# Collaborative Business Model Structures for a Digital Care Platform: Value Proposition, Partners, Customer Relations, and Revenues

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Abstract: The shortage of skilled workers and complex challenges arising from the aging of society, emphasize the relevance of collaboration between stakeholders. Furthermore, a collaboration between interdisciplinary stakeholders gather expertise and practical knowledge to successfully establish a collaborative business model on the market. Especially in the care sector, this need becomes clear. For this, a digital care platform is developed to efficiently manage the shortage of skilled workers, connect people with assistant needs and service providers in a cost-efficient manner and distribute efficiency gains throughout the collaboration network. This makes a collaborative business model that presents the way collaboration is to be built necessary and shows financing as well as efficiency gains and revenue allocation possibilities between the stakeholders. Thus, collaborative business model structures are presented in this paper to show how a collaboration of stakeholders can be successful. The analyses show the many possibilities to finance a care platform depending on the chosen business model. Especially promising seems to be a combination of financing models. The identified further challenge is to emphasize the added value a care platform brings to service providers and users alike.

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## 1 INTRODUCTION

Demographic change is a process that arises from complex problematic issues and makes innovative solution strategies necessary. These challenges include political, economic, and social dimensions (Schwarting, 2018). In this context, coping with the shortage of skilled workers will become particularly relevant because of the increasing aging of society (Schwarting, 2018). For the increasing development of smart services and platforms, solutions are relevant that meet the complexity of upcoming projects and issues. The joint project Smart Care Service [1] addresses this specific challenge by developing a digital care platform that manages the shortage of skilled workers efficiently, connects people with assistant needs and service providers, and responds to changing customer demands. An approach to this is a collaboration with multiple stakeholders and the development of a collaborative business model (Bullinger et al., 2017). The development of collaborative business models is an aim of Smart Care Service. The project aims to develop a digital care platform with multiple stakeholders from different breaches who bring in specific expertise in the process. For this, all relevant aspects for the development of a care platform will be considered.

An example in which the collaboration of multiple business partners is necessary is the Ambient Assisted Living (AAL) area. Collaboration from multiple stakeholders within the AAL area lead to high quality care services, increasement of outreach, and cost savings. Furthermore, a high number of collaborators is imperative for innovations to develop (Memon et al., 2014; Mukhopadhyay & Bouwman, 2018). Various innovative technologies are used to enable older people and people with assistant needs to live autonomously at home for as long as possible, such as motion tracking or smart devices in the household (Bleja et al., 2020). Even though the development of collaborative business models is challenging for the stakeholders, as a high number of

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collaborators also lead to high complexity and organizational effort, there are also several benefits (Mukhopadhyay & Bouwman, 2018). Besides the gain of know-how, collaborations also create new revenue streams and distribution channels, new networking partners, and cost savings in the production of goods and services (Bartels et al., 2020). Therefore, partners can contribute their expertise and practical knowledge to gain business advantages.

In this paper, two possible business models for a digital care platform are presented. The marketplace platform and the brokerage platform are the results of intensive literature review and business model development. The two types are the basis for the collaborative business model that is developed in this paper.

Initially, the business model definition, as well as a possible developing process, will be considered in chapter 2. In this, the two possible business model alignments for a digital care platform (marketplace platform and brokerage platform) will be compared. The differences will be explained in chapter 2.1. Then, based on these models, the collaborative business model structures will be shown relating to a care platform (chapter 2.1.3). Furthermore, benefits and challenges will be worked out and important aspects such as the forms of collaboration and their structures will be emphasized. While the advantages of collaborative business models are the focus of this paper, the challenges of this type of business model will also be considered and solution recommendations are given. A special focus lies on the financing and revenue potentials of a care platform (see chapter 3).

Finally, open questions for future research are presented in the further work section and the conclusion.

## 2 BUSINESS MODEL STRUCTURES

Smart services will influence many areas of society in the future. These areas include, among others, education, the production of services and products, infrastructure, and healthcare (Marquardt, 2017). The changes within these areas make new business models necessary. For this, existing business models have to be adapted or entirely new business models have to be created. Before this, a definition of what a business model is, is necessary.

