, for example, genetic technologies, so anything goes in health, so to speak. You'll do anything for health, you'll put up with anything. On the one hand - on the other hand, this contradiction again. On the other hand, people are particularly worried. People are more worried about health data than their travel booking data, which is also very understandable. Well, when it comes to financial data, you can talk now, but it's basically understandable. So, these are, let's say, the dimensions and factors that I came up with in response to your question, which of course I didn't think up at the time, but these were the things that came to mind as important tendencies, so to speak, important fundamental factors that need to be taken into account, none of which make it any easier, of course. That's good. #00:04:46-9#

3. Interviewer: Okay, thank you very much. Which players in the healthcare system do you think are responsible for promoting the digital health literacy of people with statutory health insurance? #00:04:58-3#
4. Speaker 1: Um, well, that's a difficult question to answer. The typical answer is: somehow everyone, somehow everyone is responsible, everyone has their own roles, and that doesn't really lead to anything. So, it's not plausible, let's say only to a limited extent, that the health insurance funds should now offer something in this 20k SGB V. You can kind of understand that. There is a certain analogy with preventive services. That's also in the corner, somewhere in the statutory system. These are all very desirable things, and it's always difficult to judge in the discussion about non-insurance benefits, where does the task actually end? Where does it begin? We have these discussions in many places, BzGA processes, UPB discussions and so on. The whole prevention legislation was also a very, very difficult birth. It's supposed to work quite well. I personally have little insight into that. But in

principle, these are the areas where it goes further out. Of course, this also needs to be considered in the background, so to speak. There is also the Alliance for Health Literacy, where everyone sits together again. But then of course there's also the question of what that actually means in concrete terms, who actually has to do what. So it's not easy to answer who is involved. But of course the question also arises relatively quickly as to where the state players are, and I say, you've always written about statutory health insurance, of course, but what about those with private health insurance: do they also get digital health literacy services? We don't really know now. Well, now the question is, I've already noticed that in the topic. I'm not entirely sure at the moment, we have corresponding reporting obligations, but the first report exists, the second report does not yet exist. I don't have any more detailed information on that either. But there is, so to speak, the question that we asked ourselves at the beginning, about the task, about the legislation. These framework guidelines, which were relatively abstract, naturally made sense at the time, but the question was, where are the providers, what are the products, the services? What is a good course or a good offer to strengthen additional digital skills for whom, how does it work, what quality standards are there, who actually offers it? So that was actually still a major problem for me. Promoting, so to speak, we should promote, of course you can always promote if there is something good there that you can also promote. So, and that didn't seem so clear, some health insurance companies, which are of course the larger ones, that's also somehow clear, have then set out on their own to develop something with partners. I don't know the current status, but that was indeed the case, and it was also understandable that this was somehow a difficult point. Of course, if you now - and this actually leads into the next question - that's the problem. Perhaps we should leave it at that. Maybe I'll tell you what the other players are doing in the next question, where the question comes up of how they should cooperate or something like that. #00:08:11-2#

5. Interviewer: Yes, exactly, the next question would be, what role and responsibilities do individual players have to assume to promote digital health literacy in Germany with statutory health insurance? #00:08:24-0#
6. Speaker 1: Exactly, and the question is, if this is a very general requirement for the people, the insured in the future, and the insured are now 90 percent, then this quickly leads to the question of what kind of basic image is required, then the task is, of course, if an individual health insurance company, now of course primarily after 20k, if they say here, yes, I want to enable my policyholders, so to speak, to use digital applications critically, but also productively, in whatever way, then the question is, what about the service providers, so you have formulated your text so beautifully, we need

more digital competence question mark exclamation mark, so that the insured can continue to move through the system well. Well, have they been able to do that so far? The problems are legendary, just mention the sector problem. Then there are the recurring issues: Specialist appointments, access, emergency care, which hospital, which services are actually suitable, guideline-based, there's a lot coming in. So it wasn't good before, or at least not ideal. Whether it will be easier now with digital is the question, it's a bit ambivalent, because on the one hand you can imagine that digital reminders (?) will also make navigation and orientation easier, so to speak. On the other hand, of course, a new element is added. I mean, up until now we've somehow talked on the phone, then we had email, now we also have this channel here, and then we can also chat. So whether it all gets easier and better is certainly important, and of course the digital applications. It all depends on what they are, even if it's the one that a lot of people are always talking about. These are all the DiGAs, the digital applications according to Section 39 or something like that and various other stories, i.e. the communication of the health insurance funds with the insured persons via websites, apps and so on and all these stories. So the question is, how does this affect the integration of care? And the doctors have already said that we want to be more involved in this. At the moment they are saying that they are not being used enough and so on. So the question is, isn't the GP, the general practitioner, so to speak, also somehow responsible for, let's say, digital health literacy, or maybe we'll find out what that is in detail? So far, I've left that out of the equation, but I've looked at it as one pot. That's how digital it is, competencies, we'll get to that in a moment. But then the question is, so to speak, are they not totally important, or are they not important at all, but the insured people arm themselves and then march off with it somehow, navigate the system and then critically evaluate what the individual players offer them, i.e. the service providers in particular, these questions are actually not really clarified for me, because it is also not completely clear what exactly digital applications do. They can do everything and nothing, I'd say, so you have to look very carefully at what this application is supposed to do, the roles actually depend very much on that, of course, and the responsibilities for funding and support also have to be clear. #00:11:45-5#

7. Interviewer: Would you say that you have just said that the patients can then also provide themselves with ammunition and that the whole issue is taken into account? Would you say that they also have a personal responsibility in this area? #00:11:55-8#
8. Speaker 1: Well, that's basically always the case. Well, there's always the problem that a professional system, let's say, yes, it always assumes that

clients have a certain attitude, certain orientation, certain knowledge, certain needs. This is somehow assumed at first, and there are always social developments that call this into question. That comes out very clearly, for example, in this emergency discussion, the misuse of the hospital emergency department? Yes, you can of course scandalize it and say, why don't you go to a GP first, that's what they're there for, not to the Charité outpatient clinic? Yes, then people say, well, Charité outpatient clinic, always the best doctors 24/7, I know where it is. That's not exactly where I go... so you can say "oh oh, it's not designed to conform to the system", but it's also a vote on my feet somewhere, my personal attitude. And then there's the whole question of digital diagnostic apps and so on, or the possibility of making appointments online. So that also changes structures. There are of course other issues, the feminization of the medical profession, work-life balance, generation and yet (?). And you can see that there are social developments that will of course also challenge the system. They already exist, and they also have a certain legitimacy to negotiate the boundary where you say, what do I actually expect, what does the client, the insured person, have to bring with them now, and what else do I have to give them? This is not fixed once and for all, but is somehow dynamic, and digitalization certainly plays a major role here. You can see that much more clearly in other legal systems than in Germany. So especially in those that don't have such dense, relatively dense structures, it plays an even greater role. But here, of course, the question of these boundaries is of great importance. Let me put it like this. #00:13:53-0#

9. Interviewer: Okay, thank you very much! If you review the points you have just made, what do you think? How can the promotion of digital health literacy succeed with statutory health insurance in Germany? #00:14:06-5#
10. Speaker 1: Yes, well, that's the question. That brings me to the point I just alluded to in the abstract. What is that actually? Digital competence? I think we see a lot of that. I see a lot in discussions on the subject that this is more or less unintentionally confused or that different things are being confused. There are basically three elements, I would say, one is health literacy. People are able to perceive health information, critically evaluate information, use it for themselves and act accordingly. You can now present a digital version, and there are also voices that are not wrong to say, yes, it's all digital, so of course it's not true. Does the G-BA still have leaflets? The health insurance funds have to establish legal bases for us alone, write to the insured by letter and so on. And then this whole scandalization, fax and so on, that's this track, so to speak. Nevertheless, most insured people today, when they are looking for healthy information, will look for it online, via an app or in the classic way via a web browser on a PC, which is perhaps more likely to be done by a generation that is not quite young, because they had

their first PC 20 years ago and so on, so that's how it works somehow. But is that why digital health literacy is special compared to analog health literacy? That's the first point. But is that what is meant, or is it something else? Doesn't it mean "dealing with newer digital gadgets, applications, such as, of course, the ePA at the top of the list, which hardly exists yet, but it should exist, the DiGAs and what I said, health insurance apps and so on, other things, so dealing with them, that's something else. If I search the Internet now, somehow preferably on IQWIG health information, what do I know? The father needs an operation somehow, they told him this and that. He calls me and asks me, is it reasonable what the doctor is telling me, yes, then I'll look there somehow, well, others might look somewhere else. But in principle, somehow it's quite different from saying I'm taking a DiGA for my migraine, I'm keeping a diary, I'm writing things down, if it goes well, I can then discuss it with the doctors treating me, they can look at it, they can evaluate it, they can draw conclusions from it, it's not trivial whether it works well. That's a completely different story, I'd say. So the question is, so to speak, is that the competence of using such things and before that, of course, the critical evaluation, is this app any good for me, this DiGA or not, or do I find it stupid, or do I want another one, or do I need the other one? That's a different question. I think that's a different question than not quite a different question. But that's a different perspective. And the third, of course, is that the legislator has specifically excluded this general digital competence at 20k, which is absolutely right. It can't be a SHI task, because that's clearly stated in the law. But of course it plays a major role, as I said at the beginning: general attitude towards digitalization tools, processes and so on. Do I even want that? Somehow I'm not afraid that data will flow out, that I won't be able to cope with it and make mistakes or that I'll have to do it and then not be able to see the doctor because I have the app, and then I won't need it anymore. So to speak, that's the discussion here, these health apps, these depression apps, other psych apps, I'll abbreviate them now, so they were always a bit unclear, is this a bridging solution? Is it a supplementary solution, is it a substitute solution for medical therapy, for psychotherapy, psychotherapeutic treatments and so on? Well, it's always a bit of a mixed bag. So, these are the aspects and that... well, we are health, but this general attitude towards digitalization, so to speak, that also plays a big role and is it about competence in this area? #00:18:13-9#

11. Interviewer: And what do you think? What is the role of collaboration between healthcare stakeholders to promote digital health literacy? #00:18:22-6#
12. Speaker 1: A very limited one at the moment. So the question is, I think you have to broaden the horizon, so to speak, I think you have to think about what role digital health literacy and its creation or strengthening plays on

the whole? I think many insured people, and service providers too, have completely different problems. I don't think they see their problems in healthcare in the fact that they are not digitally competent enough. They have much more fundamental problems that a certain type of digitization application is supposed to help with. That is the case. But I don't think that the majority of people who perhaps say, old topic, specialist appointment takes forever, I can't get it, difficult, are there appointment service centers? Okay, I don't know exactly whether it works now, so I think, oh, if I had an app now, that would be much better, but then I could find appointments faster. So, I don't think that's a realistic way of looking at it, or, as I said, you can talk about it in an emergency. That's where we're closest to the issue in primary care, but otherwise there are a lot of problems: People ask, which hospital should I go to, or should I go to the hospital at all? Should I have the operation now or not? Is it really good if I take the medication long-term, or can I stop taking it, or what did the neighbors say, somehow about the rehab facility? Should I go to them? All these things. I don't think people today have the impression that digitalization will solve these problems. You have to look at the context: solving structural problems, let's say, with digital applications probably won't work - that's my assertion - other instruments are needed. So that's what I think, at least. #00:20:11-4#

13. Interviewer: What instruments would that be, for example? #00:20:14-1#
14. Speaker 1: Well, all the structural reforms that are being discussed, well, I can't go into that in detail now, but of course these are structural reforms and this cross-sectoral cooperation, which in my opinion does not fail because you can't exchange enough data. But that's not the core, the core is sectoral interests, financial flows, familiar processes, familiar procedures, so to speak, that's quite clear. #00:20:41-0#
15. Interviewer: Okay, but then I would still like to refer again to possible measures to promote digital health literacy. Do you see any measures that could help to ensure that the whole thing works successfully in the future? #00:20:56-5#
16. Speaker 1: Well, I think the first thing is actually that you have to be clearer about what you mean by digital competence, all the aspects I mentioned earlier are probably important. But they need to be sorted out more analytically and practically so that we know more clearly what we are talking about. That would be a relatively important measure, to know who is responsible and what can be done. I don't see the strengthening of general health literacy primarily as the central SHI task, but of course it is still very, very central to the use and sensible use of healthcare and medical services in a broad sense. Somehow, we have been working on this for a long time, evidence-based care, shared-decision-making, eye level, of course we need a lot for this. It takes a lot, and even relatively well-educated people find it

difficult to remember what they've heard in the last ten minutes at the doctor's office. So, that really is a very basic story. The second is the knowledgeable and productive use of digital applications. Here, of course, I see the manufacturers and providers as being very much in demand. I have to say, the mantra that it should be target group-oriented, with target groups, peers and so on, should then be made and developed. Whether this is reality, question mark, this whole DiGA regulation, whether it works like this, it is, so to speak, in the core area of such things. In my opinion, there are big question marks as to whether it will work. I can't go into that in detail. But I believe that this is of course also a very big problem for the provider side, what they can deliver to us, what we should then finance. The third aspect of the general focus on digitization, which is of course now really far outside the SHI system, but here you have to be critical as to whether concrete measures should be taken. In internal discussions, when we talk about data protection, I also hear people say, yes, we can't solve it like this, we have to close our eyes and get on with it. So I can't say that with the app or with the application, no one can say today who is listening in, and then this dark side comes in, but then sometimes in discussions it becomes..., if we want to clear this up first before we start, then we can leave it alone. So that's gloomy and not very pleasant. But that seems to be an attitude that not everyone is aware of, of course, and it is also a very strong push. Take this current story again. It's very impressive, because suddenly something comes up that nobody was talking about before. Suddenly everyone is talking about it. Yes, how are they going to prepare for it? And I say, where are the experts? Of course, there are experts, but it's the same as we had here (...?), how well can people correctly assign statistical facts, and doctors are not much better than the average consumer, who is at least comparable in terms of education and whatever else. So that's difficult even for experts, and I think it's the same with digitalization. Where is the expert who can explain to me how ChatGPT works, whether it's dangerous or not? I'm just as open about that. So what am I supposed to teach people? I don't know what I'm exaggerating a bit, they already understand. But of course, with a simpler app you can present it much better and so on. But that shows very clearly that technological leaps and developments are taking place here that are not yet really foreseeable, and of course it's difficult to prepare people for that. In a well-intentioned course system, i.e. in a more concrete way, I can't do this promotion story right now, and you have to take a general view of it. But I think you also have to somehow prescribe a certain modesty here and say, well, you can't expect to completely improve the world now with a SHI-centered, quasi educational mandate, somehow in specifiable periods of time. That's pretty hubris, it's difficult to achieve that in a field like this, that's clear. #00:25:29-2#

17. Interviewer: We are now through with the questions, but I have one more sentence that I would ask you to complete. It wasn't in the questions either. That has required a bit of creativity so far. If I read out the sentence now, you are welcome to finish it: Um, in ten years, the digital health literacy of people with statutory health insurance in Germany. #00:25:50-6#
18. Speaker 1: Be a bit higher than at the moment. #00:26:00-4#

APPENDIX 11. Expert Interview 10**Expert Interview 10 (EI10)****Profession: Social health insurance****Date: June 02, 2023****Gender: male**

1. 00:00:00
Interviewer: Okay, then the first question would be: which factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany?
2. 00:00:13
Speaker 1: First of all, it is the legislator who, with his specifications in the Social Code, makes clear what requirements are placed on the individual health insurance funds and what objectives are to be achieved for insured persons. Paragraph 20k regulates the obligation of the health insurance funds to make an offer available to all insured persons. That would be the first level. The implementing or implementing provisions are regulated by the National Association of Statutory Health Insurance Funds, whereby I would like to point out that the specifics are of course not conclusively set out in a law, but require further explanations from the players and also further, continuous adjustments. Thirdly, I believe that the monitoring by the ministry, as provided for in the law, for example the two-year reporting obligation, is also important, namely to create transparency about what has happened in this area. We can discuss later whether this is already the case today, even though the two years have long since passed. But that would first be the legislator in terms of standards, then the specific content design by the National Association of Statutory Health Insurance Funds and other professional associations, and monitoring by the Federal Ministry of Health. What is also needed, and what is not currently available in my view, are more far-reaching definitions of the qualities of digital health literacy. So what do we mean by this? What is important when we spend money on it? We should be clear about what the minimum requirements are for such programs, and the question is how we evaluate them. One is the definition of quality, and believe me, from experience with the benefit assessment of many other procedures, evaluation is a completely different issue, and these are the points that come to mind in response to your first question. Everything is not yet conclusive and satisfactory would be my thesis.
3. 00:02:45
Interviewer: Do they still have social factors that they consider important? So society also has to adapt.

