



Transforming German Healthcare: Building Connected Ecosystems to Enable Seamless Digital Health

**- Navigating Prerequisites, Essential Partnerships and
Challenges**

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ABSTRACT

Title: Transforming German Healthcare: Building Connected Ecosystems to Enable Seamless Digital Health - Navigating Prerequisites, Essential Partnerships and Challenges

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The healthcare industry is going through a major shift towards digitalisation, which is changing the way it operates and its overall business strategies. This transformation opens up possibilities for improving the healthcare system by creating interconnected healthcare ecosystems. This dissertation examines how ecosystems can benefit their stakeholders by analysing the experiences of Switzerland and their implications for Germany.

The study utilises eight expert interviews to acquire key insights. These ecosystems have the potential to optimise healthcare delivery, and encourage collaboration among stakeholders, resulting in a more efficient and patient-centered healthcare system. Switzerland's experience highlights the importance of intrinsic motivation, the right mindset, and promoting interoperability and added value to address the diverse needs of stakeholders. Strategic partnerships are crucial for building a connected health ecosystem, and selecting compatible partners is essential for fostering lasting collaboration. Health insurers, technology partners, and healthcare providers must work together to create a sustainable and effective ecosystem.

However, there are several challenges that impede the growth of ecosystems in Germany, including fragmented market structures and resistance to change. Change management and regulatory alignment are amongst other factors crucial for tackling these challenges and promoting international data exchange. With the arrival of big tech companies in the healthcare sector, there are a multitude of opportunities and challenges that need to be addressed as well. This study significantly contributes to the understanding of theoretical and practical aspects of healthcare ecosystems, offering a comprehensive framework for future developments in Germany.

Keywords: Digital Healthcare, e-Health, Healthcare Ecosystem, Strategic Partnerships, Competition, Germany

SUMÁRIO

Título: Transformando os cuidados de saúde alemães: Construindo ecossistemas conectados para permitir uma saúde digital perfeita - Prerequisitos de navegação, parcerias essenciais e desafios

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A indústria da saúde está passando por uma grande mudança para a digitalização, mudando a forma como opera e suas estratégias de negócios. Esta transformação abre possibilidades para melhorar o sistema de saúde através da criação de ecossistemas de saúde interligados. Esta dissertação examina como os ecossistemas podem beneficiar os seus stakeholders, analisando as experiências da Suíça e suas implicações para a Alemanha.

O estudo utiliza entrevistas de peritos para adquirir insights-chave. Esses ecossistemas têm o potencial para otimizar a prestação de cuidados de saúde e incentivar a colaboração entre as partes interessadas, resultando em um sistema de saúde mais eficiente e centrado no paciente. A experiência da Suíça destaca a importância da motivação intrínseca, da mentalidade correta e da promoção da interoperabilidade para atender às diversas necessidades das partes interessadas. As parcerias estratégicas são cruciais para a construção de um ecossistema de saúde conectado, e a seleção de parceiros compatíveis é essencial para promover uma colaboração duradoura.

No entanto, existem desafios que impedem o crescimento dos ecossistemas na Alemanha, incluindo estruturas de mercado fragmentadas e resistência à mudança. A gestão da mudança e o alinhamento regulamentar são, entre outros fatores, cruciais para enfrentar estes desafios e promover o intercâmbio de dados. Com a chegada de grandes empresas de tecnologia no setor da saúde, há uma infinidade de oportunidades e desafios que precisam ser abordados também. Este estudo contribui para a compreensão dos aspectos teóricos e práticos dos ecossistemas de saúde, oferecendo um quadro abrangente para futuros desenvolvimentos na Alemanha.

Palavras-chave: Digital Healthcare, e-Health, Ecossistema de Saúde, Parceria Estratégica, Co-opetition, Alemanha

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List of Abbreviations

AI	Artificial Intelligence
D-A-CH	The D-A-CH region refers to the three countries of Germany (D), Austria (A), and Switzerland (CH).
DigiG	Digital-Gesetz
e.g.	exempli gratia
EHDS	European Health Data Space
EHR	Electronic Health Record
eHC	Electronic Health Card
eHealth	Electronic Health
ePA	Elektronische Patientenakte
e-prescription	Electronic Prescription
mHealth	Mobile Health
WHO	World Health Organization

1. INTRODUCTION

1.1 Problem-Setting and Research Questions

Health care systems have waited too long to unlock the full potential of digital health. Patients should no longer have to wait. Digital ecosystems are the future of health care [&]= (Dive-Reclus & Jaeger, 2022).

Digitalisation is disrupting industries worldwide. Given the importance of healthcare in our daily lives, the related industry is expected to be a key political objective. Yet, the healthcare sector has been a late adopter in embracing its transformative potential. For a long time, it has lagged behind other industries and barely entered the era of digital innovation. However, the COVID-19 pandemic has acted as a catalyst, accelerating the integration of digital technologies in healthcare (Statista, 2023b).

As a result, the field of digital health has seen a rapid expansion in recent years. The importance of digital health in achieving universal health coverage and in enhancing the efficiency, accessibility, and effectiveness of healthcare is nowadays widely acknowledged. Simultaneously, the challenges brought about by COVID-19 have highlighted the different capacities of countries to modernise their healthcare systems (WHO, 2023). One of them is Germany.

The German healthcare system has been lagging behind other European countries in terms of digitalization - the pandemic in particular has ruthlessly exposed many weaknesses in German healthcare. Even with its enormous potential for digital development and expansion, the healthcare sector is still associated with many barriers and considered as a complex and difficult-to-enter market for innovative companies (Kohl et al., 2023).

The integration of digital technology in the German healthcare system has nowadays certainly been recognised as a crucial method for maintaining and enhancing the standard of treatment, particularly in regions with limited resources or infrastructure. However, the implementation of this large project has been rather slow so far. Despite the German healthcare system being one of the most expensive in Europe, essential basic requirements for successful digitalization have been inadequately pursued for years, resulting in incomplete digital structures (Bratan, 2022).

Despite these challenges, the outlook is quite encouraging: The German healthcare industry is currently developing very rapidly, and the number of companies in the e-health sector in

Germany is growing significantly faster than the healthcare ecosystems of comparable industrialized countries (McKinsey & Company, 2024). The COVID-19 pandemic in particular has massively boosted the acceptance of digital services among both patients and doctors. This development is highly welcomed by experts, as the level of digitalisation in the German healthcare system is particularly in need of improvement in comparison to other sectors and countries.

In the dynamic landscape of digital health and health tech start-ups, strategic partnerships are emerging as a pivotal factor for driving success (Smith, 2023). Nonetheless, while the number of partnerships has increased 1.5-fold between 2021 and 2022 both in Europe and globally, the number of partnerships entered into by start-ups in Germany has decreased in the same time frame. In addition, only 10% of start-ups in Germany entered into a partnership between January 2019 and January 2023 - a significantly lower proportion than in other European countries (McKinsey & Company, 2024). In order to maintain this growth, an environment is needed in which partnerships can be expanded more easily: A digital interconnected healthcare ecosystem. In contrast to single solutions, these ecosystems provide user-facing applications through an interconnected platform that combines several single solutions into seamless patient journeys (Biesdorf, Deetjen & Kayyali, 2021).

Switzerland has recently emerged as a pioneer in the D-A-CH region by launching two distinct healthcare ecosystems, signaling a proactive approach towards digital innovation in healthcare. As Germany seeks to embark on similar initiatives by disclosing their Vision 2030¹, lessons from Switzerland's experiences become invaluable.

The following research questions arise:

1. How do the experiences of countries like Switzerland, which have already launched healthcare ecosystems, inform the development and implementation of similar initiatives in Germany? Specifically, what lessons can be drawn from their approaches in terms of frameworks and prerequisites, particularly considering the fragmented nature of the healthcare industry and the diverse range of stakeholders involved?
2. What types of partnerships and cooperation models are crucial for building a connected health ecosystem, what criteria guide their selection as suitable partners and how do

¹ German Federal Ministry of Health published <Vision 2030=: The creation of a customer-centered digital ecosystem for healthcare and nursing (Bundesministerium für Gesundheit, 2023).

these partnerships ensure long-term collaboration, alignment of standards, and mutual benefits among ecosystem participants?

3. What are the primary barriers and challenges faced by digital health startups and other stakeholders within the German healthcare sector, and how do these impact ecosystem development and response to market pressures, including competition and conflicts of interest?

1.2 Research Gap

Previous studies have emphasised the significant role of digital platforms in transforming healthcare infrastructure. Despite the rising number of digital service providers, customers seem to be becoming increasingly confused by the broad range of options and the associated information silos. In consideration of this, one potential solution might include the formation of strategic partnerships and the transition towards integrated digital platforms that offer a seamless digital patient journey. To convert the fragmented healthcare industry into an interconnected ecosystem, it is crucial to establish relationships between the different parties and stakeholders. Further investigation is required to identify essential system prerequisites and to understand how long-term, sustainable collaborations can be built up (Burch J., 2023).

1.3 Research Structure

This dissertation is organised into six chapters, starting with a literature review that dives into digitalisation in the healthcare sector by examining what the fields of e-Health and Digital Health encompass. Beyond, the concepts of Healthcare Ecosystems and (Seamless) Digital Patient Journey are explored in detail and the current state of digital health adoption in Germany is analysed. As a second thematic sphere, the literature review includes an in-depth investigation of Strategic Partnerships and Cooperations in Ecosystems.

The subsequent methodology chapter outlines the research design, data collection, and coding procedures employed to address the research questions. The subsequent chapter describes the empirical setting, including details about the eight interviewed experts, their approaches, and the insights gained. Following that, key findings from the qualitative research are presented and organised according to the theoretical concepts used to address the research questions. These results are then compared with the literature reviewed earlier, before limitations encountered in

the study will be acknowledged as well as future research will be proposed. Finally, the concluding summary rounds off the study by highlighting the main discoveries.²

² Parts of this dissertation were translated with the assistance of AI tools, such as DeepL Write and QuillBot. The content of this academic work was fully originated by the author.

2. LITERATURE REVIEW - THEORETICAL DISCUSSION

The following chapter discusses fundamental terms and concepts, such as digital health, digital healthcare ecosystem, seamless patient journeys, as well as strategic partnerships. This aims to provide the reader with a deeper understanding of the relevance of particular definitions while contextualising them within this dissertation.

2.1 Digital Health and eHealth

The World Health Organization (WHO) defines digital health as <the field of knowledge and practice associated with the development and use of digital technologies to improve health= (WHO, 2023). Digital health broadens the scope of Electronic Health (eHealth) by encompassing digital consumers, who utilise a variety of smart devices and interconnected technology, including the Internet of Things (IoT), artificial intelligence (AI), blockchain and big data. The Digital Health market covers a wide range of technologies, including mobile health apps (mHealth), connected wearable devices and fitness trackers, as well as telemedicine (Statista, 2023b). An essential component of eHealth, mobile health (mHealth), will be outlined in the following section.

2.1.1 mHealth

Mobile technologies are increasingly integrating seamlessly into people's everyday lives. Their adoption characterises our era of accelerated interpersonal communication and information transfer. Thus, mobile technologies are also revolutionizing healthcare services in form of mobile health (mHealth) practices. mHealth refers to the provision of medical procedures and public healthcare practices through wirelessly connected devices such as smartphones or digital assistants (European Commission, 2017). Telemedicine (telehealth), on the other hand, is defined as the provision of healthcare services in the areas of diagnostics, therapy, rehabilitation and health counselling at a distance through communication technologies.

The main actors in the field of digital and mobile health are defined as the patients or consumers³ of health, not the service providers. Thus, the patient journey takes over a key role

³ Within the healthcare industry, it is traditionally referred to patients rather than customers as a target group. However, current developments indicate that the patient is progressively adopting the role of a consumer, similar to those in other sectors. This phenomenon can be ascribed due to the rising expectations and self-determination of a progressively empowered patient, as well as the blurring boundaries between customers

in the future of the healthcare sector and will be examined extensively in the upcoming chapter, as well as the establishment of a system which prioritises their needs (Vision 2030).

2.2 Healthcare in Germany

<Almost everything we do these days has gone digital. The glaring exception has been health care= (Dive-Reclus & Jaeger, 2022). Germany was late in entering the e-health sector. This was primarily due to high entry barriers such as tight regulatory restrictions, as well as data sensitivity and customers' concerns about privacy.

Nonetheless, developments are promising. Currently, digital healthcare solutions in the mid three-digit range in the areas of prevention, diagnostics, therapy, consultation, care, etc. form a very heterogeneous landscape (Schachinger, 2023). However, the complexity of the healthcare sector has led to the emergence of numerous single-solution providers, resulting in information silos that limit potential innovation and foster customer confusion (Roland Berger, 2020; Kane et al., 2015).

2.2.1 Digital-Gesetz (DigiG)

Recently, on 14 December 2023, the German Bundestag laid the groundwork for the acceleration of the digitalisation of the healthcare system by adopting the Digital Law (DigiG). The aim is to improve daily care in Germany with digital solutions such as the electronic patient record (ePA) and the electronic prescription (e-prescription).

2.2.2 ePA⁴

<Current blood counts, previous illnesses, medications or the specialist's most recent examination report -- with the electronic patient record (ePA), all health data can be accessed via an app anywhere in the world= (Federal Office for Information Security, 2024). With this electronic patient file, insured persons always have their entire health record at a glance, as well as the medical personnel who provide them with the necessary treatment (gematik, 2024).

Any health-related information required is stored securely and centrally in one place in the ePA. So, it enables important information for the treatment of patients to be made available

and patients. For example, an individual receiving medical care at a nearby hospital can also be a consumer of the Apple Health service or the fitness tracking application "Strava" (Unterbrunner & Raab, 2023). This development is correlated to the general shift from curative to preventive care.

⁴ Abbreviation for <Elektronische Patientenakte=; German equal for Electronic Health Record (EHR)

immediately, for example diagnostic data, diagnoses, therapy measures, treatment reports and electronic medication plans (Bundesgesundheitsministerium, 2024).

For the first time, patients would have sovereignty over their data and can decide for whom they allow access to it. If they disclosed this information to service providers, the quality of treatment would be indirectly improved because doctors would have a more comprehensive understanding of the individual patient's history and could thus better personalise treatment. The electronic patient record (ePA) will be implemented for all people with statutory health insurance at the start of 2025. If you do not want to use the ePA, you can object (Opt-Out approach), which will significantly promote widespread use (Bundesgesundheitsministerium, 2024).