Marquardt (Marquardt, 2017) emphasizes that a consistent definition of a business model is challenging, as the several existing business model structures are not distinguishable. A business model, as Kimble (Kimble, 2015) elaborates, describes how a company operates. For this, the business model will be reduced to its key points and the relationships of the stakeholders will be analyzed. Examples of business model structures include the models by Zott/Amitt (Zott & Amit, 2010), Björkdahl (Björkdahl, 2009), and Chesbrough (Chesbrough, 2010). Even though it is complicated to find a holistic definition of what a business model is, several existing business model structures unite in the inclusion of a value proposition, e.g. Teece (Teece, 2010), Osterwalder, and Pigneur (Osterwalder & Pigneur, 2010). The aim of the implementation of a business model is the sustainable positioning in the market. To accomplish this, Bartels et al. show a possible approach to business model development based on several phases (Bartels et al., 2020).

Firstly, the business environment has to be analyzed based on its strengths and weaknesses as well as external strengths and weaknesses. A SWOT analysis could be a suitable method for this step. A Value Proposition Analysis is also a promising method in achieving the aim of reviewing the business environment. The Value Proposition Analysis works out the concrete value proposition of the possible business model (Bartels et al., 2020). Secondly, ideas of different business models will be brainstormed in a team using different creative techniques and methods. The ideas will be concretized and evaluated – facilitating the final decision on which business model to choose and work with. Furthermore, the assumptions on which a business model is based are examined. Qualitative methods, such as expert or group interviews, and quantitative methods, such as surveys, targeting the respective target groups are suitable for this purpose. Next, a prototype phase in which the acceptance of the target groups and the feasibility of the project will be evaluated is crucial (Bartels et al., 2020). In this phase, possible challenges can be identified and tackled. In the final phase, the company will implement its business model with a market launch (Bartels et al., 2020).

For a more detailed analysis, the business model canvas by Osterwalder and Pigneur will be used (Osterwalder & Pigneur, 2010). According to the authors, a business model consists of the following key points: key partners, key activities, key resources, customers relationships, channels, customer segments, cost structure, revenue streams, and value propositions (Osterwalder & Pigneur, 2010). The examination of the value proposition is especially

promising as different business models create different value propositions and – as stated – the value proposition is a uniting characteristic of different business models. Osterwalder describes value proposition as what added value a business model offers to customers (Osterwalder & Pigneur, 2010). Relating to a digital care platform it is questionable, whether the platform is designed as a marketplace platform or brokerage platform. Marketplace platforms offer a dashboard on which customers can network with service providers to book a care service. An example of a marketplace platform is idealo. On a brokerage platform like Amazon, the communication and the establishment of contact are initialized by the platform. The platform communicates with the customer and the service provider. This reduces administrative work for the service providers.

The type of platform does not only influence the value proposition but it influences other key points of a business model as well. Additionally, it makes special data usage concepts necessary for the responsible use of user data. This challenge will be explained in more detail later on.

In the following, the two mentioned types of business models will be in focus. There will be an explanation of how the business models are built and what their value propositions are. The types of platforms are the marketplace platform and the brokerage platform. The presented models are built in the same way to show several users and several providers of the potential platform. Furthermore, the models contain the same main elements: The payment flows, the service flows, and the information flows are the main elements to demonstrate the relationships between the stakeholders in detail. This also enhances the clear structure of the business models that are discussed. Afterward, collaborative business model structures – derived from the previous types of platforms – are presented (chapter 2.1.3).

## 2.1 Alignment of the Care Platform

In this chapter, the marketplace platform and the brokerage platform will be described and compared with each other in more detail. For this, the relationships between the platform, the service providers, and the users will be presented about different action flows that happen on these platforms. These flows include the payment flows, the service flows and the information flows. The special particularities with regard to a care platform will be demonstrated in this chapter using an example – a care consultation with regard to AAL services on a care platform.

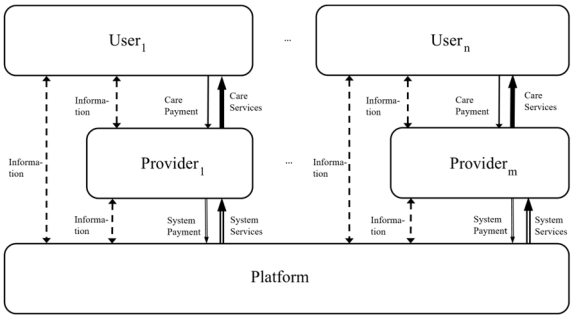


Figure 1: Marketplace Platform (Bleja, Krüger, Neumann, et al., 2022).