4. 00:02:54
Speaker 1: Well, you are now asking me what the statutory health insurance should do about this. We have a clear mandate today. This is valid, without judging the development further. So even if there are other developments now, they will not reduce the statutory mandate, but it must be accepted by law. We no longer have any requirements, and we would assess this as a health insurance fund, we still have a law, and a law has its appeal, and since you are asking me what factors are decisive for implementation by the statutory health insurance, these are not further legal developments, but what the legislator already standardizes today, what we define in consensus with others. And I believe that we are sufficiently oriented in this respect. If we were to recognize that there is a need, we now have Chat GPT now, to my great surprise, yes, that does not change the obligation to digital health literacy, and we have already defined this before, that such developments should also be the subject of funding activities.
5. 00:04:23
Interviewer: Mhm that, that fits for me at first. Okay, then the second question would be related to the actor level. Which actors in the healthcare system are responsible for promoting the digital health literacy of people with statutory health insurance in Germany?
6. 00:04:41
Speaker 1: So the responsibility qua law lies with the individual health insurance companies, so the actors of those responsible, whom they must address, are the individual health insurance funds with their associations, which have defined the so-called details. The central association has further specified the implementing provisions, and the health insurance funds must implement them. At a normative level, I believe that the legislator, who has defined the framework conditions, should be named at the meta-level, if you like, and I would like to differentiate between the education providers, who can be commissioned as the operational level, that is an implementation level, and they will certainly not be named as the central responsible party.
7. 00:05:37
Interviewer: Do you think that there will be other actors involved, apart from those you have already mentioned, which are already enshrined in law?
8. 00:05:47
Speaker 1: So, we come back to the role. I believe that the integration, and integration also means the cohesion, the interaction, the discourse of the actors must be intensified. And in my view, these are sufficient to develop the topic further, but we don't yet have this integration.

9. 00:06:12
Interviewer: So do you think that doctors and patients themselves, for example, do not bear any responsibility now?
10. 00:06:20
Speaker 1: So for the implementation, the law, the participation. You have to involve them, but that goes without saying for all activities. But if that doesn't work, then I wouldn't hold them responsible, but the responsibility, as I said before, lies with the legislator, who has imposed it through a law and now responsible for the implementation, for the offer, are the aforementioned health insurance funds and health insurance associations. In order for it to be successful, it has to be designed in the same way as all good projects that turn people into participants, it has to be needs-based, it has to be up to date, it has to fit, so it has to be constantly adapted. That's part of making sure it's a good offer. But I would like to make it clear that the responsibility for the success of this lies with the insurance companies, and they cannot delegate this away and say that the insured person was too stupid, I'm exaggerating, or wasn't interested. I think that if you are asking about responsibility, who is responsible? Then it's those mentioned.
11. 00:07:32
Interviewer: All right! Then I would like to focus more on the role and responsibilities. What role or responsibility do the individual players have to take on to promote the digital health literacy of people with statutory health insurance in Germany?
12. 00:07:48
Speaker 1: Well, that also ties in with what I said before about the different levels. So if I repeat that, the standardization, the framework must be provided by the legislator. The legislator has the normative role, the associations of the health insurance funds have the concrete role. This also results from the law and the concrete implementation by the health insurance associations, as I said before. But perhaps the new thing where we also see a deficit today, from my point of view, is that the involvement of the stakeholders, the network, as you formulated it before, is still very narrow and therefore consensus building is necessary to get a common understanding of what digital health literacy is. There are still different shades, if not fundamentally different understandings, that a more intensive discourse is being conducted here with the aim of building a consensus. Today, this is a role that the players are not fulfilling. I continue to see it as a role when they ask what needs to be done to do this well, to do it well, that we cannot conclusively describe this dynamic field of digitization by means of a curriculum, what belongs to digital health literacy, but that will always be done according to the new offers, I said earlier that Chat GPT is suddenly surprising for many, it's not really surprising, but nevertheless we have to be prepared for the fact that we will always face new challenges in the digital

world, which will then have to be answered by this question of competence. This is the issue of further development, and therefore, if you ask me about roles, this is actually an urgent function, because if the offerings are not dynamically updated and are perceived as cold coffee by insured persons, then we have no participation. Then, above all, we have not dealt with the issues for which we urgently need this competence, because, as a small digression: the acquisition of competence is not only an educational mission, but it also has certain functional backgrounds, namely to optimize digitization in health care, perhaps even to make it possible for the first time. And digital health literacy as an enabler for the use of new applications; digital health applications, care applications and therefore we have to face up to the task of ensuring that the structure, the curricula, the content of digital health literacy are always updated and this role of further development is very important and is not perceived anywhere in my estimation.

13. 00:11:02
Interviewer: Mhm, you've already touched a lot on the topic of the next question. So, how can the promotion of digital health literacy among people with statutory health insurance in Germany succeed? What I've heard now is that, on the one hand, there is the issue of cooperation between the stakeholders involved, but also the further development of information services. Are these the points that you see and are there any others?
14. 00:11:27
Speaker 1: I would like to emphasize once again that it is about a common definition. In the end, strengthening and deepening understanding is always a consensus process. There is no right or wrong, it simply has to be found by consensus. You can also develop it further. And that would be this issue of discourse. So we need a more intensive examination of this connection, as you said, with the aim of reaching a consensus and developing it further. I have already said this on two points, and I will repeat it, but because it is so crucial from my point of view, what are good offers for promoting digital health literacy, what are the five central, most important criteria and, correspondingly, how do we want to evaluate this? How do we measure the effects? How do we measure the benefits of these new services? These are tasks that we need to complete in order to make progress.
15. 00:12:28
Interviewer: Mhm, okay, then I would move on to the fifth question. This is about what measures, such as training courses to promote the digital health literacy of people with statutory health insurance in Germany, should be established in the future?
16. 00:12:46
Speaker 1: They must be measures that respond adequately to the challenge. They have to be effective, they have to be efficient. In this respect, these

measures can never be defined conclusively, but are the result of a continuous development process, if you ask me what you have just done today, what TK is doing about this: We have developed a standards-based quality grid that describes exactly how we assess and evaluate digital health or competence services today and how we would also evaluate them. I have made the documents available to you, which would go beyond the scope of this report. But that is the central question, which is why you are asking it. And it needs answers, which we have provided with the publications, and it also needs further discussion. I think that's what I wanted to say before, that the stakeholders need to enter into an exchange in order to reach a consensus. In this respect, the TK's contribution to the discussion has been published and is available, and we need a more in-depth understanding of this.

17. 00:14:04

Interviewer: Mhm, okay, then we are actually done with the questions, but I have one more sentence that I would like you to complete. It wasn't included in the questions, so a bit of creativity is required. If I were to ask you now, how would you complete the following sentence? In ten years' time, the digital health literacy of people with statutory health insurance in Germany...

18. 00:14:29

Speaker 2: Have a much higher level than today and be understood as a self-evident requirement of the insured to the health insurance funds and be understood as a self-evident offer of all health insurance funds to the insured.

19. 00:14:46

Interviewer: Okay, that worked out very well. Thank you very much.

APPENDIX 12. Expert Interview 11**Expert Interview 11 (EI11)****Profession: Social health insurance****Date: June 27, 2023****Gender: female / male**

1. Interviewer: Exactly the first question would then be, which factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany? #00:00:13-5#
2. Speaker 1: I believe that the whole topic can first be broken down into three sub-aspects. On the one hand, it generally requires digital literacy, it requires media literacy and it requires health literacy, and the whole thing is best summarized as digital health literacy. But these three sub-aspects can also be found at different levels in politics and society. There are also these social issues such as fear, a sense of security and also this self-confidence that people need, versus a white coat mentality, if you like, in other words this feeling that "I am responsible for my own health and I won't leave it to the doctors and physicians. This is also anchored in society and can be changed by addressing all of the topics I mentioned earlier - digital literacy, media literacy and health literacy - at an early stage in education. That puts us more on a political level. So some things are socially distributed and develop socially, um sociologically, and other things are influenced by politics, and theoretically you can start with these three topics at nursery age, in education, and then I have to carry that through into education. #00:01:35-2#
3. Speaker 2: I would extend that a little further. So, we need digital competence overall, regardless of the healthcare sector. When will we be rewarded with modern treatment methods? When we have problems, and then it's simply too late to tackle the issue of digital health literacy alongside the issue of health problems. So it sounds plausible, and I also advocate that we bring digitalization and digital competence forward in a way that integrates healthcare. But this relates more to chronically ill people, i.e. people who are undergoing a long-term treatment process. For people who only need it once or very sporadically, it is of course difficult to think about developing digital skills in such an escalation, and the legal regulations for health insurance companies state that this cannot relate to general digital skills, but specifically to the topic of health, and that highlights the social challenge, this separation, and I think, as [X] said, the topic of digital literacy and health literacy need to be included much earlier in education and perhaps

also touched on in many other places, as well as data literacy. That's the next problem. Today, we are only talking about the use of health applications, but we will soon come to the problem of data sharing and data use and so on, and we will face the same challenges there. That's why I think we need to incorporate this more strongly into education and start much earlier, as [company] is already doing to some extent. But we also need similar regulations in other areas that simply involve people in the system as a whole and don't just address specific problems. #00:04:00-7#

4. Interviewer: Mhm, okay, thank you very much. Then I would move on to the second question. Which players in the healthcare system do you think are responsible for promoting the digital health literacy of people with statutory health insurance in Germany? #00:04:15-3#
5. Speaker 2: Well, I think in principle you can include everyone involved to a certain extent, including occupational medicine, including pension insurance, including accident insurance. This is not the sole responsibility of health insurance. The topic of health is very multifaceted. In the end, we can also think about whether the medical profession or at least the professional associations, whether these are the medical associations or KVs, are not partly responsible, and if not to the entire population, then at least to their own members or the people they represent. From our perspective, we have to say clearly that this is not happening today. Doctors are left to their own devices. Whether the professional associations do this consciously or unconsciously is not entirely clear to me, but at least it doesn't happen, and then, as I said, you can take it much, much further, so sports clubs can also get involved in the topic of digital health literacy. We have rehabilitation sports, so when people go to rehabilitation sports now, the question will be whether it could be either replaced or at least supplemented digitally in the future, and then these would also be places or an environment in which digital health literacy can definitely be taught. I believe that each of these players must be involved in the end. I think we have to look at this from the perspective of society as a whole and, of course, it's relatively easy for politicians to place this in the hands of the health insurance funds by law. That's where the money is, in theory. #00:07:12-3#
6. Speaker 1: I have one more point to add. Well, I think that we as health insurers are quite happy to act as guides, or see ourselves as such. That's also fine, because you also have to ask yourself the question, when do you have to deal with the health insurance fund and when do you want to deal with the health insurance fund? Mostly when you're ill. But we have to reach everyone with it, and now of course you can set up great prevention programs. That's what we've done. I think we've also done it in a clever way, with "Durchblickt", where we approach schoolchildren. But in reality, we simply need more players in this role, because otherwise we won't reach

everyone. So from the point of view of user-centricity, we have to go to where the people are and make sure that we also offer the services there. For example, we now know that women make more use of prevention programs than men, and there are different aspects that need to be taken into account. I can't simply offer a prevention program for everyone and then hope to get everyone competent. So that's why it needs more, and people have contact with their doctors and physicians, especially at a young age, the teaching staff, and so we also have to approach these people and take them along so that it can work. #00:08:23-5#

7. Interviewer: Mhm, I would like to ask another question, namely, do you believe that patients also have a certain personal responsibility, or are they also responsible for strengthening their own health literacy? #00:08:36-9#
8. Speaker 1: Yes and no, so from my point of view, yes, of course, you have your own responsibility. But if I put a society in a situation over the years where it has this white coat mentality through and through and gives it up completely, then I can't suddenly say, and now you're responsible yourself. I think you have to slowly turn it in that direction. But I can't now say that you are completely responsible for yourself. In the end, of course, you are legally responsible. But socially, I think we still have a long way to go. #00:09:11-6#
9. Speaker 2: Exactly [X], described that with yes and no, I would say yes, but. But that mainly refers to the fact that we have a system in which there are no incentives to behave healthily or to use digital channels. So, if we have a fully comprehensive system, theoretically, in principle everyone is entitled to everything, without co-payment, without discount, without whatever, then there is no need to look at new solutions. And that would also be important, that in future we perhaps create tariffs or models in which people are not penalized, so to speak, for not using something, but rather incentivized in order to still have enough resources to be able to treat those people who cannot. So it's important that we also try to achieve this in a structural form, and not just through legal requirements or this and that, but that the system also promotes the acquisition of digital health literacy. #00:10:31-8#
10. Speaker 1: That means a bit towards the prevention model more than treating the sick. #00:10:39-3#
11. Speaker 2: Yes. #00:10:39-8#
12. Speaker 1: Yes. #00:10:40-7#
13. Speaker 2: Or, for example, we advise on the GP model, and now there's the option of undergoing a symptom checker beforehand, so that you inevitably end up on a digital track. We also offer this with our teledoctor. But it's not a systemic incentive like in Switzerland, for example, where you have telemedicine tariffs where you commit to using digital assistance models before you can physically go to the doctor in return for a reduction in the