2.2.3 e-prescription

The ePA will include an integration of the feature of electronic prescriptions. In Germany, the paper prescription of medications was replaced by the e-prescription on January, 1 2024. Insured persons will then only receive prescription-only medicines via e-prescription and can redeem them with their electronic health card (eHC), via app or by printing out a paper copy.

A secure transmission of e-prescriptions will be ensured, which will connect all parties involved in the healthcare system. In future, patients will be able to decide for themselves whether they want to manage their e-prescription via the secure e-prescription app and send it digitally to the pharmacy of their choice or whether they prefer to print out the access data required to redeem their e-prescription (as is currently the case). After, depending on the preference, the prescribed medication can then either be collected or delivered to the home address by courier service. Through that, workflow processes for the creation and fulfilment of prescriptions become leaner and more efficient as doctors and pharmacists save time and resources when documenting, transferring and filing prescriptions (Bundesgesundheitsministerium, 2024).

The German Federal Ministry of Health sees especially huge potential in the ePA to become the centre of an ecosystem in which we connect a variety of care services and providers to meet individual healthcare needs. This would make the ePA something like the connectivity hub of a digitally networked healthcare system (Bundesministerium für Gesundheit, 2023).

In order to dive deeper into the perspective of the individual end-consumer who makes use of the care services, a seamless digital patient journey will be mapped in the following section.

2.3 Seamless Digital Patient Journey

The patient journey begins far in advance of an actual disease or diagnosis, as people are increasingly concerned with prevention, i.e. with all suitable and targeted measures that serve to prevent a later illness. However, today's healthcare consumers are primarily concerned with a high quality of life and therefore they are increasingly demanding convenient and user-friendly help via digital media, just as they are used to in other areas of life such as the mobility, travel and e-commerce sector (Accenture, 2019).

The patient usually begins one's digital journey by either seeking information about symptoms, or by connecting their wearable devices and fitness trackers to start tracking their health data. Necessary paperwork, such as medical history and consent forms, is completed online for convenience, streamlining administrative processes as making it accessible for relevant future parties. Relevant information regarding hereditary diseases can be stored as well. The patient also gains access to their electronic health record (EHR; German ePA) through the platform, providing insights into their medical history and ongoing healthcare interactions.

In the following monitoring phase vital signs, physical activity levels, sleep patterns and nutrition data will be tracked through wearable devices and fitness trackers. This data will be analyzed by artificial intelligence (AI) and used for delivering personalized suggestions for improving health and achieving fitness goals.

The monitoring phase is followed by the interaction phase: In case some irregularities in health metrics are detected, the system prompts the patient to schedule (virtual) consultations with healthcare professionals through the digital platform. It will be able to suggest the next available date with your favoured healthcare professional and send you automated reminders. After, the patient will engage in (virtual) consultations with healthcare providers, discussing symptoms, receiving diagnoses, and discussing treatment options.

After virtual or on-site consultation, the post-encountering phase starts: Patients are able to receive an electronic prescription (e-prescription) from the healthcare professional, which

they can electronically send to pharmacies for fulfillment or order medications through (online) pharmacies with the option of immediate or same-day delivery.

Moreover, patients can engage online in post-appointment communication with healthcare providers through secure messaging platforms or telemedicine follow-up appointments to discuss treatment progress, address concerns, or receive further guidance. If they consulted a doctor in person or even had to stay in hospital in case of emergency, the following phase of discharge planning takes also place online. Patients transitioning from acute care settings are able to receive digital discharge instructions, medication lists, and follow-up appointment scheduling.

Follow-up care can again be supported digitally, for example by therapy applications. These help, for example, with completing daily exercise training and taking medication. Wearables or other telemonitoring systems can also further facilitate the post-therapy process if required. This allows follow-up care to be carried out in an extremely resource-efficient manner for both patients and medical professionals.

Health insurance companies are also meant to be integrated in the digital journey through Billing and Insurance Management: The patient utilizes the platform to submit medical bills to health insurance companies and manage insurance coverage.

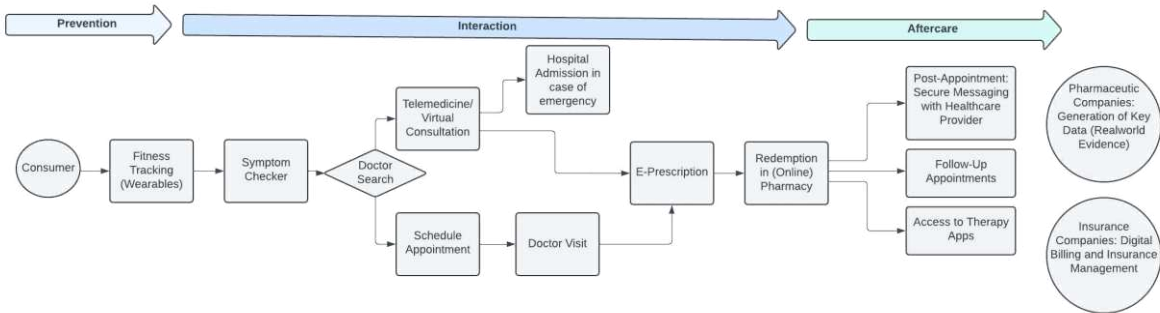


Figure 1: The interplay between digital and analogue healthcare services along a holistic patient journey (demonstrated by an exemplary illustration; source: own illustration).

In Germany, a mapped holistic patient journey currently only exists in theory. The majority of digital offerings are standalone products or services, which can be confusing for people navigating the many options. Ecosystems could address this issue by offering a comprehensive solution that supports patients throughout their entire healthcare journey. Customers and patients seek to enhance their overall quality of life rather than simply

consuming isolated services. Only by linking all touchpoints in the best possible way and building up a scalable network, an ecosystem, patients can receive holistic care tailored to their needs. Ultimately, this will enable overcoming existing gaps and improving access to services, thus enhancing the patient journey (Unterbrunner & Raab, 2023; Biesdorf, Deetjen, & Kayyali, 2021).

2.4 Vision 2030

In order to keep pace with the developments elaborated above, an environment is required in which partnerships can be formed and extended more easily, as well as clinical validations carried out in a more targeted manner.

Therefore, the German Federal Ministry of Health's Vision 2030 is to create a customer-centered digital ecosystem for healthcare and nursing. The objective is to create a healthcare system that prioritises the needs of patients and effectively integrates both digital and on-site components. The stakeholders involved in the system are closely linked and engage with each other via digital technologies and apps. The focus will be on the electronic patient file (ePA), with the aim of transforming it into the personalised health platform for insured individuals.

With this digitization strategy, the foundation for a consistently human-oriented, digital-supported healthcare that offers concrete added value is supposed to be laid (Bundesministerium für Gesundheit, 2023). The following sub-chapter will look deeper into the framework and characteristics of ecosystems.

2.4.1 Digital Health Ecosystem

The term "digital ecosystem" refers to a framework where corporations and individuals collaborate, maintaining their independence while seeking mutual benefits from their participation. It is characterised by a central digital platform that effectively facilitates this cooperation (Fraunhofer-Institut für Experimentelles Software Engineering, 2024).

One defining feature of healthcare ecosystems is customer/ patient-centricity: For the large pharmaceutical company Roche ecosystems provide society with <new ways to improve patient outcomes and overall population health= (Roche Diagnostics, 2024). Similarly,

Swiss healthcare ecosystems emphasize customer-centricity in their mission: <movos⁵ mission is to support relevant stakeholders in making better and faster decisions in healthcare. [They] [...] place patients at the centre of all activities= (movos, 2024). Compassana also claims being <based on an ecosystem that puts patients at the centre and connects service providers, doctors and insurers with each other= (Compassana, 2024).

Secondly digital ecosystems thrive on connectivity and collaboration. They connect diverse data resources, applications, devices, and technologies, enabling seamless interaction (Roche Diagnostics, 2024). For example, the Swiss healthcare ecosystem Well <connects what belongs together: doctors, pharmacies, insurers and your health= and is therefore able to <bring [&] the Swiss population more "quality of care" with customised and data-driven integrated care offerings= (Well CH, 2024).

The primary advantage of a digital ecosystem arises from the integration of a digital platform and multiple collaborators who engage in the ecosystem for mutual benefit (Fraunhofer-Institut für Experimentelles Software Engineering, 2024). So, the core idea of a <business ecosystem= is the partnerships among several players can create products or services more efficiently than any individual player could alone.

When high modularity⁴the ability to mix the services of many players⁴meets the requirement for coordination to align stakeholder activities, ecosystems emerge as the most effective form of governance. These are typical circumstances in the healthcare industry, where the system is composed of various different players such as providers (hospitals, doctors, therapists), payers (health insurers), suppliers (pharmacies, pharmaceutical and medtech companies), and regulators. Each of these players provides supplementary components that require to be coordinated and interconnected for providing a seamless patient experience (Pidun et al., 2021; Koerber et al., 2023).

<At the center of every digital ecosystem is a platform: the robust, open digital infrastructures and services that enable an entire network of diverse players to share data more easily and securely= (Dive-Reclus & Jaeger, 2022). To unlock the full potential of digital health, ecosystem approaches must seamlessly connect various services and solutions to enhance patient experiences. Ecosystems integrate medical data from the health system with patient-

⁵ Two Swiss national digital healthcare ecosystems, Compassana and Well, have already been launched. A third Swiss ecosystem, movos, is currently being developed, also focusing on patient sovereignty throughout their healthcare journey.

generated data from digital health applications (Deetjen, 2020). This integration allows patients to collect vital data independently and enables telemedicine providers to diagnose and issue electronic prescriptions (Pidun et al., 2021). Consequently, the roles of the actors involved are evolving.

To sum up, ecosystems should be taken into consideration in the field of healthcare at that point in time to meet the increasing demand for convenience, service, and flexibility that patients expect. A digital healthcare ecosystem

- Meets the specific requirements and needs of potential customers and patients (customer-centricity).
- Connects various players and their services, fostering collaboration.
- Appeals to both consumers and service providers.
- May modify the current distribution of roles within the sector.
- Provides additional value for all partners involved in the ecosystem service

From drawing together the essential characteristics of ecosystems, the following research questions arise: How can successful partnerships within an ecosystem look like? How does the distribution of roles look like in a successfully established ecosystem? What additional effective regulatory frameworks are crucial to build a digital healthcare ecosystem in Germany? Which concrete added value is necessary to convince stakeholders to become part of such interconnected ecosystem?

Before addressing the arising questions, it is essential to highlight the most crucial precondition for a successful ecosystem: cooperation between partners (Pidun et al., 2021, p.1). Thus, the following chapter will delve deeper into collaboration approaches.

2.5 Strategic Partnerships

As stated above, in the rapidly evolving digital healthcare landscape, strategic partnerships⁶ are not merely advantageous but essential. As already articulated by Doz and Hamel (1998) <In this new world of networks, coalitions, and alliances, strategic partnerships are not an option but a necessity=.

⁶ In this dissertation, the terms 3 <strategic partnership= and <strategic alliance< 3 will be used interchangeably.

This chapter delves into the various approaches to strategic alliances and partnerships within the context of digital healthcare ecosystems, emphasizing the critical need for cooperation among healthcare service providers, technology firms, pharmaceutical companies, health insurance providers, and start-ups.

A strategic alliance is a formal agreement between two or more independent entities to collaborate and leverage each other's resources, expertise, and capabilities to achieve mutually beneficial objectives. In digital healthcare ecosystems, such alliances aim to enhance innovation, improve patient outcomes, and foster sustainable healthcare solutions (Koza & Lewin, 1998; Mowery, Oxley, & Silverman, 1996; Varadarajan & Cunningham, 1995).

Strategic alliances can be broadly categorised into vertical and horizontal alliances: Vertical Alliances involve cooperation between companies and their suppliers and customers along the value chain. Vertical alliances focus on sharing resources such as raw materials, production capabilities, and distribution networks to maximize mutual benefits (Rindfleisch & Moorman, 2001). In the contrary, horizontal alliances are formed between companies operating in the same business area, horizontal alliances aim to increase market power and reduce competition by jointly exploiting market opportunities (Swaminathan & Moorman, 2009).

Vertical alliances often feature high-value collaborations and complementary information exchange, while horizontal alliances typically target market expansion and competitive advantage. Furthermore, these alliances can be either symmetric or asymmetric: Symmetric alliances are generally formed between companies of similar size and market power, these alliances are motivated by the mutual recognition of equal value and bargaining power (Kalaiganam, Shankar, & Varadarajan, 2007). Asymmetric alliances occur when a large company partners with a smaller one within the same industry to access each other's complementary resources. An example is big tech firms partnering with large pharmaceutical companies to leverage their regulatory expertise (Stuart, 2000; Yu, Xu, & Dong, 2019).

Strategic alliances offer numerous benefits for innovation:

- **Enhanced Learning and Skill Development:** Partnerships provide valuable opportunities for companies to learn from each other and develop new skills, enhancing their innovation capabilities (Belderbos, Carree, & Lokshin, 2004).

- **Knowledge Sharing:** Collaborating with diverse partners often leads to the generation of novel ideas and solutions, contributing to a richer knowledge base (Faems et al., 2005; Granovetter, 1973).
- **Risk Mitigation:** Sharing risks across multiple entities helps mitigate the impact of potential challenges or setbacks, fostering a more resilient innovation process (Chesbrough, 2003; Sandulli & Chesbrough, 2009).
- **Cost Savings and Efficiency:** Shared expenses in research and development, marketing, and infrastructure can lead to significant cost savings and faster time-to-market (Du, Leten, & Vanhaverbeke, 2014; Ind, Iglesias, & Markovic, 2017).

2.5.1 Relevance in Healthcare Ecosystems

Strategic alliances in digital healthcare ecosystems typically exhibit the following characteristics:

- **Mutual Benefit:** Alliances are structured to provide reciprocal advantages, leveraging the strengths of each partner (Doz & Hamel, 1998).
- **Shared Resources:** Partners contribute and share critical resources such as technology, knowledge, and infrastructure (Kim et al., 2010).
- **Collaborative Innovation:** Joint efforts are directed towards creating innovative solutions to complex healthcare challenges (Lubell, 2015).
- **Flexibility and Adaptability:** Alliances must be agile to adapt to the rapidly changing healthcare landscape (Bouncken & Kraus, 2021).
- **Trust and Transparency:** Effective alliances are built on trust and transparent communication between partners (Ivashchenko & Isaeva, 2021).