## 2.2 The Marketplace Platform

Marketplace platforms can be identified by several characteristics. Täuscher and Laudien summarize marketplaces as platforms on which independent stakeholders network with others. Moreover, the stakeholders can enter into business relationships, and thirdly, the marketplace platform offers a framework for transactions. Another important criterion is that the platform does not offer any services but is solely the place where different stakeholders meet (Täuscher & Laudien, 2018). Figure 1 shows this clearly: Communication takes place between the service providers and the users. For this, payment, service, and information flow run between them. Only one action takes place between the platform and the service providers, which is the delivery of system services. System services include the visual representation on the marketplace platform. The service providers pay for this service. The user and the platform communicate restrictively by the search function on the platform.

Applied to the "AAL care consultation" use case, the following has to be considered. When a person with assistant needs wants to book an AAL consultation, they search on the platform for possible providers offering this kind of consultation. Before receiving the service, the interested person pays the selected service provider directly, without the help of the platform. After receiving the payment, the service provider advises the person with assistance needs on the possibilities of using digital technologies in the home to live independently for a long time. Naturally, interested person may also book several other services apart from AAL consultation from different providers.

## 2.3 The Brokerage Platform

Lehmann explains that brokerage platforms like Amazon are gaining in importance (Olbrich &

Lehmann, 2018). Brokerage platforms are characterized by a multitude of offerings by private and commercial providers. These include products as well as services (Olbrich & Lehmann, 2018). Furthermore, the brokerage platforms' functions are to initiate transactions and to enhance transparency in an unclear market – in this case, the care market.

Olbrich and Lehmann further state, that a brokerage platform has a specific value proposition that differs from the classic marketplace platform. On the service providers' side, placing offerings on the platform enhances attention on their service range and their website. Also, service providers could use a brokerage platform for publicity reasons (Lehmann, 2019). On the demanders' side, a brokerage platform offers cost-efficient access to products and services. Lehmann also displays a few disadvantages for service providers and demanders. Thus, for service providers, it could be a higher time expenditure to create advertisements. Additionally, there still exists an information asymmetry that creates insecurity on the demanders' side (Lehmann, 2019).

The brokerage platform differs from the marketplace platform on several points – as demonstrated in Figure 2.

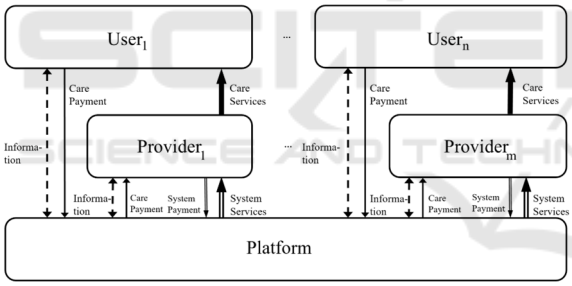


Figure 2: Brokerage Platform (Bleja, Krüger, Neumann, et al., 2022).

Between the platform and the service providers, there are still the system services and system payments. Additionally, the platform pays the service providers the care payment that they received from the users. In this model, the user pays the platform for the care services and not the service providers. The platform only forwards the care payment to the providers. The care service is the only action that takes place between the service provider and users. Communication, payment, and information run through the platform.

This influences the value proposition of the platform for the service providers and the users. By taking over the administrative workload, the platform can relieve the providers so that they can devote more time to caring for and supporting users. Furthermore, this model is less objectionable for service providers from a data protection perspective, as the service providers only receive the information they need from the providers to provide a support service.

Here, the use case "AAL care consultation" described at the beginning, is once again used for clarification. The relationships between the players differ in this business model from the market place platform.

Here, interested users can initially search for an AAL care consultation via a search mask. Once they find a suitable service provider, the platform contacts the service provider and exchanges information. The person with assistance needs pays the platform for performing the care service. The platform forwards the payment to the service provider. The person with assistance needs is then advised on AAL options in their home. If further services are required, such as the installation of AAL technologies in the home, the platform can arrange for other suitable service providers.

### 2.3.1 Collaborative Business Model Structure

Collaborations are increasingly forming, especially in the development of complex projects. In addition to the sole development of products and services, different know-how is needed, for example for marketing, the target group-specific address, or the user-centered orientation (Avital et al., 2014). Collaboration is usually a continuous, trusting cooperation of legally independent partners (Sydow, 2019). These can be composed of interdisciplinary partners to bring different expertise to the cooperation. However, companies from the same fields, e.g. possibly competitors, can also collaborate (Laycock, 2005). In most cases, collaborations are entered into when cooperation on certain issues appears to make sense, and advantages are hoped for through interdisciplinary cooperation and the exchange of ideas. Especially in the development of innovations, there is an increasing number of collaborations (Bleja et al., 2020; Echavarria, 2015).