- premium. So, in the end, that also helps. It sounds a bit like coercion, but sometimes you have to make people happy. #00:11:30-4#
14. Interviewer: Okay, then I would like to take up this topic of roles and responsibilities again. You have just briefly outlined what you would like to see from the individual actors. What do you think the actors you mentioned know that they would theoretically have such a role, and how do you think such a role could be strengthened if it is not yet so well known? #00:11:53-5#
 15. Speaker 2: Well, the awareness is already there, that's my understanding, but we are very political, so in principle doctors want patients to be responsible and health literate. But in the end, it plays into their hands if they are not, because then they can keep up their demands. This is also partly the case with us, where we say that we want patients to be responsible, but we are also afraid of what would happen if they understand too much and know too much. That's always a part of it. So the awareness is definitely there, but the will is lacking from my perspective. The awareness is already there. But there are players who don't yet see themselves where I would see them, for example occupational medicine. All of a sudden, company doctors are now involved in the topic of ePA. This means that these aspects also play a role for some, but not all. So most of them know. #00:13:34-3#
 16. Speaker 1: Um, I would like to add the aspect that, on the one hand, we still have doctors as gatekeepers at the moment, we need them to get people on board. I would also include pharmacies and actually all service providers that people deal with, and some are quite aware of their role. We also hear and see time and again that they even actively speak out against digital topics being used in some way because they then say they would have more time for their patients. However, this is sometimes also due to the fact that they don't yet see the benefits in the products. This puts us back in the role of ensuring that the products, i.e. the digital services, are good enough to benefit everyone. We are not there yet with ePA, partly with prescription, and with ePrescription it works a bit better, but still. This is where politics comes into play again, as it sets some of the requirements. This is where the manufacturers of the apps and solutions come into play, and again, we are then back to the PVS manufacturers, who also have to create the appropriate connections so that doctors can and want to use them. That's the only way to get them on board. So, it really is a network of so many aspects until we can get everyone into the roles they need to play in order to make progress, which is what makes it so difficult. You can't single out one aspect and say, well, if we turn the screw, then it will work, because there's still so much going wrong, simply in this network, so to speak. #00:15:12-8#
 17. Interviewer: Yes, okay, if you perhaps summarize the points you have just mentioned in your head, what do you think? How can the promotion of

digital health literacy succeed with statutory health insurance? #00:15:26-2#

18. Speaker 1: Well, user-centricity is always on my mind. If we really asked ourselves how to get digital health literacy to people and everyone did that, then we would probably be able to generate solutions that work. But we're so busy with politics, with all these issues around it, some of which you can't even see and grasp, that we don't put user-centricity at the forefront, because then it would work from my point of view. #00:15:59-8#
19. Speaker 2: Well, I personally would say that we need to make this part of normal school education, so start early: Um, then that would already grow over the next generations, a bit further into the care system. And the second thing is that we have to think in terms of integrating it into the care system, and that basically means that we now have a DMP program. Yes, well, a DMP program has fixed components, and there is always patient training at the beginning after enrolment, for example, and the use of digital helpers, of digital assistance systems adapted to the respective clinical picture, must simply become an integral part of this patient training and then flanked by appropriate apps and so on. But we have to think differently than we have so far. So far, the focus has been more on the clinical picture itself in the DMP and less on the possibilities that digitalization offers, and in principle this should also be the case with other offers, whether these are pilot programs, where you currently interact a lot with people, but in the end you can't actually scale that. So, if a pilot has introduced me to a program, then they also have to explain to me which parts of the support will be provided by a person in the future and how much of it will perhaps be provided by software, an app or whatever you call it, so that people don't see it as an add-on, but as an integral part of this support program. At the moment, we tend to make a bigger story out of it than it actually is, and that also scares many people that this personal component will be neglected again, i.e. in terms of care integration. #00:18:26-6#
20. Speaker 1: Maybe you can also use those who are already digitally competent anyway, maybe not in health, but just like that. Maybe you can also use them as multipliers and, assuming that they are simply fitness tracker and lifestyle health people anyway, somehow use fitness trackers and somehow jump on this bandwagon at a very early stage. Maybe you can also harness them a bit, I say, in front of the cart and put them on it and start with those who are already there anyway. They'll also bring that into society to a certain extent. So maybe I don't have to start with the states where the resistance is highest, but I'll start with the people who are already interested in it anyway, even if it's still a lifestyle issue for them because they might not be ill yet, and then we'll bring it in through them. That would also be

one approach. I don't think we're doing that enough at the moment.
#00:19:21-8#

21. Interviewer: And do you think that in order for the whole thing to succeed, i.e. the promotion of digital health literacy, in order for this to succeed, does it also require stronger networking between the players in the healthcare system, i.e. between health insurance companies and doctors, stands, representatives and so on, or is that already sufficient? #00:19:40-4#
22. Speaker 2: What does networking mean? Well, we talk about networking all the time. It's important that we work hand in hand and not necessarily networking. Networking is not enough, yes, so... #00:20:21-5#
23. Speaker 1: Above all, the networking is actually there when I think about all the committees, meetings and exchanges. It's all incredibly complicated and happens very intensively. But what follows from that is a bit of a delta. This wonderful overview of the healthcare system somehow floats through the digital spheres, where these millions of players are somehow shown, and that it somehow can't work that way... That's kind of clear. In this respect, I don't know whether it's simply networking, whether it perhaps needs more structure and common goals, because there are different goals everywhere, and that's a bit of a problem, because they're in conflict with each other. #00:21:07-5#
24. Speaker 2: Mhm. Okay, thank you very much. Then I would move on to the last question. This is a bit more specific, about actual measures to promote digital health literacy. Do you have any ideas? What measures should be established? #00:21:24-9#
25. Speaker 1: So perhaps a quick word about our own measures. We obviously think they make sense, otherwise we wouldn't be doing them. We have the "Durchblickt" prevention program. This is aimed at pupils, parents and teaching staff. That fits in quite well with the fact that we said we would simply anchor it in education at an earlier stage. That's just the way you can do it as a health insurance company. But it would actually be the right place for it in the curricula, as an additional element, so to speak, and not just in a prevention program in which only some schools participate. You have to make it user-centered. We are also out and about for older people and explain ePA, ePrescription and co. and make sure that we go through existing multipliers and get to groups that already exist, so to speak, that are established in communication, work together with "Deutschland sicher im Netz", for example, and specifically approach older people with the appropriate communication. In other words, these target groups, target group affinity in communication is totally important, and here again this user-centricity, to see where I have to start in order to reach the individual groups, and which ones I should perhaps reach first, so that the others perhaps follow

suit, we are back to the younger ones, who then explain this to their grandparents and so on. I believe that these social aspects should not be ignored, and in my view we need to start at a very early stage. With concrete political aspects in education, but also with measures like the one we have now launched with "Durchblickt". #00:23:09-6#

26. Speaker 2: There can be so many things. There are initiatives from social organizations that go into care homes. So there is a lot already there, but it has to start earlier than it is now. Today we are concentrating primarily on the sick, and in future it needs to happen much earlier, just like the approach in schools. And what else could you imagine? Well, I think we need to work much more with modern methods, as we usually do. Somehow video, podcasts, topics like that can also play a role. So, it doesn't always have to be a case of leading people by the hand and then showing them the app, but simply bringing the topics in. Um, what did Marcel Wiegand say? The eRecipe belongs in front of the news. So, it's always a question of where to place certain topics. How do I make people aware of them? Um, we know that the Tagesschau has also featured the topic of ePA before, but unfortunately with the wrong touch. So, they already know how to place topics and we still don't use it enough. It's not so much the task of the health insurance companies now, but rather of politicians to place topics. And yes, in principle you can imagine anything. Anything that is user-centered is good. #00:24:51-2#
27. Speaker 1: Yes, and in the end it also belongs on channels like Tiktok, because that's where the young people are. That means I have to work it up in such a way that it's fun and fits exactly into their world. #00:25:01-0#
28. Interviewer: Okay, thank you very much, then we are done with the questions. I would like to dismiss you straight away, but I would like to ask you to complete one more sentence. You are welcome to do this one after the other. That wasn't the end of the questions either. A bit of creativity is now required again. Finally, I would just start and then you are welcome to complete it. In ten years' time, the digital health literacy of people with statutory health insurance in Germany... #00:25:28-5#
29. Speaker 1: Only be subtly better, because we are finding it difficult to overcome the current interdependencies and structures, even though we are making every effort. But I hope that things will perhaps move faster. #00:25:48-0#
30. Speaker 2: This will develop further if we succeed in changing the structure of the healthcare system to some extent and emphasize the need for this topic more strongly. #00:26:06-6#
31. Interviewer: Okay, great, thank you very much. From my point of view, everything fits so far, and that's it for now. But I would like you to tell me

something else that is important, that you can think of on the subject, that you would like to pass on to me. #00:26:20-8#

32. Speaker 2: That's how it is, from my point of view, he buys everything fine. #00:26:28-0#

33. Interviewer: Okay, great, yes, then I would end the recording now. #00:26:31-9#

APPENDIX 13. Expert Interview 12**Expert Interview 12 (EI12)****Profession: Social health insurance****Date: June 16, 2023****Gender: male/ male**

1. Interviewer: Okay, the first question would be, what factors at the political and social level are important for promoting the digital health literacy of people with statutory health insurance in Germany? #00:00:12-7#
2. Speaker 2: Exactly, so in terms of the approach, it is good that the legislator has addressed the issue in its current form via 20k SGB V, that at least a certain allocation of tasks is actually present there. At the end of the day, we will discuss whether it is enough to allocate this via the health insurance funds. So addressing the issue in principle is certainly the right thing to do, but of course we need other aspects, and we are realizing that now. Of course, teaching digital health literacy can only work really well if you know exactly what you're teaching, and that's where there's a bit of a problem. Because so much is still in flux at the moment and we currently have applications that haven't really arrived in real life yet, it is of course incredibly difficult to provide insured persons with the right information. This means that digital applications need to be rolled out at a political level or at the level of joint self-administration so that we can communicate how they work, because there's no point in providing information and making great videos and then the people who watch the videos and want to use them end up saying that they don't work at all. In case of doubt, this causes more frustration than somehow teaching digital health literacy. In addition, of course, the issue of separating digital literacy on the one hand from digital health literacy on the other is actually relevant. Digital literacy is something that needs to be promoted more strongly, both at the level of civil society and at the political level, because this is of course something that we as a healthcare system alone cannot achieve if we first have to explain to people how to use their cell phone, smartphone or tablet, which is not originally our task and is, so to speak, a core hurdle at this point. In addition, in terms of a kind of political and social change, we must of course ensure that we see digitalization as something fundamentally positive, and I think we have always had major problems with this in Germany, in German society anyway, when I think of how it is viewed in Scandinavian countries. There, the benefits are often seen first and foremost and not immediately the problems and data protection and everything else. Um, because if we want to teach digital health literacy to people, if the first thing they always think about is "What happens to my data if it gets hacked", then of course we won't have

a positive user experience or any positive thoughts at all about what digitalization will bring in terms of positive points, and yes, people only deal with points or issues and topics if they also expect a benefit for themselves. Maybe that's the first thing. #00:03:59-3#

3. Interviewer: Okay good, then that will work for me so far. That answers all my questions for now. From your point of view, which players in the healthcare system are responsible for promoting digital health literacy among people with statutory health insurance? #00:04:19-2#
4. Speaker 2: Exactly, so the question is, do we have to focus purely on those with statutory health insurance? In fact, this is something that should also apply to those with private health insurance. Of course, we would see the health insurance funds as a relevant player, because we are the only ones who have a direct line to the insured and can, so to speak, pick up the insured in the various constellations, be it in the area of prevention, in the area of curative treatment, be it in the various sectors. That's why it certainly makes sense for us or our member health insurance funds to play a correspondingly large part in this. But beyond that, of course, digital health literacy can only work if the respective service providers in their respective settings also take on tasks or at least have a positive attitude towards digitalization in the healthcare system. We see it mainly as our part, if only because we naturally also see the framework conditions for service providers and we see a shortage of specialists, a shortage of resources, including among doctors. It is of course understandable that, with all the tasks that exist in these settings, it is not possible to offer separate training courses for patients or similar, but a positive view of the developments and also the possibility, or so to speak the objective, of making it easy for patients in the concrete implementation in actual practice. This is certainly something that is important, and of course - these are not direct players in the healthcare system - but the providers of the relevant software systems naturally play a relevant role, because if our goal is to implement digitization in a way that is as patient-friendly as possible, then it is of course important that the relevant providers also make products available to doctors' practices, other service providers that are actually easy to use and perhaps also contain certain learning elements that can be used to strengthen digital health literacy for the insured, but also for the healthcare professionals, who also need to be trained in this area.). #00:07:17-7#
5. Speaker 1: Exactly, perhaps if I may also briefly interject here to make it a little more concrete, also using the example of DiGA. So here, too, it is not enough for institutions such as health insurance companies or institutions like us to promote digital health literacy. The relevant institutions must also play their own role accordingly. And in the case of the manufacturers of

DiGA, for example, it is of course also important that they produce applications that are user-friendly on the one hand and, on the other, guarantee the necessary data protection. And that means we can't just promote digital health literacy if, in the end, the applications simply can't be used if the registration process simply goes badly or if there are reports in the news that some data relating to mental illness is being made public. In other words, the individual institutions, in this case the DiGA manufacturers, really have to fulfill their own original task accordingly so that digital health literacy or promotion by other institutions, which may then be us or the health insurance companies, ultimately has an effect. Perhaps that's another addition. #00:08:44-7#

6. Interviewer: You have now said that the health insurance companies play a role, the manufacturers play a certain role and also the service providers. What about the patients? Are they also responsible for promoting their own digital health literacy, and if so, to what extent? #00:09:03-0#
7. Speaker 2: I think you always have to assume that patients take personal responsibility for all health issues. On the other hand, you have to say that for some people in particular, a certain amount of nudging is needed to bring the insured into the realm of digital health services. Because at the moment, of course, we are still in a transitional phase. If you don't want to use digital services in healthcare, then it still works quite well without them. I can still get my sample 16 at the doctor's surgery as normal if I have a prescription, I can still get very good care at the moment even without DiGAs. The ePA is also not yet something that has really seriously arrived in healthcare, and against this background, the "pressure" (in quotation marks) on patients to deal with this topic in the long term is not yet so pronounced. At the moment, we are simply seeing a trend where everyone who finds it exciting, is a bit of a first mover or simply finds new things interesting is looking into digitalization in healthcare. But the broad mass of patients don't need it at the moment. In other areas, on the other hand, we are already seeing other developments. When I look at sectors such as banks and insurance companies, especially in the banking sector, where more and more branches are being closed and customers now have no choice but to use online banking, and then of course the pressure on providers to present appropriate solutions that people can use to do this easily is of course increasing. Or in other areas, when it comes to the fact that we are now seeing in certain rural regions that the delivery of print newspapers is being abolished and instead people are now somehow migrating to ePaper, and then you suddenly have the challenge of migrating these people to tablets and ePaper in view of the age groups that read newspapers there, i.e. with a very strong focus on 60, 70 plus. And as I said, we're simply not at that stage at the moment. But of course this will become very relevant in the future,

that the patients themselves will also develop a stronger self-interest in the area of "educating themselves" in quotation marks. #00:12:10-9#