Building a range of partnerships is crucial for the development of an interconnected ecosystem. The importance of collaborative partnerships in the creation of interconnected ecosystems is emphasised by these studies collectively. Despite the extensive literature on the benefits of strategic alliances, most studies focus on partnerships between companies in general. There is a gap in research specifically examining strategic partnerships within digital healthcare ecosystems. This study aims to fill this gap by exploring the key success factors and best practices for strategic collaboration in this specialized context.

3. METHODOLOGY

The subsequent chapter outlines the methodological framework that has been used to address the presented research questions, which was derived from a combination of qualitative expert interviews and a literature review. To mitigate potential biases that may arise from singular research methods and guarantee a thorough comprehension of the research subject, this methodology has been selected (Yu, 2009; Clark & Creswell, 2007). It provides a detailed explanation of the methodology for conducting expert interviews, defines the term <expert= and justifies the selection of interview participants, describes the interview procedure and key contextual factors, and lastly explains the structure of the interview guide and the data analysis method.

3.1 Methodological Procedure - Qualitative Research

Quantitative and qualitative methodologies are the two most prevalent methodologies for gathering research data (Ghauri, Grenhaug, & Strange, 2020). In contrast to quantitative research, qualitative research is focused on exploring and understanding behaviours, perspectives, and experiences within a specific environment. The sample size is typically smaller in this methodology, and the author's interpretation of the data is given more weight. This kind of research is well-known for its higher flexibility, which lets researchers take newly acquired information into account and receive a more comprehensive understanding of the context. The procedure covers the collection and analysis of non-numerical data, like expert interviews or observations, with the objective to gain valuable knowledge, predominantly in business context (Bell et al., 2022).

Given the complexity and emerging nature of digital healthcare ecosystems, this study adopts a qualitative research methodology. This approach is particularly well-suited when investigating novel and complex aspects of a subject, as it enables the researcher to gain a comprehensive understanding that is not restricted by predefined hypotheses. Qualitative research is crucial for the exploration of multifaceted concepts such as digital healthcare ecosystems, as it considers subjective elements and enables flexibility and adaptability throughout the research process (Williams, 2011). In an area of study with a very limited existing literature, it is particularly essential to allow for the development of new perspectives and concepts.

3.1.1 Semi-Structured Interviews

Semi-structured interviews were conducted to capture insights from diverse stakeholders within the German healthcare sector, focusing particularly on digitalization trends. Following a general set of questions, the order as well as the specific content are modified according to the answers of the interviewee. This method provided a balance between structure and flexibility, enabling exploration of predefined themes while accommodating variations in participant responses (Bernard, 2006). These interviews allow participants to freely articulate their thoughts, experiences, and perspectives.

3.1.2 Data Collection

For this dissertation, semi-structured interviews were conducted with eight industry experts to gather comprehensive insights into digital health ecosystems. Expert interviews provide a method for accessing specialised knowledge (Gläser & Laudel, 2010).

3.1.2.1 Structure of the interview guide

The interview guide was designed to balance open-ended questions with necessary structure (Baur & Blasius, 2014). The semi-structured interviews were organized into four categories: Introduction, Establishment of a Health Ecosystem, Strategic Partnerships & Cooperation Models, and Challenges & Market Environment Outlook.

After a warm welcome, participants received an introduction to the study, including its background and research objectives, the interview procedure, confidentiality assurances, and the purpose of the research. The following section which polls about the establishment of an ecosystem encourages participants to share their experiences on framework conditions, stakeholder and their required added value and potential conflicts of interests. The third category delves deeper into necessary types of partnerships and cooperation models. Lastly, participants were asked to share their views on current major challenges as well as the future trends in the market environment. The interview concluded with a thank you to the participants for their time and insights. A detailed list of interview questions is provided in Appendix 1 followed by a tabular display of the relevance of the research questions and their foundation in literature (Appendix 2).

3.1.2.2 Selection of interviewees

Eight interview participants were selected based on specific criteria to ensure the quality and relevance of their insights. These criteria included years of experiences in establishing their own ecosystems or offering consultancy services for existing ecosystems. Participants were identified through existing professional contacts, LinkedIn, and the snowball sampling method, where initial experts recommended additional interviewees. This method proved effective in this niche and emerging field of healthcare ecosystems, ensuring a specialised selection of experts. Despite the tight industry focus on the healthcare sector, the involved experts provided a broad range of perspectives on the research topic.

The subsequent table presents the selected interviewees, provides rationale for their selection, and specifies the date and duration of the interview sessions. For confidentiality reasons, the names of the interview participants are anonymised, with only their respective companies and job positions disclosed.

Table 1: Choice of Interview Partner

#	ID	Company / Organization	Position	Relevance/ Reason for Selection	Location	Date & Length
1	E1	movos CH	CEO & Founder	The start-up movos, founded in 2022, aims to establish ecosystems along the patient journey. As a neutral third party, it connects relevant stakeholders and moderate a transparent and trust-based dialogue between industry, healthcare providers and patients.	Switzerland	18.04.2024 30 min
2	E2	DigiHealth Start NRW (Ruhr-Universität Bochum)	Academic Researcher (University Project Digital Health)	The project <Digital Health Ecosystem NRW 3 Fokus Start-ups 2025= aims to build a sustainable ecosystem with a focus on digital health start-ups that produces patient-oriented digital products and digital-supported innovative services.	Germany	18.04.2024 40 min

			Start-Up)			
3	E3	RoX Health (Roche) / Professor at FU Berlin	Venture Architect & former Ecosystem Founder	RoX, a venture builder in healthcare, develops digital platform business models for patients, healthcare professionals and caregivers.	Germany	24.04.2024 45 min
4	E4	Compassana CH	Head of Ecosystem Partner Management	Compassana connects medical and medical-related service providers and promotes their cooperation via a digital healthcare platform. It is the centrepiece of the smart ecosystem for health in Switzerland. The platform optimises the integrated care of healthcare providers and the coordination of patient pathways.	Switzerland	02.05.2024 65 min
5	E5	Acitoflux	Digital Health Ecosystem Lead	Acitoflux is a consulting & venture building company which turns digital business ideas into ventures and invests in ecosystems and digital health.	Germany	02.05.2024 40 min
6	E6	Well Gesundheit AG	CEO	Launched nationally in 2022, Well is an open platform that connects all relevant stakeholders in healthcare: doctors, pharmacies, insurance companies, and consumers. The Well app offers anyone in Switzerland an end-to-end user journey through the healthcare system.	Switzerland	03.05.2024 45 min
7	E7	5-HT Digital Hub Chemistry & Health	Ecosystem Manager in the Digital Health field	Part of the Digital Hub Initiative initiated by the Federal Ministry of Economic Affairs and Climate Action to promote digital innovation in Germany. Offers start-ups, scientific institutions and established companies a central platform for networking, exchange and cooperation as well as the opportunity to build up their own digital ecosystem.	Germany	14.04.2024 40 min

8	E8	gematik GmbH	Head of International Partnerships	gematik is the German National Digital Health Agency which aims to ensure the digitisation of the German healthcare system through a robust telematics infrastructure, proving critical regulatory insights.	Germany	29.05.2024 30 min
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All interviews were conducted via video calls, lasting between 30 to 65 minutes, with real-time transcription to capture the content. The semi-structured format of the interviews which was guided by a general set of questions, aimed to elicit in-depth information on the topic (Bogner, 2005). Open-ended questions were used to ensure experts could provide comprehensive and unbiased insights (Kaiser, 2014).

The expert interviews aimed to explore diverse perspectives on digital healthcare ecosystems. Although primary sources provide broad perspectives, it is important to recognise limitations. Any perspective and point of view expressed by the interviewees might be considered subjective and might not represent the experiences of every individual in their respective environment (Boyce & Neale, 2006).

Furthermore, the restricted number of participants from every institution limits the diversity of perspectives, since it would have been enlightening to incorporate individuals from various organisational departments and hierarchical levels. However, through the implementation of interviews with eight personnel from diverse organisations, valuable insights in the establishment of holistic healthcare ecosystems were identified.

3.1.3 Data Analysis

The data collected from semi-structured interviews were analysed using content analysis to remain as faithful as possible to the data (Neergaard et al. 2009). Gioia et al.'s (2013) approach for qualitative data analysis was employed, which is effective for extracting original and practical insights from inductive research. To effectively analyse the interviews, the data requires to undergo a method called coding, which consists of three specific phases: open coding, axial coding, and selective coding (Sebastian, 2019).

3.1.3.1 Open Coding

The interview analysis process gets initiated by developing first codes through a comparison of data segments, called "open coding". This iterative comparison allows you to identify patterns and hidden connections, as well as contradictions. First-order concepts are being formed (Gioia et al., 2013).

3.1.3.2 Axial Coding

Following this, the second stage in interview analysis is axial coding. Here, previously created concepts are compared to identify overarching categories which connects them, so-called second-order themes. During this stage of the process, codes undergo rearrangements and be grouped into coherent categories. Common elements and differences among categories are created. This establishes a systematic structure for analysis (Gioia et al., 2013).

3.1.3.3 Selective Coding

Selective coding is the final stage in interview analysis. Its objective is to identify core categories that can be utilised in developing a theoretical framework. Comparative analysis allows refining and connecting core categories, which ultimately results in the creation of a cohesive theoretical model. Once the aggregated dimensions have been defined, they allow the development of a succinct theory statement which is then extended upon in further detail. It is crucial that the presumptions are backed up with coded data. This will ensure that the proposed theory is valid and credible. Gioia's method emphasizes deriving theory from the collected data, ensuring that the developed concepts are original and reflective of the respondents' views, maintaining the integrity of qualitative research (Gioia et al., 2013). The thematic analysis of the interviews based on Gioia et al., 2013 is illustrated in Appendix 3.

4. RESULTS

By analysing all conducted interviews, the thematic analysis identifies several valuable observations and patterns drawn from the collected data. Accordingly, insights and emerging themes regarding the establishment of healthcare ecosystems, crucial partnerships as well as the relation to competitors, and current challenges have been organized into eight aggregated dimensions. These dimensions encompass multiple aspects such as the requirement of a shared vision and tangible value creation, a clear definition of roles and neutral orchestration, co-creation and co-opetition as most common form of strategic partnerships, complementary characteristics as main partner selection criteria, long-term collaboration and standard adherence as challenge as well as stakeholder resistance, market entrants, budget limits, and lack of trust among data security, to name a few.

Appendix 3 presents a comprehensive thematic analysis of the interviews, which is based on the methodology outlined by Gioia et al. (2013). The following eight key findings emerge:

1. Establishing sustainable healthcare ecosystems requires navigating complex regulatory landscapes, building secure and interoperable digital infrastructure, fostering trust and collaboration through shared vision and cultural adaptation, and consistently demonstrating tangible value creation

4.1.1 Complex Regulatory Environment and Lack of Legal Support

The healthcare industry is characterised by a complex regulatory environment and conflicting stakeholder interests, which can hinder the development of ecosystem-friendly conditions. "The healthcare sector is heavily regulated and involves numerous stakeholders with conflicting interests. This complex landscape may not inherently foster ecosystem-friendly conditions contributing to the inherent [&] difficulties in establishing such systems" (E1). Furthermore, the legal framework must support digital advancements, as emphasized by E4: "Legal framework must also permit such digital advancements." Legislative initiatives, such as Switzerland's Electronic Patient Record (EPR) system, often face a lack of legal support leading to prolonged development timelines without substantial progress: "Legislative initiatives play a role. In Switzerland, the Electronic Patient Record system has been in development for 15 years without substantial progress" (E6).

4.1.2 Secure, Digital Infrastructure Needs and Interoperability

<The digital infrastructure [&] is a universal need= (E3). Interoperable systems are crucial to ensure seamless communication among various stakeholders: "Interoperable systems are also essential to ensure seamless communication" (E5). Secure communication channels <are imperative" (E5). Whereas most countries have the necessary infrastructure in place: "An infrastructure that supports digital services is necessary, but this is generally available in most countries= (E4). More acute are data privacy concerns.

4.1.3 Data Standards and Security

"Establishing data standards is a fundamental framework condition" (E4). The importance of data privacy and security cannot be overstated: "Paramount importance of addressing data privacy and security concerns" (E5). This includes decisions on data standards, data storage methods, and semantic interoperability: "Decisions on data standards, data storage methods, and semantic interoperability" (E8).

4.1.4 Shared Vision & Trust

Building a shared vision and fostering trust are essential for partnerships and collaborations. "Trust, though considered a soft factor, significantly influences partnerships and collaborations" (E5). A shared vision among key market players and a willingness to make joint initial investments are crucial: "Shared vision, openness among key market players, and willingness to make joint initial investments" (E6).

4.1.5 Need for Cultural Shift

One requires a "Cultural shift at various levels to foster ecosystem-friendly behaviors" (E1). Promoting a digital open society is essential: "Fostering a digital open society is essential" (E4). Each country has its own cultural idiosyncrasies that must be considered: "Each country possesses its own cultural idiosyncrasies that must be considered in ecosystem development efforts" (E5).

4.1.6 Demonstrated Impact & Added Value

"The main focus, however, is ensuring added value, whether from the patient9s or provider9s perspective" (E8). All participants have to see value in being part of the ecosystem, even if <this value may not be immediately apparent. The ecosystem must reach a certain

maturity before it generates tangible benefits for all members. Therefore, transparent communication about the objectives and potential benefits is crucial" (E3).

4.1.7 Top-Down vs. Bottom-Up Approach

Fundamentally, one needs to decide between the two approaches: "There is a fundamental decision that must be made, specifically whether to adopt a top-down or bottom-up approach" (E1). Experience shows a predominant preference for a bottom-up approach: "In our experience, we predominantly adopted a bottom-up approach" (E3). However, some regulation or incentive system from the top-down is also beneficial: "I believe it always makes sense to have some form of regulation or incentive system implemented from the top-down" (E5). Countries like Germany tend to favor a top-down approach due to their <legalistic culture" (E8).

2. Balanced Stakeholder Involvement with Clear Definition of Roles and Neutral Orchestration: Health insurance companies provide the financial backbone, healthcare providers ensure quality care integration, technology partners drive digital implementation, patients act as central feedback nodes, and government/regulatory authorities set frameworks

For a successful development of a healthcare ecosystem, it is crucial to have balanced stakeholder engagement, with clearly defined roles and neutral orchestration: "It's essential to identify relevant stakeholders and determine when their involvement is needed to implement the strategy effectively" (E3). Clear role distribution helps maintain independent governance and prevents partners from imposing their individual interests on operations (=no operational entanglements): <It is crucial to define the role distribution clearly. [The founding partners] provide financial support and contribute their expertise to operational projects, [&] but do not interfere with daily operations. Maintaining independent governance is essential to ensure that partners do not impose their individual interests on the operation" (E6).