Concerning the development of a care platform, for example, several providers of care services or products in the health and care sector and the platform operator could collaborate to develop the care platform and successfully launch it on the market. Collaborations with cities and health insurance companies would also be conceivable.

In addition to the many advantages of collaborative alliances, the type of cooperation is also associated with challenges. Compared to acting

alone, collaborations are associated with increased communication and coordination efforts (Geramanis, 2020). In addition, collaborative business models need to be developed to successfully and sustainably establish the products and services developed within the framework of collaboration on the market (Bleja et al., 2020).

When looking at business models, such as the Business Model Canvas (Osterwalder & Pigneur, 2010), it becomes apparent that these are usually geared towards one company and less towards the collaboration of several companies (Bleja et al., 2020; Oliveira et al., 2013). To apply existing business model structures to a collaborative merger, it is, therefore, necessary to expand the models or develop new business model structures (Bleja et al., 2020). In particular, the aspect of data protection should not be neglected in a collaborative business model. The partners have to be considered in a differentiated way, according to collaboration partners and additional collaboration partners (Bleja et al., 2020; Ganz et al., 2016).

Figure 3 describes a collaboration (see grey box) between different providers (1, 2) and a digital platform as well as the care services from the providers (1, 2) for the respective users (1, 2, 3, and 4).

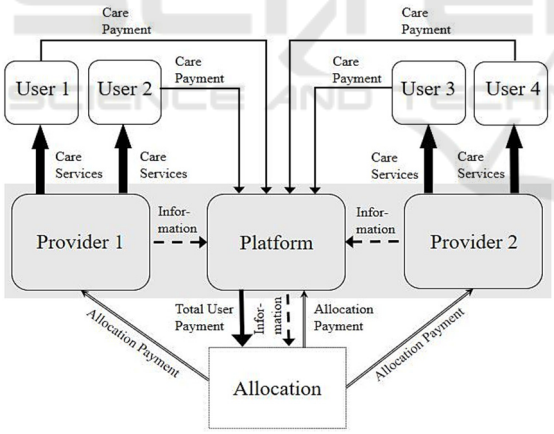


Figure 3: Collaboration Platform (own source).

Users book from the platform services that a provider offers on the platform. In this example, the providers are care service providers, and the digital platform is a care platform, which is also the collaboration partner. In this process, the providers send information to the platform that is important for allocation, for example, completing orders from the providers for the users (1, 2, 3, and 4). This information is forwarded by the platform along with the "Total User Payment" for an allocation of the efficiency gains. The allocation is now required to fairly distribute the "Allocation Payment" for the platform and Providers 1 and 2.

The "Total User Payment" is derived from the "Care Payment" of the users (1, 2, 3, and 4) for the care services of the providers (1, 2). The "Care Payment" is routed directly to the platform to centralize all payment receipts and ensure that the allocation can correctly capture all revenue.

To illustrate this once, the use case "AAL care consulation" will be referred to again. An interested user books an AAL care consultation on the platform that is provided by an exemplary Provider 1. Provider 1 delivers the AAL care consulation to the interested user and submits information to the platform about the completed service that is relevant for the allocation. The platform collects the information as well as the payment from the interested user and passes it on to Allocation. The latter then provides the "Allocation Payment" to the exemplary Provider 1 following the service.

In the figure, it is conceivable that another user also books the AAL care consultation from Provider 1 or that exemplary Provider 2 delivers another care service – for example domestic help – for the userinitially interested in only an AAL care consultation from Provider 1. There are several possibilities, which also include other users and care service providers, which are not mentioned here.

In Figure 3 of the collaborative business model, providers (1, 2) and users (1, 2, 3, and 4) are used as examples to show how such a business model could work. However, this assumption is rather model-like and, of course, user 4 could also book a service from provider 1 or user 1 from provider 2. The figure is, therefore, intended to serve as a simplification to be able to represent the collaborative business model more comprehensibly.

# 3 FINANCING AND REVENUE MODELS

Financing is an important aspect of a business model (Osterwalder & Pigneur, 2010). After an explanation of the methodology, financing and revenue models for a care platform are analyzed in the following chapter.

## 3.1 Methodology

To identify and analyze financing and revenue models for a care platform, an analysis of existing

care platforms and a qualitative survey of potential actors on a care platform were conducted in addition to a literature review.