8. Speaker 1: I would confirm that again, as Mr. Janssen just said, it's all about focusing on the added value. Because, of course, a lot depends on the image people have of the healthcare system or a visit to the doctor. Most of the time or many people simply only go to the doctor when they have something specific, and otherwise they don't bother with prevention services or health promotion services if there is no need for them. We know this from other settings, including in the area of health promotion, for example workplace health promotion. When emails pop up saying "smoking is not good" or "behave like this", these emails are often simply put away. People are simply not interested in them because there is no need or because they don't see any great personal added value. Of course, people should know that smoking is actually harmful. But of course it's still a question of how you communicate that accordingly, and that's why the big difficulty is simply how to communicate these topics, everything that has to do with health promotion and prevention, how to communicate that accordingly, and I think that's where the added value is really crucial, and that you communicate in a relatively simple, very low-threshold way and thus focus primarily on the benefits. #00:13:36-6#
9. Interviewer: Mhm Okay, then I would now move on to the next question. This is about the roles and responsibilities of the individual stakeholders in promoting digital health literacy. You've already outlined this roughly. Perhaps you could briefly formulate this again for the health insurance companies, doctors and manufacturers in one or two precise sentences. #00:13:58-6#
10. Speaker 1: Well, I would start with the service providers. This is also a setting where people are really concerned with their health. So if you're on site, then you have a specific concern, and I think it's really crucial in this setting that the service providers really get behind the issue of digitalization. So, and I believe that this is really a setting, whether you're in a GP practice or a hospital, where doctors should really take on the role of encouraging patients to engage with digital services, but then also clearly say, here, we also have services, we use video consultations, you could try that out. We also offer e-prescriptions, we also prescribe DiGA, there are perhaps corresponding flyers where you can find out more. For example, we ourselves also offer information flyers as part of our "gesund digital" project. Theoretically, you could also imagine that these flyers could be displayed in such settings, and then, if a question comes up in the doctor's surgery about how it works, that you could simply say something here, there's a flyer, the doctor doesn't have to say so much. But it's always enough to draw attention to these offers and then simply arouse interest and provide a few, shall I say,

information materials. So maybe that's it, as far as the doctors are concerned. [X], do you want to continue? #00:15:36-8#

11. Speaker 2: I'm happy to do that, exactly, and then it's actually the concrete implementation of how patients and insured persons can use digital services, the exact description and the like. We would rather see this in concrete terms at the health insurance company, because of course the paths differ to some extent when we look at electronic patient files, for example. There are different front ends, even if at the end of the day there are only a few different ePA providers that are behind them. But each health insurance fund has its own structures, of course, and against this background, it is certainly something that is the task of the respective health insurance fund or, as we are also doing in our 20k project, to communicate this accordingly and, as I said, with the actual manufacturers, I would always make a bit of a distinction. Mr. [X] already mentioned this earlier. In the case of digital health applications, of course, you have the direct opportunity to make users fit through appropriate tutorials, if insured persons have actually been prescribed a DiGA or something similar, to become fit there, how to use the individual applications, but on a very large scale in the area of software providers, of course also in the direction of making the application as user-friendly as possible. #00:17:25-1#
12. Interviewer: Thank you very much. You've just hinted at it a bit, at least that's what I heard between the lines. Do you think that the players are already aware of this role? And if not, how can it perhaps be strengthened? #00:17:39-4#
13. Speaker 2: Well, I would say that we already see this role as clearly existing for us. Of course, as we said right at the beginning, it's difficult for everyone involved in this transitional phase to bring this to life in concrete terms, because you also have to think about where you need to pick up the policyholders. What offers can be created right now that will help the insured person in their specific situation? That is certainly difficult. At the same time, we also have the constellation, especially in doctors' surgeries, where there are some female doctors who are already very committed. But the mere fact that you always see the same three to five doctors from Germany at any given specialist event who are driving digitalization forward, so to speak, shows that it simply hasn't arrived on a broad scale yet, and the fact that it hasn't arrived yet is of course very much related to the digital health literacy of the healthcare professions, which still needs to be improved, and it's not just the doctors. Of course, if I look at a constellation of a completely normal or rather standard contract doctor's practice, there must of course be a certain amount of input from the doctors themselves, so that they say here, we also want to set up our practice digitally, and then of course it comes automatically that the insured are more interested in it and realize,

oh, my doctor offers things that actually make things easier for me in everyday life or, in the best case, also improve my health, and then I get more involved with it and also take advantage of the services offered by my health insurance company, and that is the starting point, so to speak. But then, of course, the next step is to enable all the people who work in the doctor's surgery, the MFAs, to use it, because, as I said, it's no good if the doctor says we think it's all great and then the MFA at the counter says, what's my boss doing with all this digitalization stuff, I'd rather do it on paper, so I actually have to pick everyone up and take everyone with me. I think that's a key point for implementing this at the various points. I think it's in the software providers' own interests, especially in the DiGA sector. After all, there's no point in designing applications where the insured person says after 90 days at the latest, oh no, I don't understand it, the application is far too complicated, and then it's not prescribed again. The business case is structured in such a way that providers also benefit when applications are simple and when insured persons develop the necessary skills to use this application for as long as possible. #00:21:04-4#

14. Interviewer: Okay, then I would move on to the next question. Looking back over the points, what do you think can be done to promote digital health literacy? #00:21:29-0#
15. Speaker 1: Perhaps let's just summarize this once again. I think it's clear here that digital health literacy is, of course, a task for society as a whole. I think that has already emerged from the course of the interview so far, and I think your questions are also aimed at the fact that various players have a certain role in the healthcare system that needs to be filled accordingly, perhaps as a basis. So, it can't just be one institution or one specialist group, it has to be an interplay and the basics alone, the media skills, have to be trained elsewhere. As a health insurance company, we can't ultimately be the ones responsible. So then, what I have also emphasized is of course that the topic of digital health literacy is still very, very much in its infancy. That's why we still have to do a lot of piloting, a lot of testing and then, of course, talk about it and evaluate it. We are also doing this here with our "gesund digital" project for apps and the Internet, which we also offer from the [company] side, and we have now also focused on linking analog and digital services, because we are also of the opinion that if we only offered digital services now, we would of course not reach certain target groups, because we are of course also talking about people, people who perhaps don't use the internet or computers in general on a regular basis, who perhaps need to be picked up a little bit in analog form first, and who are ultimately making the leap away from analog services, and that's exactly why we're piloting this right now, for example by putting out flyers or approaching people in a targeted manner with our cooperation partner, the University Medical

Center Schleswig-Holstein. In other words, we don't wait for someone to come to us, but we approach them directly and say "here, we have information material, we also have a website where you can get more information". Exactly. Basically, however, for further expansion, also in terms of piloting, it's simply a matter of piloting further settings and also how to approach people, because this setting approach is of course perhaps a little more difficult in the area of digital health literacy than we would be with other health promotion topics. I mean, workplace health promotion, if someone says it's best to sit here like this, then it's relatively easy to communicate, and I'm in my field of application, my profession, and then I might notice something immediately, I deal with the topic, and if someone gives me help, then I notice this effect. But the question is, when should any help come when I'm looking for health information, and that can perhaps really be more of a setting where I deal with health, such as doctors' surgeries and hospitals. But here, too, the question is how big was the combination or the link to something digital, because I'm still in the analog world. In other words, you actually have to offer something like that while you're still in the digital world. So, if you take this setting approach, because in my professional environment I get information about my professional behavior or my behavior in my job. This means that if I'm now in a digital setting, I wouldn't also have to get information there, which is of course difficult again. BARMER, for example, also has a project in the area of children and young people where they want to teach children how to find health information, for example, and what health apps are. Of course, this still works, I'd say, in this age group, but of course you can't give out information about video consultations or e-prescriptions just yet. That would probably be a bit too early. This also means that if you are still in analog settings and then make offers there, this is of course only possible to a limited extent as far as certain target groups are concerned. Exactly, maybe that's the first very, very rough idea, and then simply the question, which is also what I meant, how do we address the person in the end? We are still learning a lot from our project, and we are very excited to see what the evaluation reveals, because I think we are now promoting videos, informational texts, and the question is whether these videos are well designed in the end and whether they perhaps need to be made even simpler. Are the texts understandable enough, do they still need to be presented graphically? Well, there are also many, many, many questions involved that we simply can't assess yet. And, um, at the end of the day, various factors still need to be clarified, and that starts with what exactly is digital health literacy? Which people actually need support, in which settings, and how do we reach them with which media? And then also, how exactly should we address them? #00:27:39-6#

16. Interviewer: Mhm Okay, then you've already answered a few parts of my last question, so to speak. Despite the hybrid offers, for example, are there any other ideas for possible measures to promote digital health literacy? #00:27:53-7#
17. Speaker 2: So from an approach perspective, I think it's quite clear that we're currently working on saying, okay, we first have to work out for ourselves what really works and which access route is actually the right one? Is there even a right one, or is it not more the case that there are the right approaches for different target groups? And it is difficult to answer this globally at the moment. That's why, when we formulated the relevant provisions together with the other types of health insurance funds and the umbrella organization, we also attached great importance to defining them as broadly as possible, to actually incorporating this evaluation component, to perhaps orienting ourselves even more towards it or to looking even more closely at what works in this area to the left and right, i.e. also outside Germany, i.e. what happens and then of course works above all. These are certainly aspects that play a role. And I think the specific question is, what else do we need? I think we will only be able to answer this question properly for ourselves when we have completed our project and when we actually have an evaluation there and more of these projects actually reach the evaluation stage. #00:29:41-4#
18. Interviewer: Mhm Okay, thank you very much, now we're done with the questions, but before I dismiss you now, I have one more sentence that I would like you to complete. You are welcome to do that once, but you can also do it both. I would simply start the sentence now and you are welcome to continue it. In ten years, the digital health literacy of people with statutory health insurance in Germany. #00:30:05-8#
19. Speaker 2: Considerably better, because digitalization will have progressed accordingly by then and patients without such digital health literacy would no longer really be able to find their way around the healthcare system. #00:30:34-9#
20. Speaker 1: Hopefully no longer a topic that we have to talk about in an expert interview. #00:30:48-8#

APPENDIX 14. Thesis Paper of the Delphi study (first round)

The following Thesis paper had to be assessed by the expert panel in the first round of the Delphi study. The paper was presented via the online survey tool LimeSurvey. Author's descriptions for better understanding are added in orange brackets, but were not presented to the experts within the survey.

Delphi study on digital health literacy in the German SHI system

Welcome Page

Dear expert!

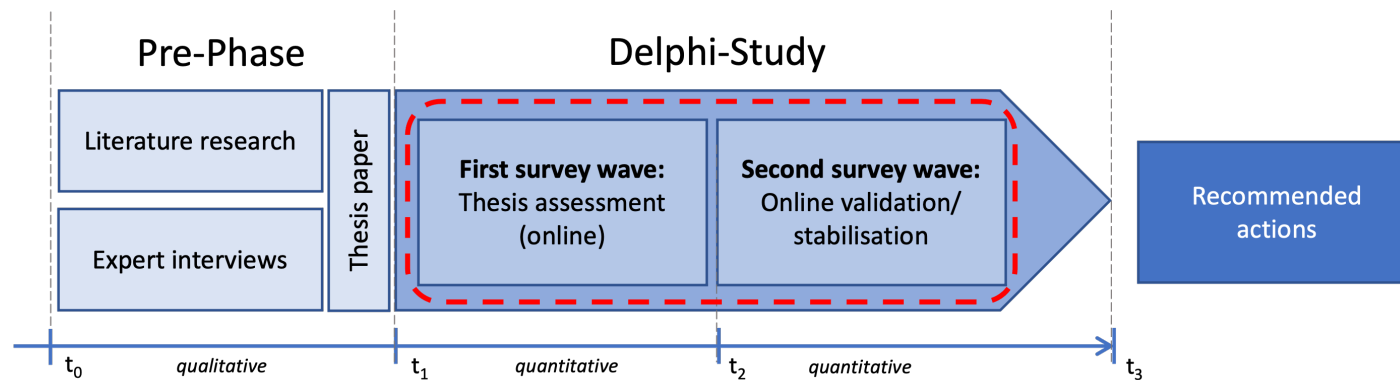
Welcome to the **first survey round** of the Delphi study on the promotion of digital health literacy (dHL) among SHI-insured persons in Germany.

The aim of the study is to **derive recommendations for action for the necessary further development of the framework conditions, responsibilities and measures to promote dHL of insured persons in the German SHI-system**. To this end, theses on future developments were developed on the basis of a literature review and preceding expert interviews, which are now to be evaluated by you as an expert.

Following the evaluation of this survey round, the theses for a **second survey round**, including a presentation of the results of the first round, will be sent back to you as an expert approximately 8 weeks after the end of the first survey period. This proce-

ture gives you, in the sense of the Delphi method, the opportunity to **reconsider your opinion** on the basis of the overall results of the expert group and to modify it if necessary. If there is a high level of agreement in the results, the questionnaire may be reduced in the course of the second round.

The **course of the study is illustrated** once again here. Your involvement in the study takes place in the two online survey rounds highlighted in red:



Important for your processing: The survey is divided into four thematic blocks:

- New competence requirements in the field of digital health
- Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL
- Understanding and anchoring of dHL in the SHI system
- Support measures for the dHL of SHI-insured persons

The survey takes **approximately 20 minutes to complete**. At the beginning of each topic block, you will be asked to assess your expertise or personal familiarity with the respective topic. This is followed by the theses, for which you are asked to give your personal assessment. There are no right or wrong answers, rather the study is explicitly concerned with ascertaining the diversity of opinions of you as an expert. At the end of each topic block, you have the opportunity to leave comments as well as open questions in a comment field. These can then be taken into account in the second Delphi round.

Thank you very much for your help and your willingness to advance the field of dHL!