4.2.1 Health Insurance Companies play a crucial role in financing

Health insurance companies are pivotal in financing the healthcare ecosystem, <seeking potentially reduced costs" (E1). Engaging health insurance companies can bring other stakeholders into the fold since they control the funding: <Health insurance companies should be the primary point of engagement. By starting with the health insurance

companies, we can potentially involve all other stakeholders, as they control the funding which influences the entire network= (E2). Insurers are indispensable, <particularly in European contexts, where they often finance solutions= (E5).

4.2.2 Healthcare Providers Essential for Quality Care

Healthcare providers are crucial for improving healthcare quality and must be involved in the ecosystem. "They must be involved because their participation enhances the quality of care" (E4). Their involvement <bring[s] essential insights into practical usability and efficiency= (E8).

4.2.3 Technology Partners Key to implementing digital solutions

Technology partners are <essential for the implementation of the system" (E4). The engagement should ideally range from MedTech institutions to pharmaceutical corporations (E5).

4.2.4 Patients Central Role for Feedback and Adoption

Patients are central to providing feedback and ensuring the adoption of the healthcare ecosystem. "Patients: A feedback pool providing insights into the system's effectiveness" (E3). They play a pivotal role as end consumers and their insights are invaluable (E5).

4.2.5 Government and Regulatory Authorities

Government authorities should be involved as they are responsible for setting regulatory frameworks and ensuring inclusivity and adoption of the healthcare ecosystem. "Political involvement is inevitable. The healthcare system is heavily regulated" (E3). These authorities set the frameworks at either the EU or national levels (E5). Policymakers are also involved to ensure that the ecosystem is inclusive and widely adopted (E8).

4.2.6 Role of Orchestrator

A neutral orchestrator is crucial for the balanced development of the ecosystem, facilitating collaboration without bias. "A crucial prerequisite for building an ecosystem [&] is the necessity to maintain neutrality as a third party. This implies that one cannot be aligned with any of the various stakeholders or be associated with any of them. This neutrality is fundamental as it allows one to assume a neutral mediation role and facilitates bringing together the stakeholders, as otherwise, there may be skepticism regarding potential biases" (E1). In practice, a neutral orchestrator ensures the balanced involvement of all

stakeholders: "Typically, having a neutral orchestrator helps, ensuring that not only policy-makers and financiers but also frontline healthcare providers and researchers are involved" (E8).

4.2.7 Importance of Stakeholder Management

Effective stakeholder management <involves demonstrating tangible benefits tailored to each stakeholder group and ensuring mutual benefit= (E2). The ecosystem only begins to yield value when it consistently comprises actors who can mutually benefit from each other. <So, it's important to always keep in mind: Who benefits from whom? And to bring them together" (E7).

3. Creating added value in healthcare ecosystems by enhancing care quality through unified data access, streamlining workflows for efficiency and cost reduction, and overcoming resistance to foster stakeholder acceptance and trust

As outlined in the theory chapter, every ecosystems needs to provide added value for its stakeholders. How added value is supposed to look like in a successfully established ecosystems, will be defined in the following:

4.3.1 Unified Data Access Enhancing Care Quality

Especially having a unified data access is crucial for enhancing the quality of care. As one expert notes, "Patients seek convenience, personalized care, and empowerment over their health data" (E2). By creating a cohesive treatment team with access to the same data, healthcare providers can deliver better patient outcomes: "The ultimate value proposition lies in creating a cohesive treatment team with access to the same data" (E4). Furthermore, shared data benefits patients personally and contributes to societal advantages: "The classic example is improved healthcare services. Patients benefit personally, and there is a societal advantage when shared data contributes to better treatment outcomes for others" (E8).

4.3.2 Streamlined Workflows and Efficiency Leading to Cost Reduction

Streamlining workflows not only improves efficiency but also leads to substantial cost savings. "Our goal is to provide data and digital services that enhance treatment quality and efficiency, ultimately lowering healthcare costs by avoiding redundant tests and streamlining the treatment process" (E4). For companies <which are inherently profit-driven, the value proposition is clear" (E3). Efficiencies in everyday clinical processes can also be

substantial: "Efficiencies in everyday clinical processes such as reducing time spent on routine tasks can be significant" (E8). Eliminating inefficient information exchange methods, such as word documents, prevents data loss: "Currently, there is no streamlined information flow, and they might exchange information through word documents or other inefficient means, leading to significant data loss" (E4).

4. Navigating conflicts of interest when establishing healthcare ecosystems by fostering collaboration, ensuring neutral orchestration, and clearly defining roles among stakeholders

To begin with, conflict sources were identified: Conflicts of interest in healthcare ecosystems tend to arise from diverse objectives among stakeholders. As one expert points out, "Conflicts of interest can arise among stakeholders due to differing objectives. [&] High-profit margins [vs.] best patient outcomes" (E5). The focus divergence between health insurance companies and startups illustrates this disparity: "For health insurance companies, the focus tends to be more on numbers, such as the impact and cost reduction potential of a digital solution. [&] However, for startups, there's often an initial emphasis on the moral component, aiming to fundamentally improve the healthcare system" (E7).

In spite of the inherent competition, stakeholders generally strive to work together for the greater good of the healthcare ecosystem. "While competition exists, my observation suggests that most stakeholders strive to collaborate" (E5). This collaborative spirit is evident among competitors within platforms: "We have three insurers who are competitors. Despite their competition, they collaborate on our platform. This separation between business operations and the ecosystem's development is crucial" (E4). Alignment on common topics helps mitigate conflicts: "We collaborate on common topics, aligning as much as possible" (E6). Two requirements that are necessary to navigate conflicts of interests could be identified:

4.4.1 Need for Neutral Orchestration

Neutral orchestration is critical for managing conflict of interest in healthcare ecosystems. "Our approach is neutral and inclusive, allowing any service provider within the Swiss healthcare ecosystem to participate. In this way, we position ourselves as neutral orchestrators, facilitating collaboration without influencing competitive dynamics" (E4). Effective mediation and facilitation by neutral parties are crucial: "Financial concerns, efficiency goals, and technical feasibility often clash. Effective communication among stakeholders

from various backgrounds4whether technical, medical, or financial4is crucial to bridge these gaps. This is why a skilled mediator is essential" (E8).

4.4.2 Need for Defined Roles

Secondly, the definition and assignment of roles and clear separation among stakeholders - including investors - helps mitigate conflicts and align interests. Well-defined roles and their scope of activity prevent operational interference: "Regarding conflicts of interest, it is important to note that our partners have different roles. Investors [&] cannot be part of my executive team, ensuring no operational entanglements. I do, however, have a vested interest in considering my partners' interests, as they bring users to the platform. Their success directly correlates with my success, creating a mutually beneficial relationship" (E6).

5. Strategic partnerships and co-creation initiatives form the foundation of resilient healthcare ecosystems, built upon preconditions: Value Creation/ tangible benefits for all stakeholders, Mutual Trust & Transparency and intrinsic motivation/ collaborative and innovative mindset

The foundation of durable healthcare ecosystems is established by strategic partnerships such as co-creation initiatives, which are based on value creation, mutual trust, and an innovative mindset:

4.5.1 Necessity of Partnerships & Collaboration

Strategic partnerships are inevitable when building a holistic healthcare ecosystem. As one expert emphasized, "The strategic partnerships we pursue are essential for building a comprehensive healthcare ecosystem" (E4). Collaboration among different parties is essential <because a fragmented approach won't suffice" (E4). Partnerships are also <vital for the validation process of novel digital health solutions" (E5).

4.5.2 Co-Creation Partnerships

The most common approach of partnerships in the healthcare sector is co-creation. Co-creation in the healthcare sector is defined as the collaborative development of health solutions by involving various stakeholders, including patients, healthcare professionals, and other relevant parties, to ensure the solutions meet the actual needs and preferences of end-users. This collaborative approach not only improves the design and functionality of health solutions but also promotes stakeholder ownership and trust, resulting in more successful

implementation and usage. According to recent studies, co-creation enhances the efficiency and effectiveness of health services by ensuring that new technologies are user-friendly and align with the real-world needs of patients and healthcare providers (Laurisz et al., 2023). So, co-creation partnerships enhance the ecosystem by involving various stakeholders in problem-solving and innovation. One expert highlighted the interconnectedness and openness required in these partnerships: "It's crucial to seek [&] partnerships that demonstrate the interconnectedness and openness of the ecosystem" (E6). Co-creation involves not only financial investment but also collaborative project work: "Consortial partners are our investors; they are financially invested and simultaneously act as co-creation partners, working on projects with us" (E6). The collaborative nature of co-creation is valuable for identifying and testing solutions: "Co-creation is a valuable method, involving affected parties in identifying problems and testing solutions in a collaborative manner" (E8).

4.5.3 Value Creation, Mutual Trust & Transparency

Effective partnerships are built on mutual value creation, trust, and transparency. Ideally, a win-win-win scenario must be achieved: "At the most fundamental level, there must be [&] a win-win-win solution. Achieving a win-win-win scenario entails creating value for both parties involved and any third party, which is straightforward in theory but proves challenging in practice" (E1). Neutrality as a third party helps facilitate stakeholder collaboration: "Neutrality as a third party...facilitates bringing together the stakeholders" (E1). Trust and transparency are critical requirements: "Mutual trust is arguably the most critical requirement...necessary transparency and clear communication" (E5).

4.5.4 Mindset / Mentality

A collaborative mindset and deep intrinsic motivation are main drivers of successful partnerships. Intrinsic motivation drives active engagement within the healthcare system (E7). Patience and motivation are necessary traits for all participants: "All participants need to bring not only motivation but also a bit of patience" (E8). The mindset of offering valuable services to retain stakeholders is crucial: "You have to let go of the idea of trying to keep the patient or customer locked in so they don't leave. You want to offer them so many cool things that they don't want to leave. And that's what happens. It's a mindset" (E4).

6. *Effective long-term collaboration requires strategic alignment and shared goals, transparent communication fostering trust, personal engagement to build robust networks, and flexibility to adapt and manage expectations continuously. This approach also extends to establishing effective standards, which hinge on open communication, collaborative process definition, and adherence to recognized benchmarks like HL7 FHIR and national standards*

Long-term collaboration relies on strategic alignment and shared objectives, open communication that fosters trust, personal commitment to develop strong networks, and the ability to adjust and manage expectations.

4.6. Orchestrator Strategies for Long-Term Collaboration

4.6.1 Strategic Alignment and Shared Goals

Successful long-term partnerships rely on strategic alignment and the right incentives. As one expert pointed out, "Short-term incentives are ineffective, given the long-term nature of the endeavor. [&] There must be a long-term benefit, which is understandable, communicable, truly valid, and, of course, value-driven" (E1). Managing and adapting to expectations and <striving to highlight the value in various areas such as positioning and branding is essential" (E3). A shared vision and common objectives can also foster cohesion, so it highly depends on <how much overlap there is" (E8).

4.6.2 Effective Communication and Networking

In addition to common goals, building trust and effective networking are fundamental. <It is imperative to be extremely well-connected within the system. Without robust connections, one risks being sidelined and missing out. [&] An exceptionally strong network [&] is a prerequisite for offering a credible, long-term perspective" (E1). Clear communication is key: <Building trust and networking stakeholders requires clear and effective communication channels... clear communication with your partners is essential" (E5). Personal contact is also vital for relationship building: <It is incredibly important to maintain personal contact... connect with the individuals within the companies rather than just communicating through emails" (E7).

4.6.3 Flexibility and Adaptability in Collaboration

Thirdly, successful collaboration requires a realistic mindset characterised by flexibility and adaptability. One expert noted, "We have the flexibility to adapt... this approach aligns with our strategy and supports continuous development" (E6). Realistic expectation management is crucial, along with early mitigation strategies in case a partner drops out" (E3). Ongoing negotiation and reassessment help maintain effective collaborations: "It is a process of ongoing negotiation and rebalancing... reassess who works best with whom" (E8).

4.6.4 Common Processes and Standards

Open communication and collaborative process definition are critical for establishing standards and adherence. An expert emphasized the importance of openness: "You can communicate and practice openness to the extent that each party recognizes the better option and acknowledges the added value in aligning with another" (E1). Aligning processes with expert advice is also crucial: "it's essential to align this with experts" (E3). Collaborative process definition is ideal (E5). For interoperability, the adherence to recognized benchmarks and standards, such as HL7 FHIR and national standards, is essential. "Ensuring it completely is not feasible [and], we do adhere to prevailing standards" (E1). One expert mentioned, "What we also do is define them based on HL7 FHIR because HL7 FHIR has already established itself in the healthcare sector worldwide" (E4). Adherence to national or pan-European standards is also necessary: "In cases where there are national or pan-European standards, one must adhere to them" (E5). The challenge of obtaining structured data highlights the importance of standardization: "It's often not possible to obtain structured data from doctor's systems [and] that's why we try to get as much as possible from insurers because they have structured data available. So, yes, the issue with standards is a problem" (E4).

7. Effective partner selection for the establishment of healthcare ecosystems is driven by the alignment of shared goals and prioritisation of complementary characteristics: This approach fosters co-opetition, where competitors prioritize openness and learning, leveraging unique selling propositions (USPs) to identify specialised niches

Ideally, the selection of suitable partners for the development of healthcare ecosystems should be driven by the alignment of shared goals and the prioritisation of traits that are complimentary to one another:

4.7.1 Complementary Characteristics

One expert stated the importance of non-overlapping yet complementary partners: "We sought partners who were complementary, preferably not overlapping, but rather complementing each other" (E3). Additionally, selecting stakeholders who can cover services beyond what one's own company provides is advantageous: <Selecting stakeholders who are complementary to the services one offers. While they don't necessarily have to be completely different, it's intriguing to partner with entities that can cover services beyond what one's own company provides= (E5).

4.7.2 Shared Goals & Thematic Alignment

Moreover, shared goals and thematic alignment are critical for successful partnerships. One expert highlighted the necessity of <having a shared goal to work towards" (E5). Ensuring thematic alignment enhances the ecosystem's qualitative value: <Ensuring thematic alignment because, as I mentioned at the beginning, the ecosystem is only qualitatively valuable if the actors come together thematically= (E7). Patience and commitment are also crucial, as partnerships often take time to develop (E8).