For the competitor analysis, the benchmark analysis was carried out according to Fleisher and Bensoussan (Fleisher & Bensoussan, 2015). First, potential competitors in Germany were identified. Of the analyzed care platforms, twelve were identified as having a particular interest in the care platform to be developed, based on their estimated level of awareness. These were then further analyzed using a catalog of criteria created for the study. This criteria catalog consists of six topic areas and contains a total of over 50 criteria.

With the help of the analysis, the offers, the value proposition, the channels for addressing customers as well as financing and revenue models of care platforms were to be recorded and analyzed. The data collection took place on the individual websites of the platforms themselves and was partly supplemented by corresponding press articles, project reports, and the social media presence of the platforms. The aim was to work out which needs in the care sector still exist on the provider and demand-side and are not covered by existing platforms. Consequently, the aim was to work out the added value that the care platform to be developed can offer providers and consumers on the platform compared to potential competitors (Bleja et al., 2021; Bleja, Krüger, & Grossmann, 2022).

After the competitor analysis, a qualitative analysis was carried out. For this purpose, potential providers were methodically interviewed on a care platform with the help of qualitative guideline-based expert interviews (Bleja et al., 2021; Bleja, Krüger, & Grossmann, 2022). In expert interviews, the focus is not on the interviewees themselves, but on the topic area, e.g. the work context the experts represent (Nohl, 2017).

In addition to the analysis of financing and revenue models, the qualitative analysis was to be used to identify needs and wishes regarding a care platform from the perspective of potential users and providers. For this purpose, a guideline was first created. Methodically, the SSP principle of guideline creation according to Helfferich (Helfferich, 2011, 2019) was used for this. The guide consists of 32 questions from eight categories and was tested before the expert interviews with the help of pre-interviews (Bleja et al., 2021; Bleja, Krüger, & Grossmann, 2022).

Due to the time restrictions of the research project, the experts were selected using selective sampling. The experts could be potential providers on a care platform and represent as many different subject areas as possible. This provides the most diverse expertise and perspectives to be included in the study. To involve the perspectives of potential users in the analysis, the experts needed to be in regular contact with people with assistance needs and their relatives.

A total of 15 experts from the fields of Care Services, Health and Nursing Care Companies, Volunteer Organizations, Seniors Representatives, Care, and Social Counselling, Housing Consulting, Financial Service Providers, and Mail-order Pharmacies were interviewed (see figure 4) (Bleja et al., 2021; Bleja, Krüger, & Grossmann, 2022).

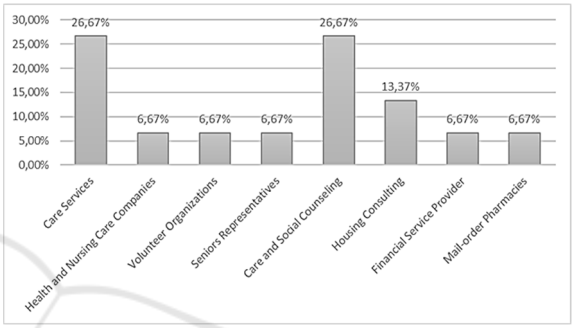


Figure 4: Composition of the Sample (Bleja, Krüger, & Grossmann, 2022).

Except for one interview, which took place via video, the interviews were conducted face-to-face at the experts' premises and recorded using a dictation machine. All interviewed experts agreed to the audio recording and signed a consent form prepared for this purpose. The interview length was between 45 and 60 minutes (Bleja et al., 2021; Bleja, Krüger, & Grossmann, 2022). The interviews were methodically evaluated with the help of content analysis according to Gläser and Laudel (Gläser & Laudel, 2010). The MAXQDA software was used for this purpose.

## 3.2 Results

The interviewees of the qualitative analysis believed that the prices for persons with assistance needs as well as their relatives should be kept as low as possible. At best, the platform should even be free to use. The result is also reflected in the analysis of other care platforms, which are all free of charge for users. Some respondents to the qualitative research also stated that it was common for service providers to pay a small annual fee depending on, for example, annual turnover. In addition, commission models could be considered financing models.

Other financing options addressed during the interviews included public funding, subsidies from

private or statutory insurers (long-term care, pension, accident insurance), the digitization fund of the statutory health insurance, and also financing via advertisements. In terms of advertising, however, some of the interviewees advised not to place too much advertising so as not to raise any doubts about the independence of the platform. Overall, respondents identified financing as one of the most complicated aspects of a care platform. At the same time, financing is very important for the success of the care platform.