Julia Ulbrich

Mail: Julia.ulbrich96@t-online.de

Study background:

The research project deals with the promotion of digital health literacy among people with statutory health insurance in Germany. It is being carried out as part of Julia Ulbrich's doctoral project at UCAM Murcia in cooperation with the FOM University of Applied Sciences and is being supervised by Prof. Dr. David Matusiewicz. In the course of various social changes such as digitalization, demographic change or increasing individualization, the classic patient journey through the healthcare system is changing. Patients are increasingly exposed to digital information and applications and require specific skills in order to continue to navigate the healthcare system and make self-determined decisions. These skills are summarized as digital health literacy.

"Digital health literacy is the ability to use digital technologies in a self-determined manner for the purpose of maintaining, restoring or improving health. It enables patients and users to find and evaluate health information, protect or release health-related personal data if necessary, assess the functionality, results and consequences of digital health applications, weigh

up the advantages and disadvantages and act accordingly. (...) Digital health literacy arises through the interaction of individual skills and socio-technological framework conditions." (Samerski/ Müller 2019).

Studies such as the HLS2-GER show that digital health literacy in Germany is (too) low. Currently, the statutory health insurance funds in particular have the task of promoting the digital health literacy of their policyholders in accordance with Section 20k SGB V. However, it is not clear how this promotion can succeed as a task for society as a whole and, in particular, which framework conditions, responsibilities and measures are required for this in the future. The aim of the research work is to determine expert opinions on necessary developments, to derive recommendations for action and to be able to proactively and structurally shape the promotion of digital health literacy in Germany.

In order to delimit the subject of the research, the study explicitly refers to the promotion of digital health literacy among SHI-insured persons, although aspects such as a high level of organizational digital health literacy are also a key factor for successful further development.

There are 29 questions in this survey.

Personal ID

In order to be able to assign your questionnaire to your person in the course of the two survey waves, a personal identification number (ID) is used. This is made up of an individual combination of numbers and letters. Please enter the first letter of your mother's first name, your mother's month of birth in digits, your mother's birthday in digits and the day of your own birthday in digits (without month and year). The code is used exclusively for the interaction of the data from the two survey waves in order to be able to analyze possible changes in the opinion patterns. Your data will of course be treated confidentially and it is not possible to trace answers back to you personally.*

	First letter of your mother's first name	Your mother's month of birth in digits (e.g. 05 for May)	Your mother's birth- day in digits (e.g. 12 for January 12)	Day of your birth- day in digits (e.g. 09 for August 9)
Personal Identification Number				

Personal ID to match corresponding thesis papers

Topic block 1: New skills requirements in the field of digital health

The aim of this thematic block is to determine what skills insured persons will need in the future in order to be able to participate in an increasingly digital SHI system in Germany.

I assess my general knowledge of new competence requirements in the healthcare sector as

Choose one of the following answers. Please choose **only one** of the following:

- very high
- rather high
- medium
- rather low
- very low
- I have no expertise in this area.

Subjective competence question to assess expert's self-perceived knowledge in a topic block.

Topic block 1: New skills requirements in the field of digital health

Thesis: The competence requirements for insured persons in the SHI system will change over the next few years as a result of ongoing digitalization.

Please indicate the extent to which you agree with the following developments with regard to competence requirements for insured persons in the area of digital health by 2030 and assess their Importance in connection with the promotion of dHL.*

Two-point Likert Scale

Please choose the appropriate response for each item:

	Agreement				Importance			
	disag- ree at all	disag- ree	agree	fully agree	not im- portant at all	not im- portant	im- portant	very im- portant
Insured persons must be familiar with technologies such as AI or big data .								
Insured persons must be familiar with questions of data security (e. g. data sharing).								
Insured persons must be able to understand their own health data (e.g. via wearables).								
Insured persons must be able to communicate digitally with stakeholders in the SHI system (e.g. video consulta- tion).								

	Agreement				Importance			
	disag- ree at all	disag- ree	agree	fully agree	not im- portant at all	not im- portant	im- portant	very im- portant
Insured persons must be able to handle digital documents .								
Insured persons must be able to use their electronic patient file (ePA).								
Insured persons must be able to make self-determined decisions based on digital health information.								
Insured persons must be able to decide for themselves on the use of digital health services (e.g. DiGA).								
Insured persons must be able to use digital structures in the SHI system (e.g. e-prescription).								
Insured persons must be able to navigate the SHI system independently (e.g. know trustworthy organizations).								

Topic block 1: New skills requirements in the field of digital health

What other skills requirements will insured persons in the SHI system have to face as a result of digitalization by 2030?

Please write your answer here:

Open question

Would you like to make any final comments on the topic of "New skills requirements in the field of digital health"?

Please write your answer here:

Expert's opportunity to make comments

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

The aim of this thematic block is to determine the extent to which established roles, responsibilities and structures in the SHI system need to be further developed for the successful promotion of dHL.

I rate my general knowledge of the players in the healthcare sector as

Choose one of the following answers. Please choose **only one** of the following:

- very high
- rather high
- medium
- rather low
- very low
- I have no expertise in this subject area.

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Please indicate to what extent you agree with the following theses and how relevant you consider the outlined development to be with regard to the successful promotion of dHL.

Please choose the appropriate response for each item:

	Agreement				Importance			
	disag- ree at all	disag- ree	agree	fully agree	not im- portant at all	not im- portant	im- portant	very im- portant
New skills requirements with regard to digital health will change the job profiles of those involved in the SHI system by 2030.								
By 2030, new job profiles will be established to promote the dHL of insured persons in the SHI system. Example: Introduction of a "digital nurse" who advises insured persons in the doctor's practice on issues relating to the dHL (e.g. creating an electronic patient file, enabling video consultations).								

	Agreement				Importance			
	disag- ree at all	disag- ree	agree	fully agree	not im- portant at all	not im- portant	im- portant	very im- portant
In the spirit of a "Health in All Policies approach", certain skills required for a high dHL should also be promoted in other policy areas outside the SHI system (e.g. in schools).								

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Thesis: The tasks of health insurance funds will change by 2030 with regard to the promotion of dHL.

Please select from the list on the left which of the following tasks the health insurance funds will take on by 2030. Create a ranking and position the task that you consider most important for the successful promotion of dHL at the top of the list on the right using drag and drop.

Leave the tasks that the health insurance funds will not take on on the left-hand side.

Please select at most 6 answers. Please number each box in order of preference from 1 to 6.

Ranking question

- **Individual support for insured persons:** providing advice and guidance at the relevant point of contact (e.g. use of digital health information as part of care advice)
- **Offer training and information material:** e.g. flyers, health magazines
- **Creating transparency:** better presentation of own service portfolio with regard to digital healthcare offerings
- **Financing:** of support measures, also from other SHI players
- **Coordinator and orchestrator:** bringing together the players in the SHI system to jointly promote dHL
- **Topic occupants:** Positioning as the main actor responsible for promoting the dHL

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Thesis: The tasks of doctors will change by 2030 with regard to the promotion of dHL.

Please select from the list on the left which of the following tasks doctors will take on by 2030. Create a ranking and position the task that is most important to you for the successful promotion of dHL at the top of the list on the right using drag and drop. Leave the tasks that doctors will not take on on the left-hand side.

Please select at most 6 answers. Please number each box in order of preference from 1 to 6.

- **Training:** of insureds to improve dHL
- **Intermediaries:** Proactive mediation of digital health services to insured persons, e.g. prescription of digital health apps, ePA, video consultations
- **Patient Empowerment:** Promoting and demanding responsible and digitally health-competent insured persons in everyday treatment
- **Testimonial:** Positive discussion of digitalization topics with insureds
- **Digital practice:** supporting the digital infrastructure in the healthcare sector
- **Organizational dHL:** Promotion of own dHL and that of the practice staff

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Thesis: The tasks of politics will change by 2030 with regard to the promotion of dHL. Please select from the list on the left which of the following tasks politics will take on by 2030. Create a ranking and position the task that you consider most important for the successful promotion of dHL at the top of the list on the right using drag and drop. Leave the tasks that the policy will not take on on the left-hand side. Note: § 20k SGB V obliges the statutory health insurance funds to offer their insureds services to promote dHL.

Please select at most 8 answers. Please number each box in order of preference from 1 to 8.

- **Close monitoring of implementation:** of support measures for dHL including sanctions in the event of non-compliance with legal mandates
- **Legal basis setter:** Definition and concretization of the requirements for the promotion of dHL in § 20k SGB V
- **Continuous further development:** of requirements for the promotion of dHL in § 20k SGB V
- **Definition of responsibilities:** of further responsible actors for the promotion of dHL
- **Promote infrastructure:** Creating the structural basis for making digital health services accessible to insured persons
- **Strategy development:** Stronger strategic handling of the topic, e.g. by integrating it into the digital strategy of the Federal Ministry of Health

- **Promotion of a general dHL:** Establishing information campaigns as a trustworthy body, e.g. via the Federal Center for Health Education or the Federal Ministry of Health
- **Networker:** Bringing together the players in the SHI system to promote dHL as part of jointly initiated measures

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Please indicate to what extent you agree with the following theses and how relevant you consider the outlined development to be with regard to the successful promotion of dHL among insured persons.*

Please choose the appropriate response for each item:

	Agreement				Importance			
	disagree at all	disagree	agree	fully agree	not important at all	not important	important	very important
By 2030, stakeholder groups such as self-help groups and patient organizations will contribute to the promotion of dHL with their educational offerings.								
By 2030, pharmacies will be included in the promotion of dHL as a central consultation point for insured persons.								
By 2030, the interest groups and umbrella organizations in the SHI system will play a central role in promoting dHL of their members (e.g. GKV-Spitzenverband, KVs and KBV).								

	Agreement				Importance			
	disag- ree at all	disag- ree	ag- ree	fully ag- ree	not im- portant at all	not im- portant	im- portant	very im- portant
By 2030, a central and independent institution (e.g. foundation) will be established to promote dHL in the SHI system.								
By 2030, there will also be a National Action Plan for the promotion of dHL.								
By 2030, all players in the SHI system will have to complete mandatory training on dHL.								
By 2030, dHL topics will be part of the training and study programs for healthcare professions.								
By 2030, a high organizational dHL will be part of quality assurance standards in the SHI system.								

Would you like to make any final comments on the topic of "Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL"?

Please write your answer here:

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

The third thematic block deals with how the topic of dHL must be understood and anchored in the German SHI system in the future.

I rate my general knowledge of the concept of the dHL and its anchoring in the German healthcare system as
...

Choose one of the following answers Please choose **only one** of the following:

- very high
- rather high
- medium
- rather low
- very low
- I have no expertise in this subject area.

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Thesis: The understanding of dHL in the German SHI system must be homogenized.

Please indicate which of the following definitions* best describes dHL in your opinion at the present time.

Please select one of the following answer options. The parts of the text in bold represent significant changes in content compared to the previous definition. Please briefly explain below why you have chosen your definition.

*** The source for each definition can be found on the final page of this survey.**

Please choose **only one** of the following:

- Digital health literacy is the ability to search, find, understand and evaluate health information based on digital sources and apply the knowledge gained to address health challenges and solve problems."
- Digital health literacy "encompasses the **interplay of personal and social factors** in the use of digital technologies in searching, acquiring, understanding, evaluating, communicating and applying health information in all healthcare contexts with the aim of maintaining or improving quality of life throughout the lifespan."

- "Digital health literacy is the ability to use digital technologies **in a self-determined manner** for the purpose of maintaining, restoring or improving health. It enables patients and users to find and evaluate health information, **protect or release health-related personal data if necessary, assess the functionality, results and consequences of digital health applications, weigh up the advantages and disadvantages and act accordingly.** (...) Digital health literacy arises from the interaction of individual skills and socio-technological conditions. **It includes awareness of the ethical, legal and social implications for both individuals and organizations and enables them to shape digital change in a way that promotes health.**"
- Digital health literacy "encompasses individual, social and technical skills and resources that are important for searching, finding, understanding, evaluating and using digitally available health information. **It is a dynamic concept that is closely linked to the approach of lifelong learning and empowerment.** Digital health literacy **takes into account the continuous development of digital technologies.** It should enable citizens to increase their self-efficacy through the use of digital health applications and to lead a self-determined life with a high quality of life. Specific digital health literacy encompasses dimensions such as computer literacy, data literacy, privacy literacy, traditional literacy, media literacy, navigation literacy, information literacy and health literacy. These dimensions **must each be applied to the dynamic context of health, the healthcare system and society as a whole.** The respective specific competencies enable citizens to protect their privacy, increase data security and maintain and improve their health and well-being based on reliable information."
- **None** of the options

Please briefly explain why you have chosen this definition.

Please write your answer here:

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Thesis: For a successful increase in dHL in the SHI system, uniform goals must be defined to which the promotion is oriented.

Please select which of the following objectives should be pursued with the promotion of dHL by insured persons. Create a ranking and position the goal that is most important to you at the top of the list on the right using drag and drop.

Leave objectives that you do not consider relevant on the left-hand side.

Please select at most 7 answers. Please number each box in order of preference from 1 to 7.

- Strengthening the **(digital) self-determination** of insureds
- Strengthening the **Patient Empowerment** of insureds
- Strengthening the **self-efficacy** of insureds
- **Teaching skills** for the use of digital health information and applications
- Increasing **equal opportunities and participation** of insured persons in the SHI system
- Increasing the **navigation skills** of insured persons in the SHI system
- Maintaining and improving the **quality of life** of insured persons

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Which of the following theses do you tend to agree with? Please use the slider (from -100 to 100) to express your agreement with the thesis shown on the left or right.

Your answer must be between -100 and 100. Please write your answer(s) here:

Slider question

Please indicate to what extent you agree with the thesis presented.

Please choose the appropriate response for each item:

	Disagree at all	Disagree	Agree	Fully agree
Insured persons have a personal responsibility to promote their digital health literacy, but are also dependent on suitable framework conditions and support from the SHI system (e.g. existence of digital structures, understanding of the benefits and necessity of a high level of dHL).				

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Please indicate to what extent you agree with the following theses and how relevant you consider the outlined development to be with regard to the successful promotion of dHL.*

Please choose the appropriate response for each item:

	Agreement				Importance			
	Disag- ree at all	Disag- ree	Agree	Fully agree	Not im- portant at all	Not im- portant	Im- portant	Very im- portant
The support measures for the dHL should be geared towards new competence requirements in the digital SHI system.								
By 2030, there will be a coordinated curriculum in the SHI system that specifies the content for promoting dHL.								
The dHL concept must be regularly adapted and further developed in line with changing competence requirements and framework conditions.								
In addition to the localization of support measures for dHL in the SHI system, networking with other policy areas in which dHL competence areas are promoted is necessary ("health in all policies approach", e.g. early learning at school)								

	Agreement				Importance			
	Disag- ree at all	Disag- ree	Agree	Fully agree	Not im- portant at all	Not im- portant	Im- portant	Very im- portant
The SHI system must see the benefits and added value of digitalization and a high level of dHL more clearly as an opportunity and communicate this.								
For the successful promotion of dHL, the processes and responsibilities in the SHI system must be better inter-linked (e.g. a health app (DiGA) must not only be included in the benefits catalog and financed by the health insurance funds, but doctors must also proactively prescribe it and use it in everyday treatment, and manufacturers must ensure that insured persons understand the application and recognize added value through a user-friendly design).								