4.7.3 Co-opetition & Niche Specialisation

Collaboration along with learning from rivals, known as co-opetition, is essential. One expert emphasized this: "Co-opetition instead of competition is imperative [&] various interests must find a place. [&] it is an absolute prerequisite for the functioning of the ecosystem= (E1). Especially cultivating a mindset of being open and receptive to learning from competitors is advantageous: "Fostering openness towards fellow competitors should be prioritized. [&] Being receptive to learning from competitors and seeking helpful insights is key" (E5). Simultaneously, each partner's unique selling proposition (USP) needs to be highlighted: <Each startup or solution, even if similar, possesses its unique selling proposition (USP). It's crucial to highlight this USP effectively= (E5). This makes it easier to recognise the value and differentiation potential of each partner: <They can position their services uniquely. [&] The key is seeing the value and differentiation potential= (E6). Niche specialisation may bring the advantage of simplifying options for healthcare professionals: <Ideally, each competitor would identify their niche, offering the best product or service in that area. This specialisation can streamline choices for healthcare providers and enhance the overall system= (E8).

8. *Establishing sustainable healthcare ecosystems involves navigating challenges: persuading stakeholders about the significance of long-term viability, overcoming healthcare professionals' resistance to change, addressing budget limitations in digitalization efforts, managing cultural concerns regarding data security and trust, and adapting to shifts in the market environment including the entry of global tech players*

To establish healthcare ecosystems, one must effectively address issues such as stakeholder resistance and change management, financial restrictions, data security, and market entries.

4.8.1 Long-term Viability

A significant challenge is ensuring the financial and commercial viability of long-term business models. One expert noted, "The primary challenge [&] lies in the financial or commercial viability of a business model. It is a long-term endeavor, requiring significant perseverance" (E1). The short-term focus of many stakeholders, especially younger enterprises, also hampers progress as <[t]he absence of immediate pressure to address long-term objectives enables a prioritization of quick wins= (E3). Keeping stakeholders engaged over the long term is essential as it helps <to keep it interesting, to continue providing added value" (E7).

4.8.2 Resistance and Change Management

Another major barrier is the resistance to change among healthcare professionals. One expert observed, "The biggest challenge I see is in change management... doctors just aren't willing to do it" (E4). Familiarity with existing systems often leads to resistance: <Convincing doctors of digitalization can be challenging, especially considering their familiarity and comfort with existing systems. They may be resistant to change and hesitant to adopt something new= (E6). Early adopters can play a crucial role in overcoming this resistance: <We need to win over a few pioneers who are willing to try new approaches, and then use their successes to persuade others. Additionally, we have established a Medical Advisory Board [&], this ensures that the sales approach is tailored to the medical profession's needs and concerns= (E6).

4.8.3 Digitalisation No Priority in Budget Allocation

Moreover, budget constraints make digital innovation a lower priority. "Digital innovation is more of a secondary or tertiary priority... economic times when there may not be much

budget available" (E7). This lack of immediate financial resources can impede progress despite the potential benefits.

4.8.4 Market Entrants

4.8.4.1 Trust and Data Security Concerns Among Big Tech Players

Trust and data security among big tech players entering the health market are critical issues. One expert questioned the willingness to entrust health records to large tech companies: <Do you want to entrust your health records to Apple, Google, or Amazon? I think probably not= (E1). Another expert emphasized, "I really believe trust is a big thing...these [global operating tech] companies don't inspire that much trust" (E5). Cultural and regulatory concerns also play a role: <There is a cultural and regulatory hesitation in Germany regarding data privacy and control. Balancing public and private interests in data utilization is an ongoing challenge= (E8). However, compelling offers might mitigate some privacy concerns: "If a company provides a compelling offer for any reason, data privacy concerns may become less significant because the practical benefits outweigh these concerns< (E2).

4.8.4.2 Market Impact Concerns

The entry of global tech players into the healthcare market raises concerns about dependency and market dominance. One expert warned of potential over-reliance: <We should be cautious not to become overly dependent on them&potential reliance should be mitigated= (E3). Yet, these companies can also facilitate innovation by establishing standards as <they offer considerable power= (E3). Their ability to integrate vast amounts of data into meaningful contexts is also advantageous: <They possess the capacity to integrate vast amounts of data into meaningful contexts and introduce innovative solutions to the market= (E5).

4.8.4.3 Opportunities for Local Ecosystems: Potential for Innovation and Data Integration

Local healthcare ecosystems can leverage their strengths against global competition. Local anchoring and complementary aspects offer advantages: "Our strong local anchoring is a significant advantage... [global tech companies offer] more complementary aspects than competitive ones" (E6). There is potential for greater data availability and integration: "We see the opportunity to have more data available...not the technology that's the issue, but rather the change management, the mindset of service providers and patients" (E4).

4.8.4.4 Future Role of Big Tech in Healthcare

The future role of big tech in healthcare is complex, balancing advantages and risks. Big tech companies face significant image risks related to trust: <There's an image issue to consider. Apple, Google, and whoever else cannot afford to take risks in the health sector because it would be a death blow and a delicate issue deeply tied to trust. If trust were somehow compromised, the entire business model would be severely tarnished. [&] Therefore, there may not be a huge desire to delve deeply into it. On a service level, yes, but not on the infrastructure level= (E1).

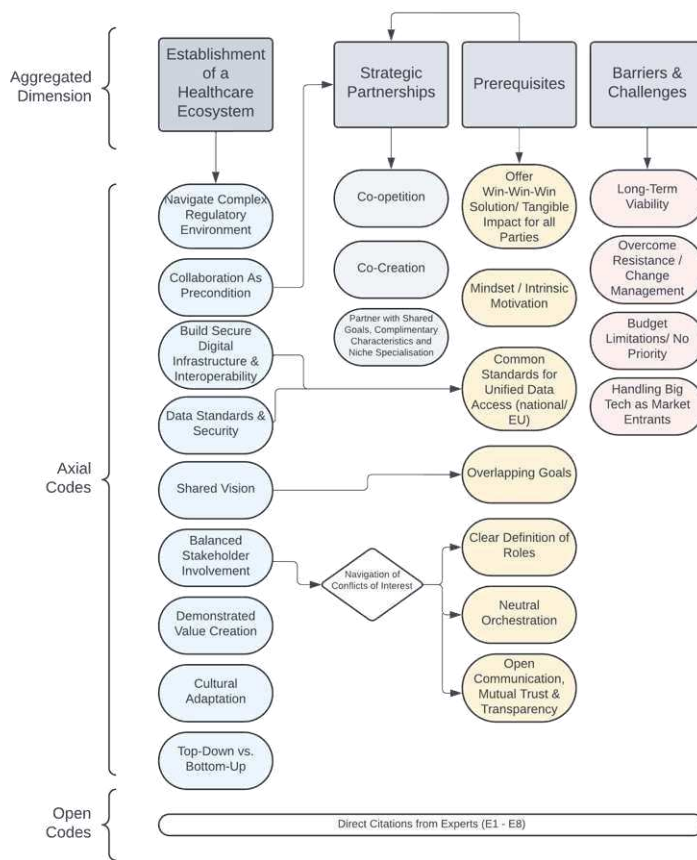


Figure 2: Coding tree (own illustration)

5. DISCUSSION

5.1 Theoretical Contributions

This study has made significant theoretical and managerial contributions to the understanding of healthcare ecosystems within Germany's healthcare landscape. Drawing from the experiences of countries that have undertaken similar initiatives, e.g. Switzerland, can greatly inform the development and implementation of such in Germany. The lessons derived from their approaches offer valuable insights into the frameworks, prerequisites, and partnership models required for establishing healthcare ecosystems. This discussion chapter thoroughly examines these lessons, delving into the research questions by incorporating expert knowledge and theoretical insights. Here are some important findings that address the research questions:

1. How do the experiences of countries like Switzerland, which have already launched healthcare ecosystems, inform the development and implementation of similar initiatives in Germany? Specifically, what lessons can be drawn from their approaches in terms of frameworks and prerequisites, particularly considering the fragmented nature of the healthcare industry and the diverse range of stakeholders involved?

Switzerland's experiences in launching different healthcare ecosystems provide valuable insights for Germany. Key lessons for Germany include the importance of a robust legal framework that supports digital advancements (E4) and the necessity of interoperable systems to ensure seamless communication (E5) and secure data transfer. Establishing data standards is crucial, as it forms the foundation for interoperability (E4). Regulatory frameworks and digital standards play a crucial role in encouraging the adoption of new technologies, reinforcing the need for strong legislative support which is more prevalent in Germany than in Switzerland (Benedict & Schlieter, 2015; E6). Recent regulatory changes, such as the Digital Healthcare Act (DigiG) and the introduction of the electronic patient file (ePA), have significantly advanced the development of digital or hybrid healthcare solutions (Zeggel, 2023). These changes align with the German Federal Ministry of Health's Vision 2030, which aims to establish a patient-centered digital ecosystem that seamlessly integrates digital and on-site elements, with a key focus on the ePA.

Framework conditions such as legislative support, secure digital infrastructure, interoperability, shared vision and trust, cultural adoption, and demonstrated tangible added value are

critical. Overcoming cultural differences and regulatory hesitations can be challenging obstacles to ecosystem development. Germany's preference for a top-down approach is evident in its legalistic culture, which stands in contrast to Switzerland's predominantly bottom-up approach (E1, E8). Germany could consider adopting a hybrid approach that combines top-down and bottom-up strategies to address the needs of various stakeholders and meet regulatory requirements. As Pikkarainen et al. (2017) emphasize, collaboration between various actors, including intermediaries playing a coordinating role, is essential for the effective functioning of a healthcare ecosystem. Not only an intermediary maintaining neutrality to balance diverse stakeholder interests (E1) was identified as a crucial prerequisite, also the creation of a win-win-win scenario (E1), as well as the right intrinsic motivation, mindset and pioneer spirit (E7, E8, E4, E6).

In the context of Germany's healthcare landscape, this study has made substantial theoretical and managerial contributions by highlighting the need for balanced regulatory and collaborative frameworks. The hybrid approach recommended aligns with the findings of Pikkarainen et al. (2017) and provides a practical pathway for addressing Germany's cultural and regulatory challenges.

2. What types of partnerships and cooperation models are crucial for building a connected health ecosystem, what criteria guide their selection as suitable partners and how do these partnerships ensure long-term collaboration, alignment of standards, and mutual benefits among ecosystem participants?

Strategic partnerships play a crucial role in the development of interconnected ecosystems, as highlighted by the study. Successful partnerships often include a variety of stakeholders, such as health insurers, technology partners, healthcare providers, and patients (E4, E5). Health insurers, for example, have a crucial role in financing the system and can impact the participation of other stakeholders (E2, E4). Having technology partners is crucial for the development and integration of digital solutions, while healthcare providers provide valuable insights into system usability (E6, E8).

Choosing the right partners for successful and sustainable business partnerships is important for the success of these collaborations (Rese, 2006). Based on a survey of 455 CEOs, it was found that the selection of the right partner is the most crucial aspect when it comes to designing a strategic alliance (Holohan, 1998). Essential criteria for selecting partners include shared vision, thematic alignment, and complementary roles (E1, E3, E5).

Successful partnerships often involve a neutral orchestrator who can mediate between stakeholders and mitigate conflicts of interest (Roksandić & Saver, 2020). This ensures that development remains fair and unbiased, without any one party exerting too much influence (E1, E3). Effective communication and regular reassessment of partnerships help in adapting to expectations and changing needs.

Utilising co-creation models, where stakeholders work together to identify and tackle challenges, can greatly improve the effectiveness and longevity of the ecosystem (Laurisz et al., 2023; E6, E8). The emphasis on co-creation aligns with the concept of digital ecosystems thriving on modularity and connectivity, as seen in Switzerland's healthcare initiatives. In their study, Frick et al. (2020) highlight the benefits of adopting a platform-based approach in healthcare. They emphasise how this approach can generate substantial value for all stakeholders involved, promoting innovation and improving operational efficiency.

The successful development of a health ecosystem is not only reliant upon working closely together with healthcare professionals (co-creation), it should also not leave out the integration of cooperation and competition, which is known as co-opetition. It is imperative to cultivate an environment of collaboration and transparency with competitors, rather than viewing them as mere adversaries (E1). Organisations can improve their offerings and contribute to the ecosystem's overall success by being receptive to learning from competitors and pursuing valuable insights (E5). Each partner should emphasise their unique value (USP) and acknowledge the niche they claim within the ecosystem (E5, E6). In an ideal scenario, specialisation enables competitors to provide superior products or services in specific areas, thereby simplifying the selection process for healthcare providers and enhancing the ecosystem (E8). This method guarantees that a variety of interests are taken into account, thereby fostering a more dynamic and effective healthcare ecosystem.

This study has made significant contributions by confirming the significance of strategic partnerships and co-creation models within Germany's healthcare ecosystem. The findings are in line with the existing research on the importance of choosing the appropriate partners and employing a neutral orchestrator to facilitate collaborations, which is crucial for ensuring long-term success.

3. What are the primary barriers and challenges faced by digital health startups and other stakeholders within the German healthcare sector, and how do these impact ecosystem

development and response to market pressures, including competition and conflicts of interest?

The rapid growth and dynamics of the digital health sector can bring both opportunities and challenges (Zeggel, 2023). The healthcare system in Germany encounters various challenges which makes it little ecosystem-friendly, among them: regulatory constraints, fragmented market structures, and healthcare providers' resistance to change. These barriers have a significant impact on ecosystem development, making it difficult to gain traction and hindering the adoption of common digital solutions (Statista, 2023b). Dealing with the resistance to change among healthcare providers and the short-term focus of many stakeholders can complicate achieving widespread digital transformation (E4, E6).

Conflicts that arise between profit-driven entities and patient-centric goals can result in misalignment and inefficiencies within the ecosystem (E5, E7). Conflicts of interest are a common issue in healthcare systems and can be quite risky, as pointed out by Roksandić and Saver (2020). To tackle these challenges, it's important to showcase the benefits of digital solutions and implement efficient change management strategies. This requires convincing early adopters to embrace innovative methods and leveraging their achievements to influence others (E6). As an example, creating Medical Advisory Boards can customise the sales approach to address the specific needs and concerns of medical professionals. Involving healthcare professionals from the start in the development of digital health applications is essential for creating user-friendly interfaces, incorporating valuable features, and increasing overall acceptance. By adopting a collaborative approach (co-creation; E6, E8), digital solutions can be greatly improved in terms of practical usability and acceptance.