Based on literature analysis, a variety of other financing options for a care platform could be identified in addition to the financing options already mentioned for the platform via commercial advertising (e.g., in the form of banner ads) and via contributions from users (subscriptions) or providers (offer fees, brokerage, and sales provision). For example, it could also be suitable for a care platform to use a so-called freemium model (Grothus et al., 2021a; Li et al., 2020). In this case, the basic version of the platform is offered to users free of charge so that they can try it out first. If needed, users can additionally subscribe to a paid premium version, which provides them with further benefits. In addition, revenue could be generated through the collection and processing of user data by using it internally or passing it on to third parties (leverage customer data) (Grothus et al., 2021a). However, financing the platform by selling data was considered critical by the interviewees in the qualitative analysis conducted.

Pay-per-use models could also be considered for the use of certain services by users, such as consulting, or by providers, such as customer data management. Accordingly, payment would be based on the pure duration of use of certain services (Grothus et al., 2021a; Wirtz & Ullrich, 2008).

In addition, financing through donations, subsidies from health and long-term care insurers, and local authorities could be considered. In this context, social impact bonds could also be conceivable as financing models. Social impact bonds are cooperative ventures in which one or more social service providers, charitable foundations, or private investors, and the state participate. The target group, the goal, the key success criteria, and the financial framework are contractually defined in advance. In the first step, the investors or foundations provide financing. If the agreed targets are achieved, the state assumes the costs and, if applicable, also a target achievement premium payment (Fölster, 2017; Hulse et al., 2021; Katz et al., 2018; Wilson et al., 2015).

In addition to grants and donations, crowdfunding is also an option for developing and building the platform (Grothus et al., 2021a; Wirtz & Ullrich, 2008). For example, the platform ReCare, which is also active in the healthcare sector, secured part of its funding via crowdfunding (Thieme Verlag, 2021). In crowdfunding, a product or project is financed by many investors. If a predefined budget is achieved, then the project is realized (Grothus et al., 2021a; Wirtz & Ullrich, 2008).

Grothus, Thesing and Feldmann, conclude that innovative business models are often characterized by a combination of different financing and revenue models (Grothus et al., 2021b).

It can be stated that the financing of a care platform represents an important aspect of the business model, but also a major challenge for the platform operators. This is also shown by the results of the studies, where financing was identified as one of the most critical aspects of the business model (Bleja et al., 2021).

On the one hand, this is due, among other things, to the fact that the use of many websites and apps is free for users (Scherenberg, 2015). Accordingly, the willingness to spend money for this on the part of the users is low. On the other hand, care service providers in Germany currently have a surplus of demand (Jacobs et al., 2021), so they are not forced to offer their services additionally via care platforms. Consequently, the willingness of providers of products and services to spend money for a presence on an online platform is also rather low. For this, the value proposition of the users and providers should be identified in detail. Only if the users and/or providers have visible added value through the platform does this have a positive effect on their willingness to pay.

# 4 CONCLUSION AND FURTHER WORK

For the new development of a care platform, it must offer added value to existing solutions, ideally for the providers on the platform as well as for the users. Accordingly, the platform has to be developed with the stakeholders as far as this is possible, e.g. with the help of a human-centered design approach. Both a brokerage and a marketplace platform are conceivable, each with different structures. Furthermore, the financing of the platform was identified in the qualitative expert interviews as an important aspect of the long-term implementation of the care platform on the market. A variety of revenue

models are available for this, which can also be combined. The competitor analysis and the qualitative analysis both conclude that financing the platform is realistic, via the providers above all. Especially in the care sector, there is currently a surplus of demand, so the providers of care services and products are not dependent on a care platform to generate orders. Accordingly, the challenge beyond generating offers is to achieve further added value for the providers so that they are willing to pay for it. For example, another focus of the platform could be to reduce the administrative burden for providers.

If a platform is to be developed and brought on the market by collaborative partners, the allocation aspect poses a challenge. The costs and revenues generated by the platform need to be fairly distributed among the collaborative partners afterward. However, especially if the revenues were generated together and the partners cooperate on one level, a decision support system based on solution approaches of cooperative game theory is needed to distribute the costs and revenues. Based on the results presented, collaborative business model structures for a care platform will be developed and a decision support system for the distribution of costs and revenues among the collaboration partners.

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