Would you like to make any final comments on the topic of "Understanding and anchoring digital health literacy in the German SHI-system"?

Please write your answer here:

Topic block 4: Support measures for dHL of SHI-insured persons

In this thematic block, the aim is to determine which specific measures can contribute to promoting dHL of insured persons in the sense of a holistic concept at all levels of the SHI system.

I rate my general expertise regarding specific measures to promote the digital health literacy of insured persons in the German healthcare system as

Choose one of the following answers. Please choose **only one** of the following:

- very high
- rather high
- medium
- rather low
- very low
- I have no expertise in this subject area.

Topic block 4: Support measures for dHL of SHI-insured persons

Thesis: Measures to change the structures of the SHI-system must be taken in order to successfully promote dHL of insured persons.

Please evaluate the structural developments outlined below in terms of their Importance for the successful promotion of dHL and their likeliness of implementation.*

Please choose the appropriate response for each item:

	Importance				Likeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
By 2030, insured persons in the SHI-system will be able to choose more cost-effective digital insurance tariffs (e.g. "video consultation first") to encourage them to engage with digital health services.								
By 2030, the SHI-system will have a user-friendly digital ecosystem that has largely digitized analogue processes (e.g. e-prescription, digital communication channels).								

	Importance				Likeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
By 2030, insured persons in the SHI-system will be obliged to use a comprehensive digital eco-system .								
By 2030, there will be new remuneration structures for the promotion of dHL by healthcare stakeholders.								
By 2030, there will be structures in the SHI-system for testing, evaluating and implementing support measures in standard care.								
By 2030, the Innovation Fund will have established new funding waves for projects to promote dHL.								
By 2030, insured persons will be increasingly involved in digitization processes (e.g. in the development of health apps).								
By 2030, health kiosks will be used as a low-threshold access and advice point for insured persons in matters relating to dHL.								

Topic block 4: Support measures for dHL of SHI-insured persons

Thesis: To successfully promote dHL of insured persons in the SHI system, educational measures must be established for the insured persons.

Please evaluate the educational measures and developments outlined below in terms of their Importance for the successful promotion of dHL and their likeliness of implementation.

Please choose the appropriate response for each item:

	Importance				Likeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
By 2030, there will be nationwide information campaigns on general digitalization topics (e.g. "E-prescription before the news").								
By 2030, dHL topics will be incorporated individually and integratively (according to target group, competence, needs) into every point of contact between insured persons and healthcare stakeholders (e.g. integration into DMP training courses).								

	Importance				Likeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
As part of the promotion of the dHL, the added value of digital services must be highlighted in order to achieve a high level of acceptance.								
By 2030, there will be specific support measures to promote sub-skills of dHL (e.g. assessing trustworthy health information).								
Promotional measures should be varied and take into account different methods (e.g. storytelling) and distribution channels (e.g. magazines, face-to-face, social media).								
The promotion of dHL should be integrated into existing prevention and setting approaches on a topic-specific basis (e.g. workplace health promotion).								
By 2030, SHI-insureds will have the opportunity to obtain a " digital driver's license " that will enable them to make appropriate use of healthcare services.								

Would you like to make any final comments on the topic of "Support measures for dHL of SHI-insured persons"?

Please write your answer here:

Personal details

Personal details: The socio-demographic data to be filled in here is used exclusively to determine the statistical profile of the group of experts surveyed and will be treated confidentially. At no time will your personal data be linked to your answers, passed on or used for other research purposes. The data will be collected exclusively for this study, will not be passed on to third parties and will be stored inaccessibly for ten years and treated confidentially in accordance with the recommendations of the German Research Foundation (DFG).

Gender: *

Please choose **only one** of the following:

- male
- female
- diverse

Socio-demographic data

Age: *

Choose one of the following answers. Please choose **only one** of the following:

- up to 24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years and older

Professional field of activity: *

Choose one of the following answers. Please choose **only one** of the following:

- Social Health Insurance company
- Healthcare provider or their representative in the SHI-system
- Patient representative/ self-help organization
- Legislation/ Politics
- IT service provider/ software manufacturer or their representative
- Other stakeholders in the SHI system
- University
- Non-university research institution
- Other

Are there any general concluding remarks you would like to make about the Delphi study or the topic of digital health literacy?

Please write your answer here:

Final remarks

Thank you for your participation in the first round of the Delphi study on the promotion of digital health literacy among SHI-insured persons in Germany. You are making a significant contribution to the definition of recommendations for the further development of framework conditions, responsibilities and measures for the promotion of dHealth literacy.

As soon as the responses to the first survey round have been evaluated, you will receive another e-mail with the opportunity to take part in the second survey round (in approx. 8 weeks after the end of the first survey period). The results of the first survey round will be fed back to you. The purpose of the second survey round is to record changes in opinion based on the results of the first round.

If you have any questions, please do not hesitate to contact me!

Julia Ulbrich

Contact: julia.ulbrich96@t-online.de

Farewell Page

Please note:

The definitions used in topic block 3 are from Norman/ Skinner (2006), Bautista (2015), Samerski/ Müller (2019), Kolpatzik/ Zeeb/ Sørensen (2020).

APPENDIX 15. Thesis Paper of the Delphi study (second round)

The following Thesis paper had to be assessed by the expert panel in the second round of the Delphi study. The paper was presented via the online survey tool LimeSurvey. In contrast to the first survey wave, some theses were eliminated due to a high stability of opinion that was reached in the first round. In the first topic block, answer options derived from the answers in the first round were added. Furthermore, the group results as well as the feedback and comments from the first round were integrated in the thesis paper for the second survey wave. Author's descriptions for better understanding are added in orange brackets, but were not presented to the experts within the survey.

Delphi study on digital health literacy: Second survey wave

Dear expert!

Welcome Page

Welcome to the second survey round of the Delphi study on the promotion of digital health literacy (dHL) among SHI-insured persons in Germany. Thank you for your continued participation!

The aim of the study still is to **derive recommendations for action** for necessary further developments of the framework conditions, responsibilities and measures to promote the dHL of insured persons in the German SHI system. After you have evaluated theses in the first survey round, the **results will now be given back to you** in the second survey round. In the spirit of the Delphi method, this procedure gives you the opportunity to reconsider your opinion on the basis of the overall results of the expert group.

Important for your processing: The survey is still divided into four thematic blocks, but the content has been **modified on the basis of the results from round 1**. For example, theses for which a high level of opinion stability (>75,0%) was already achieved in the first round were not asked again in the second round of the survey. In addition, some answer options were supplemented on the basis of their feedback and open feedback was added.

The four thematic blocks are:

- New competence requirements in the field of digital health
- Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL
- Understanding and anchoring dHL in the SHI system
- Support measures for the dHL of SHI-insured persons

The survey now takes about **20 minutes to complete**. Feedback and explanations for interpreting the results are highlighted in red. The following still applies: There are **no right or wrong answers**; rather, the study is explicitly about collecting the diversity of opinions from you as an expert. At the end of each topic block, you again have the opportunity to leave comments and open questions in a comment field or to refer to the feedback presented. As in the first round, this survey is anonymous.

Thank you very much for your help and your willingness to advance the field of dHL!

Julia Ulbrich
Contact: julia.ulbrich96@t-online.de

Study background:

The research project deals with the promotion of digital health literacy among people with statutory health insurance in Germany. It is being carried out as part of Julia Ulbrich's doctoral project at UCAM Murcia in cooperation with the FOM University

of Applied Sciences and is being supervised by Prof. Dr. David Matusiewicz. In the course of various social changes such as digitalization, demographic change or increasing individualization, the classic patient journey through the healthcare system is changing. Patients are increasingly exposed to digital information and applications and require specific skills in order to continue to navigate the healthcare system and make self-determined decisions. These skills are summarized as digital health literacy.

"Digital health literacy is the ability to use digital technologies in a self-determined manner for the purpose of maintaining, restoring or improving health. It enables patients and users to find and evaluate health information, protect or release health-related personal data if necessary, assess the functionality, results and consequences of digital health applications, weigh up the advantages and disadvantages and act accordingly. (...) Digital health literacy arises through the interaction of individual skills and socio-technological framework conditions." (Samerski/ Müller 2019).

Studies such as the HLS2-GER show that digital health literacy in Germany is (too) low. Currently, the statutory health insurance funds in particular have the task of promoting the digital health literacy of their policyholders in accordance with Section 20k SGB V. However, it is not clear how this promotion can succeed as a task for society as a whole and, in particular, which framework conditions, responsibilities and measures are required for this in the future. The aim of the research work is to determine expert opinions on necessary developments, to derive recommendations for action and to be able to proactively and structurally shape the promotion of digital health literacy in Germany.

In order to delimit the subject of the research, the study explicitly refers to the promotion of digital health literacy among SHI-insured persons, although aspects such as a high level of organizational digital health literacy are also a key factor for successful further development.

There are 20 questions in this survey.

Personal ID

In order to be able to assign your questionnaire to your person in the course of the two survey waves, a personal identification number (ID) is used. As in the first round, please enter the first letter of your mother's first name, your mother's month of birth in digits, your mother's birthday and the day of your own birthday (without month and year).

The code is used exclusively for the interaction of the data from the two survey waves in order to be able to analyze possible changes in the opinion patterns. Your data will of course be treated confidentially and it is not possible to trace answers back to you personally.*

	First letter of your moth- er's first name	Your mother's month of birth in digits (e.g. 05 for May)	Your mother's birthday in digits (e.g. 12 for January 12)	Day of your birthday in digits (e.g. 09 for Au- gust 9)
Personal Identification Number				

Topic block 1: New skills requirements in the field of digital health

The aim of this thematic block is to determine what skills insured persons will need in the future in order to be able to participate in an increasingly digital SHI system in Germany.

Thesis: The competence requirements for insured persons in the SHI system will change over the next few years as a result of ongoing digitalization. Please indicate the extent to which you agree with the following developments with regard to competence requirements for insured persons in the area of digital health by 2030 and assess their relevance in connection with the promotion of dHL.*

In the first round, there was a high level of agreement on some theses. These were not put up for assessment again, so the previous response options were reduced. The result of round 1 is summarized in the two values for agreement/ no agreement and relevance/ no relevance. The values are highlighted in red below. In addition, new response options were added based on your free text responses.

Please choose the appropriate response for each item:

	Agreement				Importance			
	disag- ree at all	disag- ree	agree	fully ag- ree	not im- portant at all	not im- portant	im- portant	very im- portant
Insured persons must be familiar with technologies such as AI or big data.								

	Agreement				Importance			
	disagree at all	disagree	agree	fully agree	not important at all	not important	important	very important
Consent: (Fully) agree: 59,4% Disagree (at all): 40,6% Relevance: (Very) Important: 56,3% Not important (at all): 43,7%	Presentation of feedback and newly added answer options derived from the first round							
Insured persons must retain control over technologies (e.g. be able to decide on "digital detox").								
Insured persons must be able to handle digital identities .								
Insured persons must be familiar with robotics .								
Insured persons must be familiar with sensors .								
Due to the increasing flood of information , insured persons must be able to decide which digital health information is important to them individually.								
Insured persons need to know how to access digital health information and services .								

Topic block 1: New skills requirements in the field of digital health

Would you like to make any final comments on the topic of "New skills requirements in the field of digital health"?

Feedback and comments from the first round

Feedback from the first round:

- We invest a lot in "hardware", a lot in software and little in the sensible use of these categorically new possibilities of digitalization. All "good" applications require "good" users. What makes a good user is also a result of the available teaching and learning opportunities and the skills ultimately acquired. We do not understand dHL enough as an "enabling technology" - otherwise it is difficult to understand the hesitant expansion of offers to strengthen dHL.
- Digital health literacy is not a skill that can be taught to the target group without a use case. At best, it can and must be implicitly included in the development of a specific offer. In this respect, it is less an offer than an attitude of the developers of offers, services, communication materials and digital products for prevention, health promotion, care, nursing and navigation in the healthcare sector.
- Health insurance companies will have to expand their role in order to offer individual support in the area of digital health literacy
- It is essential to take the insured along with them with regard to the new competence requirements in the area of digital health and to train them in line with their needs. This is the only way to increase the digital health literacy of each individual.
- Honesty is crucial here: on the one hand, there will 1. probably be digital applications which, if you acquire any missing skills, will mean improvements for you (or your relatives) (either procedural in terms of appointments, prescriptions, applications, overview of your own data, etc.), or medical to improve care provision. However, there will presumably also be "offers" or mandatory uses that do not offer any individual benefits

for the insured person and may also require effort, but increase the efficiency of care or serve research purposes. It seems important that a distinction is made between the two (even if they are initially indistinguishably present simultaneously in certain products and processes) and that they are communicated honestly.

- There has been a lot of talk about "must". In my view, however, it is not a must, but should
- Insured persons will have less and less need to interpret "raw data" from wearables, for example; due to the large amount of data in general in our lives, insured persons will increasingly be given less the data and more the interpretations and recommendations resulting from this data
- It should not/can not be the task of each individual policyholder to understand the individual technologies (How does big data work? To what extent does AI play a role in application x or diagnosis y and which one?) That would possibly be too much for the individual. But the individual has a right to find, understand and make use of the "best" in the field of "digital health". The health insurance fund can provide support as a navigator or advisor and guide.
- We can't just discuss the topic with skills. We also need to focus on the mindset. People need to be more open to change in the healthcare sector and want to try out new things. This has more to do with personality and attitude than with skills.
- Particularly with regard to the use of AI, it is becoming increasingly important for insured persons to be able to distinguish between real and fake and therefore trustworthy and untrustworthy.

Please write your answer here:

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

The aim of this thematic block is to determine the extent to which established roles, responsibilities and structures in the SHI system need to be further developed for the successful promotion of dHL.

Please indicate to what extent you agree with the following thesis and how relevant you consider the outlined development to be with regard to the successful promotion of dHL.

In the first round, there was a high level of agreement on two theses. These were not put up for assessment again, so the previous response options were reduced. As a result of round 1, the two values for agreement/ no agreement and relevance/ no relevance are summarized. The values are highlighted in red below.