One of the main challenges in the healthcare industry is the need for strong standardisation to ensure the smooth exchange of data across borders. The lack of consensus on common technological standards among different stakeholders in the healthcare industry is a major obstacle to innovation in this field (Frick et al., 2020). Efforts are currently being made at the European level to establish a regulatory framework for the digitalisation of the healthcare system across borders. The European Health Data Space (EHDS) is working towards creating a seamless cross-border data exchange system across the EU by 2025 (Europäische Kommission, 2024). This initiative highlights the significance of aligning standards and regulations to facilitate smooth data exchange between countries, ultimately improving the efficiency and effectiveness of healthcare delivery.

Moreover, the entrance of big tech companies into the healthcare sector presents both opportunities and challenges for local ecosystems. These companies possess the necessary infrastructure and technological capabilities to greatly improve healthcare delivery. Nevertheless, it is crucial to handle their limited regulatory knowledge (Vemmer & Thomas, 2020) and address any potential issues regarding data privacy and monopolisation (E1, E2, E5) with caution. The advancements made by tech giants, including wearables and AI-driven tools, have the potential to enhance efficiency and elevate the quality of patient care. However, it is important to address concerns regarding privacy and ensure that corporate profit motives do not overshadow public health interests (Blumenthal et al., 2019; Szigetvári & Meskó, 2023).

Ultimately, to establish a connected health ecosystem in Germany, it is crucial to learn from the experiences of other countries such as Switzerland. It is also important to cultivate strategic alliances, tackle regulatory and cultural obstacles, and engage stakeholders in a meaningful way. The main priority should be to generate value for all participants, guaranteeing seamless integration, and cultivating an inclusive and cooperative atmosphere for digital health innovation. This study has made significant contributions to enhancing our understanding of the theoretical and practical aspects of healthcare ecosystems, offering a comprehensive framework for future advancements in Germany.

6. CONCLUSION

To unlock the full potential of digital health, ecosystem approaches must seamlessly connect various services and solutions to enhance patient experiences. This study confirms that establishing holistic healthcare ecosystems in Germany requires alignment in complex regulatory landscapes 3 at both national and EU levels. Key to success is fostering collaboration and trust among stakeholders, which necessitates a setting of clear role definitions and neutral orchestration to effectively manage conflicts of interest between participating parties. Open communication can help managing expectations and ensuring a demonstration of tangible, customised added value to obtain and maintain stakeholder motivation and participation in the ecosystem.

Undoubtly, the transformation towards digital healthcare systems is inevitable and ongoing. As one expert noted, *<This is a change management process that doctors need to go through, and it will be crucial for long-term success. Nevertheless, this is happening now. Healthcare is becoming digital or semi-digital. Whether it takes another year or three years, it's simply a fact= (E4)*. Together, the present findings reveal that further research on accelerating societal change and openness is necessary, particularly in building trust in data privacy and being open towards technological progress among medical service providers, to encourage wider acceptance and engagement with digital healthcare solutions.

Valuable lessons from Switzerland's approaches provide a roadmap for Germany: Co-operation and especially co-creation emerge as the most suitable forms of collaboration within such an ecosystem, with significant involvement needed from medical service providers. Only by working together tightly, the digital gap can be bridged more effectively.

6.1 Limitations and Further Research

While this study provides valuable insights into the development and implementation of holistic healthcare ecosystems, the following limitations should be acknowledged: Initially, every nation's healthcare system is unique. Thus, the geographical focus on Switzerland and Germany, with their specific regulatory and policy environments, may limit the generalisability of findings to other regions with very differing healthcare systems.

Secondly, the small sample size and expert selection were concentrated on a limited number of existing ecosystem founders and e-health consultants: Therefore, due to the research field's novelty, the diverse perspectives needed to understand the broad range of stakeholder

experiences may not be fully captured. Furthermore, economic and financial factors were not thoroughly explored, despite their importance in comprehending the sustainability and scalability of healthcare ecosystems.

To gain a more comprehensive understanding of the development and impact of healthcare ecosystems, future research should incorporate longitudinal studies that monitor their evolution and maturity over time. This should include a more thorough comprehension of the financial viability of healthcare ecosystems. This may encompass assessing cost savings, efficiency gains, and economic benefits for various stakeholders, such as insurers, providers, and patients.

Moreover, research on accelerating societal change and improving the acceptance of digital solutions should be investigated. Special attention should be given to promoting openness towards technological progress for medical service providers which is essential to foster wider acceptance and engagement with digital healthcare solutions. In addition to that, methods to enhance trust in data privacy within digital health ecosystems require further exploration. This could include looking into best practices for data security, transparent communication about data usage, and patient consent processes. Especially the comprehension of soft factors, e.g. societal attitudes towards data privacy, is necessary to find the right strategies to mitigate concerns and achieve a greater acceptance of digital health solutions.

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Appendix

Appendix 1: Semi-structured interview protocol

Question ID	Topic	Interview Question	Type of Question
Q1	Introduction	Can you briefly elaborate on your current role and your connection and experience with health ecosystems.	Open
Q2	Establishment of a Health Ecosystem	What framework conditions are necessary to establish a connected health ecosystem, particularly concerning digital infrastructure and legal frameworks?	Open
Q3		Which stakeholders should be involved in creating a connected health ecosystem, and what roles could they play?	Open
Q4		What added value does an ecosystem need to provide for each player to generate sufficient motivation to become part of the ecosystem? / How can an ecosystem ensure that all partners benefit from the ecosystem?	Open
Q5		What conflicts of interest among healthcare stakeholders could impede progress?	Open
Q6		Top-Down vs. Bottom-Up Approach?	Alternative
Q7		Strategic Partnerships & Cooperation Models	Can you elaborate types or examples of partnerships that you believe are crucial to building a connected health ecosystem?
Q8	What are popular cooperation models within the ecosystem?		Open
Q9	How does your company / the ecosystem orchestrator ensure long-term collaboration with its partners?		Open
Q10	What criteria does your company consider when selecting suitable partners?		Open
Q11	How is it ensured that partners agree on common standards regarding e.g. data, technology, and processes?		Open
Q12	What prerequisites and conditions are necessary for successful partnerships within a health ecosystem?		Open
Q13	How does your company, or respectively the partners, deal with potential competitors within the ecosystem?		Open
Q14	Challenges	What are currently the biggest challenges faced by the company/ the health ecosystem environment?	Open
Q15	Market Environment Outlook	Globally operating tech companies such as Alphabet, Amazon, or Apple are also entering the healthcare sector with their platforms: How does your company address this? What opportunities & risks arise for health ecosystems?	Open
	Closing	Do you have any additional remarks?	Open
		Do you know anyone else in the field who might have more insights to share on this topic?	

Appendix 2: Relevance of Research Questions

Interview Question	Link to relevant research question	Statement	Foundation in Literature (Author, Year)
Q2: What framework conditions are necessary to establish a connected health ecosystem, particularly concerning digital infrastructure and legal frameworks?	How do the experiences of countries like Switzerland, which have already launched healthcare ecosystems, inform the development and implementation of similar initiatives in Germany? Specifically, what lessons can be drawn from their approaches in terms of frameworks and prerequisites, particularly considering the fragmented nature of the healthcare industry and the diverse range of stakeholders involved?	<ul style="list-style-type: none"> - <Regulatory changes constantly provide new impetus and form the basis for digital or hybrid healthcare solutions. This applies no later than since new digital laws from the Federal Ministry of Health regularly open up obligations, deadlines and potential for digitization.= 	<p>Benedict, M., & Schlieter, H. (2015).</p> <p>Benis, A., et al. (2021).</p> <p>Zeggel, J., (2023).</p>
Q3: Which stakeholders should be involved in creating a connected health ecosystem, and what roles could they play?		<ul style="list-style-type: none"> - <u>Pikkarainen (2017)</u> emphasizes the need for collaboration between actors such as doctors, nurses, patients, and companies, with intermediaries potentially playing a coordinating role. 	<p>Pikkarainen, M. et al. (2017).</p>
Q4: What added value does an ecosystem need to provide for each player to generate sufficient motivation to become part of the ecosystem?		<ul style="list-style-type: none"> - In healthcare, a platform could be used to build a new ecosystem that actually creates added value for all partners. 	<p>Frick, K., Bosshart, D., & Breit, S. (2020).</p>
Q5. What conflicts of interest among healthcare stakeholders could impede progress?		<ul style="list-style-type: none"> - <Conflicts of interest pervade most healthcare systems and pose considerable risks.= 	<p>Roksandić, S., & Saver, R.S. (2020).</p>
Q6. Top-Down vs. Bottom-Up Approach?		Ecosystem Approach Comparison	
Q7. Can you elaborate types or examples of partnerships that you believe are crucial to building a connected health ecosystem?	What types of partnerships and cooperation models are crucial for building a connected health ecosystem, what criteria guide their selection as suitable partners and how do these partnerships ensure long-term collaboration, alignment of standards, and mutual benefits among ecosystem participants?	<ul style="list-style-type: none"> - >The digital health market is growing steadily. This creates room for a wide range of providers. These can be either competitors or cooperation partners. In doing so, partnership cooperations have the advantage of increasing shared potential.< 	<p>Zeggel, J., (2023).</p>

Q8. What are popular cooperation models within the ecosystem?		<ul style="list-style-type: none"> - >The digital health market is growing steadily. This creates room for a wide range of providers. These can be either competitors or cooperation partners. In doing so, partnership cooperations have the advantage of increasing shared potential.< 	Zeggel, J., (2023).
Q9. How does your company / the ecosystem orchestrator ensure long-term collaboration with its partners?		<ul style="list-style-type: none"> - Successful alliances are built on factors such as [&] a long-term commitment (Whipple, 1999). 	Whipple, J.M., & Frankel, R. (1999).
Q10. What criteria does your company consider when selecting suitable partners?		<ul style="list-style-type: none"> - Ecosystems are the royal way to scale such cooperation. Providers who successfully use this for themselves can become centres of gravity 3 that is, providers that take advantage of a relevant market position and cluster other providers around themselves.< - The selection of the right partners for successful and sustainable business partnerships is a critical factor in the success of such collaborations. - According to a survey of 455 CEOs, the most important factor in designing a strategic alliance is the selection of the right partner (chosen by 75% of the CEOs). 	Zeggel, J., (2023). Rese, M. (2006). Holohan, P.M. (1998).
Q11. How is it ensured that partners agree on common standards regarding e.g. data, technology, and processes?		<ul style="list-style-type: none"> - <Innovations in healthcare are primarily hindered or prevented because the various actors cannot agree on common technological standards.= 	Frick, K., Bosshart, D., & Breit, S. (2020).
Q12. What prerequisites and conditions are necessary for successful partnerships within a health ecosystem?		<ul style="list-style-type: none"> - Partners in alliances bring in personal attributes and institutional characteristics that can form obstacles to successful alliances. 	Koelen, M.A., Vaandrager, L., & Wagemakers, A. (2012).

Q13, How does your company, or respectively the partners, deal with potential competitors within the ecosystem?	What are the primary barriers and challenges faced by digital health startups and other stakeholders within the German healthcare sector, and how do these impact ecosystem development and response to market pressures, including competition and conflicts of interest?	- <The digital health market is growing steadily. This creates room for a wide range of providers. These can be either competitors or cooperation partners.=	Zeggel, J., (2023).
Q14. What are currently the biggest challenges faced by the company/ the health ecosystem environment?		- <The accelerated development of the digital health sector is, first of all, a positive signal. At the same time, the dynamics also offer challenges.<	Zeggel, J., (2023).
Q15. Globally operating tech companies such as Alphabet, Amazon, or Apple are also entering the healthcare sector with their platforms: How does your company address this? What opportunities & risks arise for health ecosystems?		<ul style="list-style-type: none"> - <The disruption caused by tech companies can drive innovation and efficiency in the healthcare sector.= - >Their collaborations with healthcare institutions are aimed at accessing and analyzing health data, which can lead to improved patient care and outcomes.= - <These companies are leveraging advanced technologies to develop digital health solutions, including wearables and AI-driven tools.= - <The increasing control of these companies over healthcare data raises concerns about privacy and the potential for corporate profit-making to overshadow public health interests< 	<p>Blumenthal, D., Galvin, R.S., & Mohta, N.S. (2019).</p> <p>Szigetvári, G., & Meskó, B. (2023).</p> <p>Parnas, M. (2017).</p>

Appendix 3: Thematic analysis of the interviews based on Gioia et al., 2013

Interview Findings			
	First-Order Concepts - Direct Quotation	Second-Order Themes	Aggregate Dimension
Establishment of a healthcare ecosystem 3 Framework Conditions	<The healthcare sector is heavily regulated and involves numerous stakeholders with conflicting interests. This complex landscape may not inherently foster ecosystem-friendly conditions contributing to the inherent challenges and difficulties in establishing such systems.= (E1)	Complex Regulatory Environment and Lack of Legal Support	1. Establishing sustainable healthcare ecosystems requires navigating complex regulatory landscapes, building secure and interoperable digital infrastructure, fostering trust and collaboration through shared vision and cultural adaptation, and consistently demonstrating tangible value creation
	"Legal framework must also permit such digital advancements." (E4)		
	"Legislative initiatives play a role. In Switzerland, the Electronic Patient Record (EPR) system has been in development for 15 years without substantial progress." (E6)		
	"The digital infrastructure [&] is a universal need." (E3)	Secure, Digital Infrastructure Needs and Interoperability	
	"An infrastructure that supports digital services is necessary, but this is generally available in most countries." (E4)		
	"Interoperable systems are also essential to ensure seamless communication." (E5)		
	"Secure communication channels are imperative." (E5)	Data Standards and Security	
	<Establishing data standards is a fundamental framework condition.= (E4)		
	"Paramount importance of addressing data privacy and security concerns." (E5)		
	"Decisions on data standards, data storage methods, and semantic interoperability." (E8)	Shared Vision & Trust	
	<Trust, though considered a soft factor, significantly influences partnerships and collaborations.= (E5)		
	"Shared vision, openness among key market players, and willingness to make joint initial investments." (E6)		
	"Cultural shift at various levels to foster ecosystem-friendly behaviors." (E1)	Cultural Shift	
	"Fostering a digital open society is essential." (E4)		
	<Each country possesses its own cultural idiosyncrasies that must be considered in ecosystem development efforts.= (E5)		
<The main focus, however, is ensuring added value, whether from the patient9s or provider9s perspective.= (E8)	Demonstrated Impact & Added Value		
<One critical aspect is ensuring that all participants see value in being part of the ecosystem. Initially, this value may not be immediately apparent. The ecosystem			

	must reach a certain maturity before it generates tangible benefits for all members. Therefore, transparent communication about the objectives and potential benefits is crucial.= (E3)		
Top-Down vs. Bottom-Up Approach	"There is a fundamental decision that must be made, specifically whether to adopt a top-down or bottom-up approach." (E1)		
	"In our experience, we predominantly adopted a bottom-up approach." (E3)		
	"I believe it always makes sense to have some form of regulation or incentive system implemented from the top-down." (E5)		
	"Germany tends to favor a top-down approach, reflecting our legalistic culture." (E8)	Cultural Preferences	
Stakeholder Roles	<It's essential to identify relevant stakeholders and determine when their involvement is needed to implement the strategy effectively.= (E3)	Clear Distribution of Roles	2. Balanced Stakeholder Involvement with Clear Definition of Roles and Neutral Orchestration: Health insurance companies provide the financial backbone, healthcare providers ensure quality care integration, technology partners drive digital implementation, patients act as central feedback nodes, and government/regulatory authorities set frameworks
	<It is crucial to define the role distribution clearly. [The founding partners] provide financial support and contribute their expertise to operational projects, [&] but do not interfere with daily operations. Maintaining independent governance is essential to ensure that partners do not impose their individual interests on the operation.= (E6)		
	"Insurance companies, seeking potentially reduced costs." (E1)	Health Insurance Companies play a crucial role in financing	
	<Health insurance companies should be the primary point of engagement. By starting with the health insurance companies, we can potentially involve all other stakeholders, as they control the funding which influences the entire network." (E2)		
	"Insurers: They finance the system since someone must bear the costs. The most substantial savings are likely to occur for the insurers.= (E4)		
	"Insurers are also indispensable stakeholders, particularly in European contexts where they often finance solutions." (E5)		
	<Health professionals are incentivized, as they aspire to improve healthcare quality, driven by the ethical oath to provide better services or enhanced health outcomes for the same expenditure.= (E1)	Healthcare Providers Essential for Quality Care	
	"Healthcare Providers: They must be involved because their participation enhances the quality of care." (E4)		
	<"Frontline healthcare providers [&] bring essential insights into practical usability and efficiency." (E8)		
	"Technology Partners: Essential for the implementation of the system." (E4)		