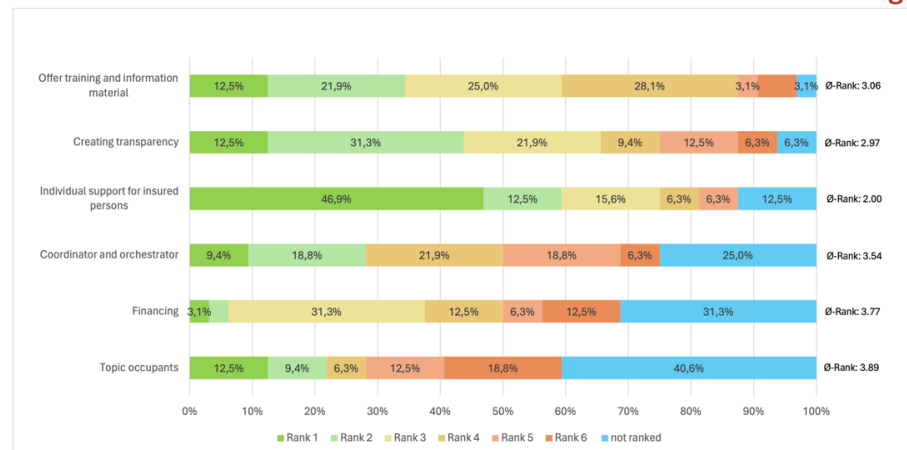
Please choose the appropriate response for each item:

	Agreement				Importance			
	disagree at all	disagree	agree	fully agree	not im- portant at all	not im- portant	im- portant	very im- portant
By 2030, new job profiles will be established to promote the dHL of insured persons in the SHI system. Example: Introduction of a "digital nurse" who advises insured persons in the doctor's practice on issues relating to the dHL (e.g. creating an electronic patient file, enabling video consultations). Consent: (Fully) agree: 75,0% Disagree (at all): 25,0% Relevance: (Very) Important: 77,4% Not important (at all): 22,6%								

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Thesis: The tasks of health insurance funds will change by 2030 with regard to the promotion of dHL. Please select from the list on the left which of the following tasks the health insurance funds will take on by 2030. Create a ranking and position the task that you consider most important for the successful promotion of dHL at the top of the list on the right using drag and drop. Leave the tasks that the health insurance funds will not take on on the left-hand side.

The diagram below shows the ranking distribution from the first round. The blue bar shows how often a task was not assigned to the health insurance companies. The other bars show the distribution by priority from rank 1 to rank 6. The Ø-Rank indicates the mean value of all ranked answers and is also highlighted in red in the answer options below.



Visual feedback
(see chapter 5)

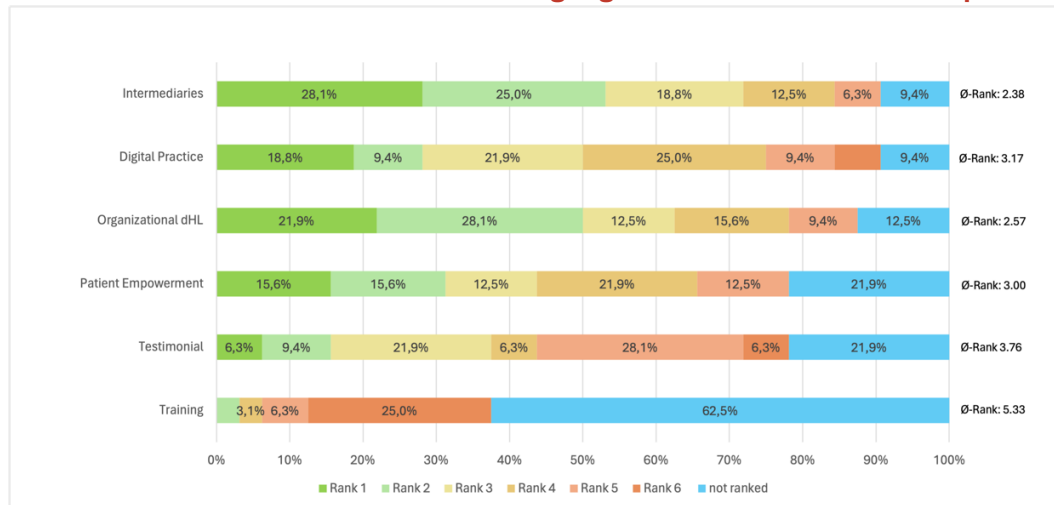
Please select at most 6 answers. Please number each box in order of preference from 1 to 6.

- **Offer training and information material:** e.g. flyers, health magazines
(Ø-Rank: 3.06)
- **Creating transparency:** better presentation of own service portfolio with regard to digital healthcare offerings
(Ø-Rank: 2.97)
- **Individual support for insured persons:** providing advice and guidance at the relevant point of contact (e.g. use of digital health information as part of care advice)
(Ø-Rank: 2.00)
- **Coordinator and orchestrator:** bringing together the players in the SHI system to jointly promote dHL
(Ø-Rank: 3.54)
- **Financing:** of support measures, also from other SHI players
(Ø-Rank: 3.77)
- **Topic occupants:** Positioning as the main actor responsible for promoting the dHL
(Ø-Rank: 3.89)

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Thesis: The tasks of doctors will change by 2030 with regard to the promotion of dHL.
Please select from the list on the left which of the following tasks doctors will take on by 2030. Create a ranking and position the task that is most important to you for the successful promotion of dHL at the top of the list on the right using drag and drop. Leave the tasks that doctors will not take on on the left-hand side.

The diagram below shows the ranking distribution from the first round. The blue bar shows how often a task was not assigned to doctors. The other bars show the distribution by priority from rank 1 to rank 6. The Ø-Rank indicates the mean value of all ranked answers and is also highlighted in red in the answer options below.



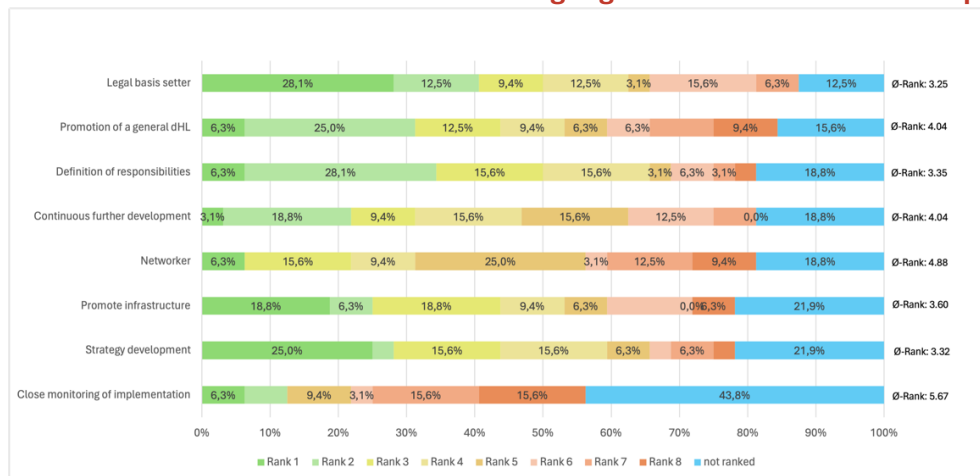
Please select at most 6 answers. Please number each box in order of preference from 1 to 6.

- **Intermediaries:** Proactive mediation of digital health services to insured persons, e.g. prescription of digital health apps, ePF, video consultations
(Ø-Rank: 2.38)
- **Digital practice:** supporting the digital infrastructure in the healthcare sector
(Ø-Rank: 3.17)
- **Organizational dHL:** Promotion of own dHL and that of the practice staff
(Ø-Rank: 2.57)
- **Patient Empowerment:** Promoting and demanding responsible and digitally health-competent insured persons in everyday treatment
(Ø-Rank: 3.00)
- **Testimonial:** Positive discussion of digitalization topics with insureds
(Ø-Rank: 3.76)
- **Training:** of insureds to improve dHL
(Ø-Rank: 5.33)

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Thesis: The tasks of politics will change by 2030 with regard to the promotion of dHL. Please select from the list on the left which of the following tasks politics will take on by 2030. Create a ranking and position the task that you consider most important for the successful promotion of dHL at the top of the list on the right using drag and drop. Leave the tasks that the policy will not take on on the left-hand side. Note: § 20k SGB V obliges the statutory health insurance funds to offer their insureds services to promote dHL.

The diagram below shows the ranking distribution from the first round. The blue bar shows how often a task was not assigned to politics. The other bars show the distribution by priority from rank 1 to rank 8. The Ø-Rank indicates the mean value of all ranked answers and is also highlighted in red in the answer options below.



Please select at most 8 answers. Please number each box in order of preference from 1 to 8.

- **Legal basis setter:** Definition and concretization of the requirements for the promotion of dHL in § 20k SGB V
(Ø-Rank: 3.25)
- **Promotion of a general dHL:** Establishing information campaigns as a trustworthy body, e.g. via the Federal Center for Health Education or the Federal Ministry of Health
(Ø-Rank: 4.04)
- **Definition of responsibilities:** of further responsible actors for the promotion of dHL
(Ø-Rank: 3.35)
- **Continuous further development:** of requirements for the promotion of dHL in §20k SGB V
(Ø-Rank: 4.04)
- **Networker:** Bringing together the players in the SHI system to promote dHL as part of jointly initiated measures
(Ø-Rank: 4.88)
- **Promote infrastructure:** Creating the structural basis for making digital health services accessible to insured persons
(Ø-Rank: 3.60)
- **Strategy development:** Stronger strategic handling of the topic, e.g. by integrating it into the digital strategy of the Federal Ministry of Health
(Ø-Rank: 3.32)
- **Close monitoring of implementation:** of support measures for dHL including sanctions in the event of non-compliance with legal mandates
(Ø-Rank: 5.67)

Topic block 2: Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL

Please indicate to what extent you agree with the following theses and how relevant you consider the outlined development to be with regard to the successful promotion of dHL among insured persons.

In the first round, there was a high level of agreement on one thesis. This was not put up for assessment again, so the previous answer options were reduced. As a result of round 1, the two values for agreement / no agreement and relevance/ no relevance are summarized. The values are highlighted in red below.

*

Please choose the appropriate response for each item:

	Agreement				Importance			
	disagree at all	disagree	agree	fully agree	not important at all	not important	important	very important
By 2030, pharmacies will be included in the promotion of dHL as a central consultation point for insured persons. Consent: (Fully) agree: 43,8% Disagree (at all): 56,2% Relevance: (Very) Important: 61,3% Not important (at all): 38,7%								

	Agreement				Importance			
	disagree at all	disagree	agree	fully agree	not im- portant at all	not im- portant	im- portant	very im- portant
By 2030, the interest groups and umbrella organizations in the SHI system will play a central role in promoting dHL of their members (e.g. GKV-Spitzenverband, KVs and KBV). Consent: (Fully) agree: 65,6% Disagree (at all): 34,4% Relevance: (Very) Important: 84,4% Not important (at all): 15,6%								
By 2030, a central and independent institution (e.g. foundation) will be established to promote dHL in the SHI system. Consent: (Fully) agree: 31,3% Disagree (at all): 68,7% Relevance: (Very) Important: 50,0% Not important (at all): 50,0%								

	Agreement				Importance			
	disagree at all	disagree	agree	fully agree	not important at all	not important	important	very important
By 2030, there will also be a National Action Plan for the promotion of dHL. Consent: (Fully) agree: 60,0% Disagree (at all): 40,0% Relevance: (Very) Important: 75,9% Not important (at all): 24,1%								
By 2030, all players in the SHI system will have to complete mandatory training on dHL. Consent: (Fully) agree: 41,9% Disagree (at all): 58,1% Relevance: (Very) Important: 73,3% Not important (at all): 26,7%								

By 2030, dHL topics will be part of the training and study programs for healthcare professions. Consent: (Fully) agree: 65,6% Disagree (at all): 34,4% Relevance: (Very) Important: 96,9% Not important (at all): 3,1%								
By 2030, a high organizational dHL will be part of quality assurance standards in the SHI system. Consent: (Fully) agree: 58,1% Disagree (at all): 41,9% Relevance: (Very) Important: 77,4% Not important (at all): 22,6%								

Would you like to make any final comments on the topic of "Roles and responsibilities of stakeholders in the SHI system for the promotion of dHL"?

Feedback from the first round:

- The normatively and technically defined responsibilities are often not reflected in the understanding of roles and, above all, in the active actions of the central SHI players. Since 2019, we have had a law that obliges SHI providers to provide services for their policyholders. Even today, a large proportion of SHI providers document that they do not provide any services or that their services do not meet the requirements (!). The BMG takes note of this - and does nothing. The SHI providers do not publish their reports on this - they only become transparent after being requested by insured persons via information portals, which shows that the providers are not fulfilling their legally assigned roles and obligations. This behavior is one of the main obstacles to digital transformation (not "data protection", as these players often claim).
- It is not to be expected that "big things" will be done with regard to dHL. It will essentially remain a case of "learning by doing" and "muddling through", as is likely to be the case for practically all aspects of digitalization in the consumer sector, in my opinion. all conceivable organizations, especially those with direct contact to insured persons, will probably consider ways of dealing with it and implement them more or less well. it seems conceivable that dHL will be part of major digitalization activities in many areas and for many players. It is rather unlikely that there will be a concentration of "the" dHL as a topic in institutional form.
- When it comes to these issues, it is difficult to reconcile desire and reality. Many points are very important in the context of the dHL but are unlikely to be implemented.

- Even if the strengthening/promotion of the digital health literacy of insured persons has been assigned to the statutory health insurance funds by § 20k SGB V, implementation is still a task for society as a whole that can only be achieved jointly and by all systems. The earlier citizens are or become health literate, the more positive it is for their own health and the less burden it places on the entire (healthcare) system. In the best-case scenario, the topic should already be made compulsory in the school setting.
- In my opinion, it is very important that the individual players/interest groups in the healthcare system have a common goal and a common strategy with regard to dHL and that responsibilities are also defined.

Please write your answer here:

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

The third thematic block deals with how the topic of dHL must be understood and anchored in the German SHI system in the future.

Thesis: The understanding of dHL in the German SHI system must be homogenized.
Please indicate which of the following definitions* best describes dHL in your opinion at the present time.
Please select one of the following answer options. The parts of the text in bold represent significant changes in content compared to the previous definition. Please briefly explain below why you have chosen your definition.

*** The source for each definition can be found on the final page of this survey.**

The top answer from the first round was the third definition (46,9%). Reasons from round 1 are highlighted in red below.

Please choose **only one** of the following:

- "Digital health literacy is the ability to search, find, understand and evaluate health information based on digital sources and apply the knowledge gained to address health challenges and solve problems."
18,8% | Reasons for selection: includes only individuals, easy to understand, reflects the core of the topic.
- Digital health literacy "encompasses the **interplay of personal and social factors** in the use of digital technologies in searching, acquiring, understanding, evaluating, communicating and applying health information in all healthcare contexts with the aim of maintaining or improving quality of life throughout the lifespan."
3,1% | Reasons for selection: Comprehensive definition that refers to the entire lifespan and leaves out ethical, legal and social implications, which are not a core component of dHL.

- "Digital health literacy is the ability to use digital technologies **in a self-determined manner** for the purpose of maintaining, restoring or improving health. It enables patients and users to find and evaluate health information, **protect or release health-related personal data if necessary, assess the functionality, results and consequences of digital health applications, weigh up the advantages and disadvantages and act accordingly.** (...) Digital health literacy arises from the interaction of individual skills and socio-technological conditions. **It includes awareness of the ethical, legal and social implications for both individuals and organizations and enables them to shape digital change in a way that promotes health.**"

Top answer (46.9%) | Reasons for selection: Reference to legal requirements (§ 20k), self-determination as the primary goal, weighing up advantages and disadvantages included, inclusion of socio-technical framework conditions & organizational dHL, mapping the scope of the concept.

- Digital health literacy "encompasses individual, social and technical skills and resources that are important for searching, finding, understanding, evaluating and using digitally available health information. **It is a dynamic concept that is closely linked to the approach of lifelong learning and empowerment.** Digital health literacy **takes into account the continuous development of digital technologies.** It should enable citizens to increase their self-efficacy through the use of digital health applications and to lead a self-determined life with a high quality of life. Specific digital health literacy encompasses dimensions such as computer literacy, data literacy, privacy literacy, traditional literacy, media literacy, navigation literacy, information literacy and health literacy. These dimensions **must each be applied to the dynamic context of health, the healthcare system and society as a whole.** The respective specific competencies enable citizens to protect their privacy, increase data security and maintain and improve their health and well-being based on reliable information."

28,1% | Reasons for selection: includes lifelong learning approach and the dynamics of the concept.

- **None** of the options
3,1% | Reasons for the selection: A meaningful definition approach should refer to three elements, 1. the search/find/value and use of 2. digital information, applications and offers and 3. cultural, social and socio-technical systems and developments.

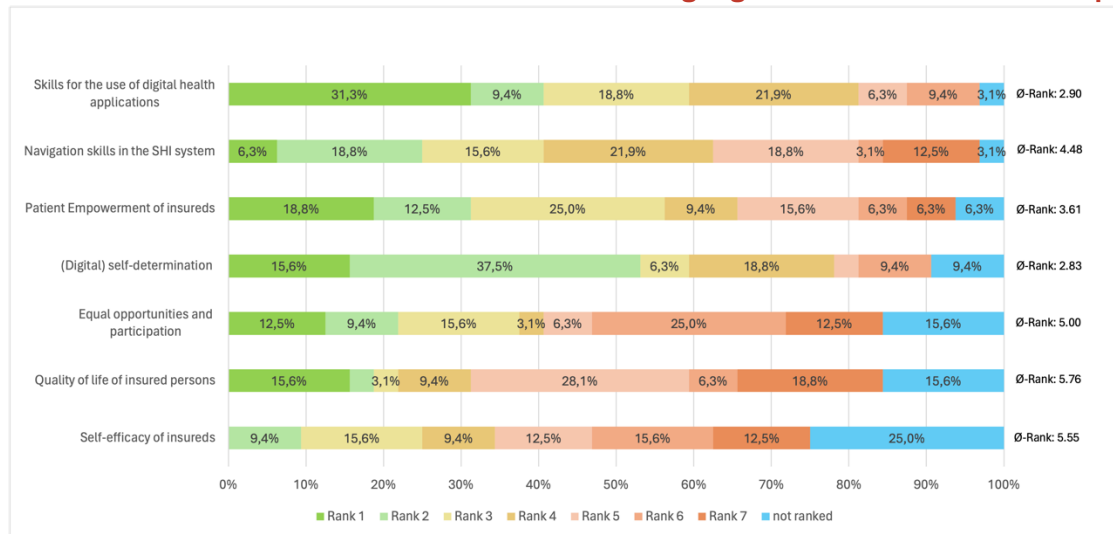
Please briefly explain why you have chosen this definition.

Please write your answer here:

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Thesis: For a successful increase in dHL in the SHI system, uniform goals must be defined to which the promotion is oriented. Please select which of the following objectives should be pursued with the promotion of dHL by insured persons. Create a ranking and position the goal that is most important to you at the top of the list on the right using drag and drop. Leave objectives that you do not consider relevant on the left-hand side.

The diagram below shows the ranking distribution from the first round. The blue bar shows how often a goal was perceived as not relevant. The other bars show the distribution by priority from rank 1 to rank 7. The average rank indicates the mean value of all ranked answers and is also highlighted in red in the answer options below.



Please select at most 7 answers. Please number each box in order of preference from 1 to 7.

- **Teaching skills** for the use of digital health information and applications
(Ø-Rank: 2.90)
- Increasing the **navigation skills** of insured persons in the SHI system
(Ø-Rank: 4.48)
- Strengthening the **Patient Empowerment** of insureds
(Ø-Rank: 3.61)
- Strengthening the **(digital) self-determination** of insureds
(Ø-Rank: 2.83)
- Increasing **equal opportunities and participation** of insured persons in the SHI system
(Ø-Rank: 5.00)
- Maintaining and improving the **quality of life** of insured persons
(Ø-Rank: 5.76)
- Strengthening the **self-efficacy** of insureds
(Ø-Rank: 5.55)

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Which of the following theses do you tend to agree with? Please use the slider (from -100 to 100) to express your agreement with the thesis shown on the left or right.

The average value of the survey results from round 1 is -55.

Your answer must be between -100 and 100

Please write your answer(s) here:

Topic block 3: Understanding and anchoring of dHL in the German SHI-system

Please indicate to what extent you agree with the following thesis and how relevant you consider the outlined development to be with regard to the successful promotion of dHL. *

In the first round, there was a high level of agreement on five theses. These were not put up for assessment again, so the previous response options were reduced. The result of round 1 is summarized in the two values for agreement/ no agreement and relevance/ no relevance. The values are highlighted in red below.

Please choose the appropriate response for each item:

	Agreement				Importance			
	Disag- ree at all	Disag- ree	Agree	Fully agree	Not im- portant at all	Not im- portant	Im- portant	Very im- portant
By 2030, there will be a coordinated curriculum in the SHI system that specifies the content for promoting dHL. Consent: (Fully) agree: 28,1% Disagree (at all): 71,9% Relevance: (Very) Important: 32,5% Not important (at all): 37,5%								

Would you like to make any final comments on the topic of "Understanding and anchoring digital health literacy in the German SHI-system"?

Feedback from the first round:

- I am missing monetary incentives for insured persons to strengthen their digital skills or use digital methods, e.g. in prevention
- It generally does not seem plausible that the competence requirements change quickly - even if new digital technologies are constantly being developed, the concept of competence must be seen as "deceleration": The competence itself must be such that it is possible with its help to acquire the "new thing" comparatively quickly (or to assess it and then, if necessary, not to acquire it.) To separate digital health competence from general digital competence is less due to conceptual differences. The "benefits and added value" of digitization are already being advertised. It is not the task of dHL to advertise more here. Conceptually, the dHL is more geared towards taking a critical look at expectations and, if necessary, enabling a realistic assessment.
- It should also be possible for doctors to compare the DiGAs with the individual contracts of the health insurance fund, and more transparency of the contracts and the DiGAs should be created for doctors so that they can quickly make an individual treatment recommendation. Health insurance companies often offer better contracts than DiGAs.
- We are at the beginning of digitalization in the healthcare sector. Many technologies (such as big data or AI) will be invisible/less visible to patients in the background and will help to provide digital solutions easily. For example, AI will probably enable a lot to be done via a voice interface and solved in dialog, which is currently "more difficult" for those affected to do themselves through Google searches and interpreting results etc.
- I think the topic of the opportunities and benefits of digitalization for patients is extremely important; far too often, the discussion is exclusively about data protection.

Please write your answer here:

Topic block 4: Support measures for dHL of SHI-insured persons

In this thematic block, the aim is to determine which specific measures can contribute to promoting the dHL of insured persons in the sense of a holistic concept at all levels of the SHI system.

Thesis: Measures to change the structures of the SHI-system must be taken in order to successfully promote dHL of insured persons.

Please evaluate the structural developments outlined below in terms of their relevance for the successful promotion of dHL and their likeliness of implementation.*

In the first round, there was a high level of agreement on two theses. These were not put up for assessment again, so the previous response options were reduced. The result of round 1 is summarized in the two values for agreement/ no agreement and relevance/ no relevance. The values are highlighted in red below.

Please choose the appropriate response for each item:

	Importance				Linkeliness			
	Not important at all	Not important	Important	Very important	Not likely at all	Not likely	Likely	Very likely
By 2030, insured persons in the SHI-system will be able to choose more cost-effective digital insurance tariffs (e.g. "video consultation first") to encourage them to engage with digital health services.								

	Importance				Linkeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
Relevance: (Very) important: 71,9% Not important (at all): 28,1% Likeliness: (Very) likely: 25,0% Not likely (at all): 75,0%								
By 2030, the SHI-system will have a user-friendly digital ecosystem that has largely digitized analogue processes (e.g. e-prescription, digital communication channels). Relevance: (Very) important: 100,0% Not important (at all): 0,0% Likeliness: (Very) likely: 65,6% Not likely (at all): 34,4%								
By 2030, insured persons in the SHI-system will be obliged to use a comprehensive digital ecosystem . Relevance: (Very) important: 50,0% Not important (at all): 50,0%								

	Importance				Linkeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
Likeliness: (Very) likely: 15,6% Not likely (at all): 84,4%								
By 2030, there will be new remuneration structures for the promotion of eHL by healthcare stakeholders. Relevance: (Very) important: 83,9% Not important (at all): 16,1% Likeliness: (Very) likely: 58,6% Not likely (at all): 41,4%								
By 2030, there will be structures in the SHI-system for testing, evaluating and implementing support measures in standard care. Relevance: (Very) important: 80,6% Not important (at all): 19,4% Likeliness: (Very) likely: 58,6% Not likely (at all): 41,4%								

	Importance				Linkeliness			
	Not important at all	Not important	Important	Very important	Not likely at all	Not likely	Likely	Very likely
By 2030, insured persons will be increasingly involved in digitization processes (e.g. in the development of health apps). Relevance: (Very) important: 93,8% Not important (at all): 6,2% Likeliness: (Very) likely: 58,1% Not likely (at all): 41,9%								
By 2030, health kiosks will be used as a low-threshold access and advice point for insured persons in matters relating to eHL. Relevance: (Very) important: 74,2% Not important (at all): 25,8% Likeliness: (Very) likely: 53,3% Not likely (at all): 46,7%								

Topic block 4: Support measures for dHL of SHI-insured persons

Thesis: To successfully promote dHL of insured persons in the SHI system, educational measures must be established for the insured persons.

Please evaluate the educational measures and developments outlined below in terms of their relevance for the successful promotion of dHL and their likeliness of implementation.

In the first round, there was a high level of agreement on four theses. These were not put up for assessment again, so the previous response options were reduced. The result of round 1 is summarized in the two values for agreement/ no agreement and relevance/ no relevance. The values are highlighted in red below.

Please choose the appropriate response for each item:

	Importance				Likeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
By 2030, there will be nationwide information campaigns on general digitalization topics (e.g. "E-prescription before the news"). Relevance: (Very) important: 84,4% Not important (at all): 15,6%								

	Importance				Likeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
Likeliness: (Very) likely: 46,9% Not likely (at all): 53,1%								
By 2030, dHL topics will be <i>incorporated in- dividually and integratively</i> (according to tar- get group, competence, needs) into every point of contact between insured persons and healthcare stakeholders (e.g. integra- tion into DMP training courses). Relevance: (Very) important: 90,6% Not important (at all): 9,4% Likeliness: (Very) likely: 53,1% Not likely (at all): 46,9% By 2030, SHI-insureds will have the oppor- tunity to obtain a "<i>digital driver's li- cense</i>" that will enable them to make appro- priate use of healthcare services. Relevance: (Very) important: 67,5% Not important (at all): 32,5%								

	Importance				Likeliness			
	Not im- portant at all	Not im- portant	Im- portant	Very im- portant	Not li- kely at all	Not li- kely	Likely	Very li- kely
Likeliness: (Very) likely: 21,9% Not likely (at all): 78,1%								

Topic block 4: Support measures for dHL of SHI-insured persons

Would you like to make any final comments on the topic of "Support measures for dHL of SHI-insured persons"?

Feedback from the first round:

- In my opinion, no major "support measures" are to be expected, as the topic of dHL is more likely to be of symbolic-rhetorical interest in the overall context of digitization-relevant players.
- In general, I believe that no "pilots" will be paid and that there will only be "individual support" if this is realized cost-effectively via technology / AI (this is also an advantage of technology).
- Targeted support measures are particularly important for older target groups. They are sick much more often than younger people and are also less able to deal with digital services or need a lot of help with them. However, with a view to the further development of digitalization/AI etc., it is also important to keep all insured persons digitally fit at all times.

Please write your answer here:

General final comments

Are there any general concluding remarks you would like to make about the Delphi study or the topic of digital health literacy?

Feedback from the first round:

- It's great that the field for implementing §20k SGB V is being scientifically monitored via this study! The law lacks evaluation. I wish it every success and exciting findings.
- Ultimately, the dHL cannot be detached from general educational issues relating to health on the one hand and digitalization on the other. If a competent approach to health issues and a competent approach to digitalization issues can be achieved, the dHL should be a success. Otherwise not. In my opinion, funding specifically for the dHL will do little to change this.
- Strengthening or expanding organizational health literacy is at least as important as strengthening the digital health literacy of each individual. The German (healthcare) system is intransparent and complex, especially for laypeople, which means that the system as a whole needs to be simplified (low-threshold access to information and/or services, understandable/simple language, etc.). Furthermore, additional topics such as navigational, communicative (teach back, chunk and check, ask me three), etc. should be established. Health literacy should also be considered and established.
- "Insured" is not the same as citizens. And "SHI" is not the same as the "healthcare system" in Germany. I don't know whether the wording of the survey was deliberate. In my opinion, this limited the possible answers (mentally) somewhat.
- I am looking forward to the results of the study. The topic is so important and has not yet been taken seriously enough by many stakeholders, including health insurance companies.

Please write your answer here:

Thank you for your participation in the second round of the Delphi study on the promotion of digital health literacy among SHI-insured persons in Germany. You are making a significant contribution to the definition of recommendations for the further development of framework conditions, responsibilities and measures for the promotion of dGK.

Once the evaluation has been completed, you will receive a management summary with the key results of the study. If you have any questions in advance, please do not hesitate to contact me!

Julia Ulbrich
Contact: julia.ulbrich96@t-online.de

Farewell Page

Please note:

The definitions used in topic block 3 are from Norman/ Skinner (2006), Bautista (2015), Samerski/ Müller (2019), Kolpatzik/ Zeeb/ Sörensen (2020).