	"Engage with technology enablers, which can range from large MedTech institutions to life science and pharmaceutical corporations." (E5)	Technology Partners Key to implementing digital solutions	
	"Affected individuals who prefer not to navigate through numerous healthcare providers." (E1)	Patients Central Role for Feedback and Adoption	
	"Patients: A feedback pool providing insights into the system's effectiveness." (E3)		
	"Patients, clients, or end consumers hold a central and pivotal role." (E5)		
	"Political involvement is inevitable. The healthcare system is heavily regulated." (E3)	Government and Regulatory Authorities	
	"Government authorities set regulatory frameworks at either the EU or national levels." (E5)		
	"Policymakers are involved to ensure inclusivity and adoption." (E8)		
	<A crucial prerequisite for building an ecosystem [&] is the necessity to maintain neutrality as a third party. This implies that one cannot be aligned with any of the various stakeholders or be associated with any of them. This neutrality is fundamental as it allows one to assume a neutral mediation role and facilitates bringing together the stakeholders, as otherwise, there may be skepticism regarding potential biases.= (E1)	Role of Orchestrator	
	<Typically, having a neutral orchestrator helps, ensuring that not only policymakers and financiers but also frontline healthcare providers and researchers are involved.= (E8)		
	<Ideally, the orchestrator should maintain a neutral role. In theory, this neutrality ensures the ecosystem's balanced development. [&] In practice, having an orchestrator with a vested interest can also work, provided there is complete transparency.= (E3)		
	"Generating sufficient motivation involves demonstrating tangible benefits tailored to each stakeholder group." (E2)	Importance of Stakeholder Management	
	"An ecosystem only begins to yield value when it consistently comprises actors who can mutually benefit from each other. So, it's important to always keep in mind: Who benefits from whom? And to bring them together." (E7)		
Added Value	"Patients seek convenience, personalized care, and empowerment over their health data." (E2)	Unified Data Access Enhancing Care Quality	3. Creating added value in healthcare ecosystems by enhancing care quality through unified data
	"The ultimate value proposition lies in creating a cohesive treatment team with access to the same data." (E4)		

	"The classic example is improved healthcare services. Patients benefit personally, and there is a societal advantage when shared data contributes to better treatment outcomes for others." (E8)		access, streamlining workflows for efficiency and cost reduction, and overcoming resistance to foster stakeholder acceptance and trust
	<Our goal is to provide data and digital services that enhance treatment quality and efficiency, ultimately lowering healthcare costs by avoiding redundant tests and streamlining the treatment process.= (E4)	Streamlined Workflows and Efficiency Leading to Cost Reduction	
	"For companies, which are inherently profit-driven, the value proposition is clear." (E3)		
	<Efficiencies in everyday clinical processes4such as reducing time spent on routine tasks4can be significant." (E8)		
	<Currently, there is no streamlined information flow, and they might exchange information through word documents or other inefficient means, leading to significant data loss.= (E4)		
	"Gaining acceptance from these actors can be challenging. Despite significant progress, historical disappointments, such as unmet promises in elderly care, have created skepticism." (E3)		
	"Many doctors seem uninterested because they are concerned about the implications of patient information access." (E4)		
Conflicts of Interests	"Conflicts of interest can arise among stakeholders due to differing objectives. [&] High-profit margins [vs.] best patient outcomes." (E5)	Conflict Sources	4. Navigating conflicts of interest when establishing healthcare ecosystems by fostering collaboration, ensuring neutral orchestration, and clearly defining roles among stakeholders
	"For health insurance companies, the focus tends to be more on numbers, such as the impact and cost reduction potential of a digital solution. [&] However, for startups, there's often an initial emphasis on the moral component, aiming to fundamentally improve the healthcare system " (E7)		
	"While competition exists, my observation suggests that most stakeholders strive to collaborate." (E5)	Collaborative Efforts	
	"We have three insurers who are competitors. Despite their competition, they collaborate on our platform. This separation between business operations and the ecosystem's development is crucial. [&] We avoid entangling ourselves in competitive dynamics and refrain from regulating competition.= (E4)		
	"We collaborate on common topics, aligning as much as possible.= (E6)		
	"Financial concerns, efficiency goals, and technical feasibility often clash. Effective communication among stakeholders from various backgrounds4whether technical, medical, or financial4is crucial to bridge these gaps. This is why a skilled mediator is essential.= (E8)	Need for Neutral Orchestration	

	<Our approach is neutral and inclusive, allowing any service provider within the Swiss healthcare ecosystem to participate. In this way, we position ourselves as neutral orchestrators, facilitating collaboration without influencing competitive dynamics.= (E4)		
	<Regarding conflicts of interest, it is important to note that our partners have different roles. Investors [&] cannot be part of my executive team, ensuring no operational entanglements. I do, however, have a vested interest in considering my partners' interests, as they bring users to the platform. Their success directly correlates with my success, creating a mutually beneficial relationship.= (E6)	Need for Defined roles (e.g. Role of Investors)	
Partnerships & Cooperation Models	"The strategic partnerships we pursue are essential for building a comprehensive healthcare ecosystem." (E4)	Necessity of partnerships & collaboration	5. Strategic partnerships and co-creation initiatives form the foundation of resilient healthcare ecosystems, built upon preconditions: Value Creation/ tangible benefits for all stakeholders, Mutual Trust & Transparency and intrinsic motivation/ collaborative and innovative mindset
	"Collaboration among different entities during the system's construction phase is crucial because a fragmented approach won't suffice." (E4)		
	"Strategic partnerships are vital for the validation process of novel digital health solutions." (E5)		
	"It's crucial to seek [&] partnerships that demonstrate the interconnectedness and openness of the ecosystem." (E6)		
	"Consortial partners are our investors; they are financially invested and simultaneously act as co-creation partners, working on projects with us." (E6)	Co-Creation Partnerships as ideal form of collaboration	
	"We bring in co-creation and technology partners where it makes sense. These partners are not investors but collaborators." (E6)		
	"Co-creation is a valuable method, involving affected parties in identifying problems and testing solutions in a collaborative manner." (E8)		
	<Co-creation stands out as a model that fosters diverse and equitable participation. Ensuring all stakeholders have a shared vision and complement each other's roles usually leads to more sustainable partnerships.= (E8)		
	"The success of such partnerships hinges on clear strategic and operational alignment, collaborative development, transparency, and expectation management." (E3)		
Prerequisites/ Preconditions	<At the most fundamental level, there must be [&] a win-win-win solution. Achieving a win-win-win scenario entails creating value for both parties involved and any third party, which is straightforward in theory but proves challenging in practice.= (E1)	Value Creation, Mutual Trust & Transparency	
	"Neutrality as a third party...facilitates bringing together the stakeholders." (E1)		

	"Mutual trust is arguably the most critical requirement...necessary transparency and clear communication." (E5)		
	"Intrinsic motivation...to actively address the actors within the healthcare system." (E7)		
	"All participants need to bring not only motivation but also a bit of patience." (E8)		
	<You have to let go of the idea of trying to keep the patient or customer locked in so they don't leave. You want to offer them so many cool things that they don't want to leave. And that's what happens. It's a mindset.> (E4)	Mindset / Mentality	
	<The pioneer spirit and attitude [&], mentality [to collaborate].=> (E6)		
Long-Term Collaboration	<Short-term incentives are ineffective, given the long-term nature of the endeavor. [&] There must be a long-term benefit, which is understandable, communicable, truly valid, and, of course, value-driven.=> (E1)	Orchestrator Strategies for Long-Term Collaboration: 1)Strategic Alignment and Incentives	6. Effective long-term collaboration requires strategic alignment and shared goals, transparent communication fostering trust, personal engagement to build robust networks, and flexibility to adapt and manage expectations continuously. This approach also extends to establishing effective standards, which hinge on open communication, collaborative process definition, and adherence to recognized benchmarks like HL7 FHIR and national standards.
	<Managing expectations and striving to highlight the value in various areas such as positioning and branding is essential." (E3)		
	<Show partners that they are investing in the cutting edge, which encourages long-term engagement." (E7)		
	"Whether each of the potential participants has their own vision and goal, and how much overlap there is< (E8)		
	<It is imperative to be extremely well-connected within the system. Without robust connections, one risks being sidelined and missing out. [&] An exceptionally strong network [&] is a prerequisite for offering a credible, long-term perspective.=> (E1)	2) Effective Communication and Networking	
	<Building trust and networking stakeholders requires clear and effective communication channels... clear communication with your partners is essential." (E5)		
	<It is incredibly important to maintain personal contact... connect with the individuals within the companies rather than just communicating through emails." (E7)		
	"We have the flexibility to adapt... this approach aligns with our strategy and supports continuous development." (E6)	3) Flexibility and Adaptability in Collaboration	
	<Realistic expectation management is crucial, along with early mitigation strategies in case a partner drops out." (E3)		
	"It is a process of ongoing negotiation and rebalancing... reassess who works best with whom." (E8)		

Common Standards	<You can communicate and practice openness to the extent that each party recognizes the better option and acknowledges the added value in aligning with another.= (E1)	Open Communication, Collaborative Process Definition, Establishing Standards and Adherence	
	<it's essential to align this with experts.= (E3)		
	"Ideally, processes are collaboratively defined" (E5)		
	<Ensuring it completely is not feasible [&], we do adhere to prevailing standards.= (E1)		
	<What we also do is define them based on HL7 FHIR because HL7 FHIR has already established itself in the healthcare sector worldwide.= (E4)		
	<In cases where there are national or pan-European standards, one must adhere to them" (E5)		
	"The Interop Council and its associated coordination office now have to gradually establish standards" (E8)		
	<It's often not possible to obtain structured data from doctor's systems [&] that's why we try to get as much as possible from insurers because they have structured data available. So, yes, the issue with standards is a problem.= (E4)		
Criteria for Partner Selection	"Our primary selection criterion is unequivocally evidence and patient-centricity." (E1)		
	"We sought partners who were complementary, preferably not overlapping, but rather complementing each other." (E3)	Complementary Characteristics	
	<Selecting stakeholders who are complementary to the services one offers. While they don't necessarily have to be completely different, it's intriguing to partner with entities that can cover services beyond what one's own company provides.= (E5)		
	"One important criterion is having a shared goal to work towards." (E5)	Shared Goals & Thematic Alignment	
	<Ensuring thematic alignment because, as I mentioned at the beginning, the ecosystem is only qualitatively valuable if the actors come together thematically.= (E7)		
	<Patience and commitment are essential, as these partnerships often take time to develop.= (E8)		
Competition within Ecosystem	"Co-opetition instead of competition is imperative [&] various interests must find a place. [&] it is an absolute prerequisite for the functioning of the ecosystem.= (E1)	Co-opetition & Niche Specialization	

7. Effective partner selection for the establishment of healthcare ecosystems is driven by the alignment of shared goals and prioritisation of complementary characteristics: This approach fosters co-opetition, where competitors prioritize openness and learning, leveraging unique selling propositions (USPs) to identify specialised niches

	<p>"Fostering openness towards fellow competitors should be prioritized. [&] Being receptive to learning from competitors and seeking helpful insights is key." (E5)</p> <p><Each startup or solution, even if similar, possesses its unique selling proposition (USP). It's crucial to highlight this USP effectively.= (E5)</p> <p><Each partner must recognize their value. [&]They can position their services uniquely. [&] The key is seeing the value and differentiation potential.= (E6)</p> <p><Ideally, each competitor would identify their niche, offering the best product or service in that area. This specialization can streamline choices for healthcare providers and enhance the overall system.= (E8)</p>		
Challenges Arising and Market Environment Changes	<p><The primary challenge [&] lies in the financial or commercial viability of a business model. It is a long-term endeavour, requiring significant perseverance.= (E1)</p>	Long-term Viability	8. Establishing sustainable healthcare ecosystems involves navigating challenges: persuading stakeholders about the significance of long-term viability, overcoming healthcare professionals' resistance to change, addressing budget limitations in digitalization efforts, managing cultural concerns regarding data security and trust, and adapting to shifts in the market environment including the entry of global tech players
	<p><The prevailing trend is the short-term orientation adopted by numerous stakeholders, particularly young enterprises. The absence of immediate pressure to address long-term objectives enables a prioritization of quick wins.= (E3)</p>		
	<p>"Long-term viability...keeping the stakeholders in the ecosystem in the long term...to keep it interesting, to continue providing added value." (E7)</p>		
	<p>"The biggest challenge I see is in change management... doctors just aren't willing to do it." (E4)</p>	Resistance and Change Management	
	<p><Convincing doctors of digitalization can be challenging, especially considering their familiarity and comfort with existing systems. They may be resistant to change and hesitant to adopt something new.= (E6)</p>		
	<p><we need to win over a few pioneers who are willing to try new approaches, and then use their successes to persuade others. Additionally, we have established a Medical Advisory Board [&], this ensures that the sales approach is tailored to the medical profession's needs and concerns.= (E6)</p>		
	<p>"Digital innovation is more of a secondary or tertiary priority... economic times when there may not be much budget available." (E7)</p>	Digitalisation currently no priority in budget allocation	
	<p><Do you want to entrust your health records to Apple, Google, or Amazon? I think probably not.= (E1)</p>	Trust and Data Security Concerns Among Big Tech Players	
	<p>"I really believe trust is a big thing...these [global operating tech] companies don't inspire that much trust." (E5)</p>		
<p><There is a cultural and regulatory hesitation in Germany regarding data privacy and control. Balancing public and private interests in data utilization is an ongoing challenge.= (E8)</p>			

	"If a company provides a compelling offer for any reason, data privacy concerns may become less significant because the practical benefits outweigh these concerns. Concerns about monopolization must be carefully managed [tho]." (E2)	Market Impact Concerns	
	"We should be cautious not to become overly dependent on them...potential reliance should be mitigated." (E3)		
	"They offer considerable power and can expedite the establishment of standards, facilitating innovation." (E3)	Opportunities for Local Ecosystems: Potential for Innovation and Data Integration	
	"They possess the capacity to integrate vast amounts of data into meaningful contexts and introduce innovative solutions to the market." (E5)		
	"We see the opportunity to have more data available...not the technology that's the issue, but rather the change management, the mindset of service providers and patients." (E4)		
	"Our strong local anchoring is a significant advantage... [global tech companies offer] more complementary aspects than competitive ones." (E6)	Future Role of Big Tech in Healthcare	
	<There's an image issue to consider. Apple, Google, and whoever else cannot afford to take risks in the health sector because it would be a death blow and a delicate issue deeply tied to trust. If trust were somehow compromised, the entire business model would be severely tarnished. [&] Therefore, there may not be a huge desire to delve deeply into it. On a service level, yes, but not on the infrastructure level.= (E1)		

Appendix 4: Exemplary Interview Transcript – Expert 1

Interviewer: Can you briefly elaborate on your current role and your connection and experience with health ecosystems?

Interviewee:

I co-founded [name of the health ecosystem company] with [co-founder] in the summer of 2022, following a period of prior engagement in the healthcare sector. My involvement included founding or contributing to [former company], from which I derived extensive knowledge, contacts, assets, and networks, notably the Long Covid Network.

Upon initiating [company], we pursued three interconnected objectives:

[Company] undertakes three interrelated endeavours:

1. Foundational infrastructure: We establish the foundational infrastructure for sharing structured health data, based on a wallet model. This framework enables patients or affected individuals to retain their data within a wallet or health database, facilitating its accessibility and utilization.
2. Structured patient journeys: The second component entails crafting structured patient journeys aimed at fostering better transparent decision-making for both patients and healthcare professionals.
3. Analytics: The third aspect involves leveraging analytics to inform better decision-making processes. This includes generating evidence-based insights conducive to deriving decisions aligned with High Value Care principles, benefiting both individuals and healthcare professionals.

Interviewer: What framework conditions are necessary to establish a connected health ecosystem, particularly concerning digital infrastructure and legal frameworks?

Interviewee:

I believe there are numerous facets at play, particularly within the healthcare sector, which is heavily regulated and involves numerous stakeholders with conflicting interests. This complex landscape may not inherently foster ecosystem-friendly conditions, contributing to the inherent challenges and difficulties in establishing such systems. This complexity has historical roots, evolving over time into a multifaceted political dynamic. Healthcare initially emerged as a policing measure, primarily focused on disease control. This historical backdrop significantly influences the contemporary landscape, characterized by top-down regulation or market-driven approaches, compounded by heterogeneous dependencies among various stakeholders. Furthermore, disparities in interests between insurers and service providers exacerbate the challenge. For instance, a consumer adopting a comprehensive insurance mentality may not actively engage in the ecosystem, as they perceive themselves as mere consumers rather than participants. This necessitates a cultural shift at various levels to foster ecosystem-friendly behaviours. Such a cultural transformation is a protracted process, akin to a change management initiative. It involves prompting and sustaining this change, contingent upon factors such as the prevailing insurance landscape, whether unified or fragmented like in Switzerland and Germany. Addressing these challenges requires fundamental decision-making regarding top-down or bottom-up approaches.

Interviewer: What approach in your opinion is more appealing? top-down or bottom-up?

Interviewee:

Previous attempts at top-down solutions have often faltered, as they lack user buy-in, necessitating a shift towards incentivizing ecosystem participation based on perceived individual benefits. This entails identifying and aligning individual incentives to collectively motivate participation, emphasizing the importance of understanding and integrating diverse stakeholder perspectives to foster motivation and collaboration within the ecosystem. Now, the solution emerges, essentially by discerning what the individual benefits are and connecting them in such a way that the motivation is substantial enough to participate.

Interviewer: Which stakeholders should be involved in creating a connected health ecosystem, and what roles could they play?

Interviewee:

It is a question of who must and who should be involved. The issue not addressed in the previous question is financing. In healthcare, if you have financing, typically you have business models over three degrees, thus there are very few direct business models. Services are exchanged for performance, usually resulting in triangular relationships or even more complex arrangements on the same level. Consequently, this introduces immense complexity with various stakeholders needing involvement. This entails, notably:

1. A regulator on one side, which may not necessarily have an interest in the ecosystem.
2. Insurance companies, seeking potentially reduced costs. However, an insurance company does not inherently focus solely on cost reduction, as insurance operates rather passively. Ultimately, when additional costs arise, premiums increase, which may not align with the insurer's interests.
3. On the other hand, MedTech and Pharma companies may have significant interest, depending on the specific player. Some emphasize the need for higher quality rather than sheer quantity.
4. Health professionals are incentivized, as they aspire to improve healthcare quality, driven by the ethical oath to provide better services or enhanced health outcomes for the same expenditure. This fundamental expectation is also shared by affected individuals who prefer not to navigate through numerous healthcare providers to find solutions, ideally seeking resolution with the first provider or even avoiding hospitalization altogether.
5. In summary, a regulator, payer, provider, and consumer integration are deemed essential.

Interviewer: Can you elaborate types or examples of partnerships that you believe are crucial to building a connected health ecosystem?

Interviewee:

Essentially, a crucial prerequisite for building an ecosystem, as per our understanding, is the necessity to maintain neutrality as a third party. This implies that one cannot be aligned with any of the various stakeholders or be associated with any of them. This neutrality is fundamental as it allows one to assume a neutral mediation role and facilitates bringing together the stakeholders, as otherwise, there may be scepticism regarding potential biases toward certain interests. Therefore, this constitutes a fundamental requirement. Considering these conditions, the challenge arises in determining which stakeholders need to be involved:

1. It is believed that all the stakeholders mentioned must be involved.
2. However, it is essential to address their interests on an individual basis.

The problem arises when there is dominance or overweighted influence from one stakeholder over another, potentially deterring associated parties. For instance, if a particular insurance company holds a 20% market share, it may question its involvement. Hence, meticulous stakeholder management becomes crucial. While the convergence of technology and medicine is vital, effective stakeholder management is equally necessary. It involves addressing individual interests, organizing and coordinating them in a manner that they recognize the value proposition without alienating others. Striking this delicate balance is paramount. Typically, in Switzerland or the German-speaking region, various associated factors come into play. For instance, there are different insurance associations (A and B), and their involvement or non-involvement can impact decisions. This phenomenon is not exclusive to insurance companies or pharmaceutical firms; there exist networks that must be considered and kept on the radar during integration decisions.

Interviewer: Is it currently the case that you actively seek out the players, or do they also approach you at times?

Interviewee: Both, it's a bit of both.

Interviewer: How does your company / the ecosystem orchestrator ensure long-term collaboration with its partners?

Interviewee:

Certainly, one cannot guarantee anything in such a system, but one can certainly lay the groundwork to credibly steer it in that direction. Firstly, independence is undoubtedly a critical factor in aligning interests to ensure that all parties have long-term incentives. Short-term incentives are ineffective, given the long-term nature of the endeavour. For businesses, there must be a long-term benefit, which is understandable, communicable, truly valid, and, of course, value-driven. Secondly, on the other hand, it is imperative to be extremely well-connected within the system. Without robust connections, one risks being sidelined and missing out on crucial points, thereby failing to align all interests effectively. Therefore, an exceptionally strong network, coupled with adept stakeholder management, is a prerequisite for offering a credible, long-term perspective.

Interviewer: What criteria does your company consider when selecting suitable partners?

Interviewee:

Fundamentally, we are guided by evidence-based principles, which is essential to us. This means that we rely on evidence and are less inclined towards speculative topics based solely on logic. For instance, Long Covid is currently a topic with limited evidence, posing a challenge for decision-making. It is evident, therefore, that this underscores the complexity of the healthcare sector, necessitating a continuous engagement with uncertainty. Consequently, healthcare is an evolving field, characterized by a continual state of uncertainty. It is not an exact science; rather, it is subject to evolving indications and syndromes. Hence, navigating uncertainty is a crucial and valid aspect. Therefore, it is imperative to acknowledge prevailing opinions and integrate them into evidence-based approaches.

Hence, our primary selection criterion is unequivocally evidence and patient-centricity. We do not pursue solutions that contradict the interests of those affected, but rather aim to convene various stakeholders to collaboratively devise solutions that are balanced and considerate of the diverse players involved.

Interviewer: How is it ensured that partners agree on common standards regarding e.g. data, technology, and processes?

Interviewee:

Ensuring it completely is not feasible. However, I believe that you can communicate and practice openness to the extent that each party realizes that "the better is the enemy of the good." When one recognizes the better option and acknowledges the added value in aligning with another, despite potential initial challenges, the motivation to do so is established. While we do not fully guarantee such alignment, we do adhere to prevailing standards. It is evident that we are significantly advanced technologically, but there are always risks involved. One may consider these risks within the context of embracing uncertainty, which, in turn, fosters innovation. Ultimately, certainty remains elusive, and it is through grappling with uncertainty that progress is achieved.

Interviewer: What prerequisites and conditions are necessary for successful partnerships within a health ecosystem?

Interviewee: At the most fundamental level, there must be at least a win-win, if not a win-win-win solution. While this sounds remarkably simple, it is precisely where the challenge lies. Achieving a win-win-win scenario entails creating value for both parties involved and any third party, which is straightforward in theory but proves challenging in practice.

Interviewer: Speaking of challenging, what are currently the biggest challenges faced by your company/ the health ecosystem environment?

Interviewee:

Alongside considering and coordinating all the incentives, I believe the primary challenge, which is also intertwined with the incentives, lies in the financial or commercial viability of a business model. This aspect often involves navigating through multiple layers, presenting a genuine challenge that shapes the entire business model with investors. It is a long-term endeavour, requiring significant perseverance. On the other hand, these are daily challenges. Besides the entire process of building, having investors, funders, and financial sources that perceive, comprehend, and support this vision poses additional hurdles.

Interviewer: How does your company, or respectively the partners, deal with potential competitors within the ecosystem?

Interviewee:

For us, co-opetition instead of competition is imperative; we see precisely that it must be so, that the various interests of, for example, pharmaceuticals, insurance, and service providers, which do not need to be competitors, must find a place, on the one hand, but also among the different players themselves - two insurance, two pharmaceuticals, three insurance - without them feeling marginalized. This is not merely simple, but it is an absolute prerequisite for the functioning of the ecosystem. And then, returning to the question of how to address these interests? That is precisely the point, but it is a condition, not a competition, rather, each must find their place within their field, but come to a common understanding.

Exactly, so once again, I think ensuring that is difficult, but one can set incentives to provide added value, and I think there must be a distinction between two phases or several phases, but there are two essential ones: the development phase and the operational phase.

1. In the development phase, compromises must be made.
2. In the operational phase, when you have established a standing, you can be more accepting of demands and simply establish facts. But these are different phases, and we are not yet at the stage where we dictate terms; instead, we must consider and act accordingly. By dictate, I don't mean to imply anything forceful; rather, it's about arriving at a point where we can assert, 'The interest of the patients is XY-Y,' and enforce that. We are not there yet, but naturally, that is the direction we are heading.

Interviewer: Globally operating tech companies such as Alphabet, Amazon, or Apple are also entering the healthcare sector with their platforms: How does your company address this? What opportunities & risks arise for health ecosystems?

Interviewee:

I think I view this relatively calmly because if you look at it, consider Amazon trying, Apple attempting, or not yet officially attempting but having accumulated the largest data value or data pool with Apple Health, it's clear. But I think now you can answer for yourself: Do you want to entrust your health records to Apple, Google, or Amazon? I think probably not. Therefore, I assume they will be players and must be, but I don't believe it will systematically evolve to them controlling the infrastructure and healthcare system; rather, they will remain service providers. However, I don't expect the ecosystem to revolve around them; they will be significant providers but not the moderators of this ecosystem.

There's likely also a regulatory aspect within each country. And of course, there's an image issue to consider. Apple, Google, and whoever else cannot afford to take risks in the health sector because it would be a death blow and a delicate issue deeply tied to trust. If trust were somehow compromised, the entire business model would be severely tarnished, and I don't think any of them can afford that. Therefore, there may not be a huge desire to delve deeply into it. On a service level, yes, but not on the infrastructure level.

Co-Existence of Ecosystems:

1. Absolutely, I firmly believe it's necessary, and I also believe they need to interact with each other. Not to say, "Oh yes, we know better," or whatever, but to learn from each other.
2. The second point is that the regulatory and regional nuances are so different that you can't replicate an approach in Germany one-to-one in Switzerland, Austria, Sweden, or anywhere else. I think this is a realization that despite all the similarities, there are differences, and we probably need to come together more, which is partly happening but is also very regionally focused.

Ultimately, with the three components we are working on, our goal is to provide individuals, affected patients, with wallets, and the ability to store structured health data and use it for decisions and better transparency. That's absolutely the goal, and we are fully aware. It's a long-term endeavour.

Interviewer: Thanks a lot for your time and willingness to support my research. Really insightful talk. Good luck with [your company], excited to read more about it in the future!