



Original article/research

Business models and eHealth social innovations for social care services: Serving the two sides of the market

Vivian Vimarlund^{a,*}, Nicolas Nikula^b, Christian Nøhr^c

^a Professor in Informatics, School of Engineering, Department of Computer and Information Science, Linköping University, Linköping, Sweden

^b M.Sc in Economics, Post Nord, Stockholm, Sweden

^c Professor Center for Health Informatics and technology, Maersk McKinney Moller Institute, University of Southern Denmark



ARTICLE INFO

Keywords:

Business models
eHealth social innovations
Two sides markets
Brokers

ABSTRACT

Purpose: : The aim of the study is to explore a business model that can serve the two sides of the eHealth market with special focus on social innovations for social care in which elderly care is one of the main areas

Method: : Explorative case study, semi-structured interviews, focus groups and workshop. A case study methodology allowed us to study a contemporary issue of worldwide interest, to perform the study in a real-life setting, capture experiences and expectations from the two sides of the market, and to deliver outcomes that can lead to an in-depth understanding of the requisites business models for eHealth social innovations must approach.

Results: : A business model that serves the two sides of the market must offer a structure that supports interaction and transaction between different actors. A major challenge to develop effective business models is related to the absence of intermediaries or brokers that reduce transaction costs and stimulate comparative advantage. Brokers are thus required to establish links and to support the flow of up-to-date information amongst actors.

Conclusion: : The broker business models is expected to close the gap that today exists in the eHealth market for social innovations because absence of marker-makers that bring together buyers and sellers, facilitate transactions, create dialogue and stimulate the two sides of the market. The outputs of this study can contribute to change the business-line thinking in health and social care and to identify a work-model that stimulate the two sides of the market.

Introduction

The concept of ‘social innovation’ has been used to describe a very broad range of activities associated with the development of products and services that address health and social care challenges and that at the same time benefit primarily society rather than private individuals [1,2]. Compared to other innovations, social innovations focus on new forms of cooperation and are aimed to find new solutions to social problems [3]. Social innovations are further described as an outcome that include services, products, and processes that together results in innovation of the network of actors, in the re-organization of processes, or in the innovation of the role and scope of providers. [4-6]. Social innovations are a multi-dimensional concept, used to describe the developing and deploying of solutions to challenging systemic social and environmental issues in support of social progress. Social innovations cannot be seen as a prerogative or privilege of any organizational form

or legal structure. They require the active collaboration of constituents across government, business, and the nonprofit world.

Over the last few years, the trend in social care has been to offer innovative eHealth services that increase involvement and engagement of i.e., elderly, as well as providers of services, and entrepreneurs [3,7]. These services are expected to match the challenges of the millennium (i.e., effective, and efficient delivery of health and social care, performance of organizations, patient care and welfare, good policies, sustainability of health expenditures, economics, and performance). In parallel with this, the interest in the use for eHealth services to support social the challenges that emerged of Covid-19 pandemic has increased globally [8][1,8]. Worldwide many different steps have been taken to increase the engagement of consumers and providers focusing on the development or identification of social innovations that increase wellbeing or that tackle social challenges such as the lack of qualified personnel or dwindling resources [9]. For this reason, much effort has been put to

* Corresponding author.

E-mail address: Vivian.Vimarlund@liu.se (V. Vimarlund).

<https://doi.org/10.1016/j.hlpt.2021.100555>

Available online 27 August 2021

2211-8837/Published by Elsevier Ltd on behalf of Fellowship of Postgraduate Medicine. This is an open access article under the CC BY license

(<http://creativecommons.org/licenses/by/4.0/>).

improve interactions between and within entrepreneurs, stakeholders, providers, and consumers, to develop, sell and use services that have a social value and benefit for the whole society [10]. For example, ambient assisted living services for elderly that support individuals' daily activities at home, and that facilitate independence and well-being as well as inclusion in the society.

While the possibility to increase the use of eHealth social innovations, especially in social care exists [11–14], an increasing interest to identify solid business models that can be applied for this kind of innovations has arisen. However, business models for eHealth social innovations, in general, have been difficult to identify and design. Previous research on business models in the eHealth area has mainly focused on a healthcare setting where reimbursements come from (i) patients' insurance companies, (ii) employer's insurance companies [15–18] or from (iii) the social insurance system. To our best knowledge, there are few studies that discuss which issues need to be approached in a business model that aims to serve both sides of the market with special focus on social care.

In this paper, we explore and suggest a business model that can serve the two sides of the eHealth market with special focus on social innovations for social care in which elderly care is one of the main areas

Background

Health and social care for the elderly are important parts of Swedish welfare policy. Of Sweden's 10 million inhabitants, 20 per cent have passed the standard retirement age of 65. This number is projected to rise to 23 per cent by 2040, partly because of the large number of Swedes born in the 1940s.

Swedish elderly care is governed by the "Social Services ACT", and it largely funded by municipal taxes and government grants. The municipalities duties include: care for people with physical disabilities or psychological disorders, and support and service for people in the home or in special accommodations (i.e., elderly homes). Most elderly care is funded by municipal taxes and government grants. In 2014, the total costs of elderly care in Sweden were SEK 109.2 billion (USD 12.7 billion, EUR 11.7 billion). Only 4 per cent of the costs was financed by patient charges. Costs paid by the elderly themselves are subsidised and based on specified rate schedules. In 2018, 13.5 per cent of health and social care was financed by regional councils but carried out by private care providers. An agreement guarantees that individuals that receive services from private organizations are covered by the same regulations and fees that apply to municipal care facilities. However, while the municipalities are the responsible for to help elderly people live independent live and stay in their own homes as long as possible.¹, the regions are the responsible for medical care provided by physicians. eHealth services for elderly described as social innovations are usually developed in collaboration within municipalities, health and social care organizations, entrepreneurs, researchers as well as representatives from patients' organizations. Many of the social innovations that have been introduced during the last years have been developed with the aim of creating value from the exchanges that take place during the delivery of a service i.e., a reduction in the transaction costs of searching services, and/or removal of obstacles that may negatively impact on the sustainability of the market.

In health and social care contexts, several stakeholders actively participate in the design and implementation of services. These

¹ In 2020, home help staff assisted around 236,000 people aged 65 or over. When an elderly person is no longer able to cope with the demands of everyday life, he or she can apply for assistance from municipally funded home-help services. The extent of such care is subject to an assessment of need. Elderly people with disabilities can receive assistance around the clock, which means that many are able to remain at home throughout their lives. The severely ill, too, can be provided with health and social care in their own homes.

stakeholders, normally, expect to get some benefit from their work, whether it is economic or non-economic. Furthermore, these stakeholders strive to apply business models that can be used both by public and private organizations. Entrepreneurs expect to receive monetary compensation that, at least, covers their production costs, health- and social care organizations (providers) expect to get some benefit from the use of the services, and third parties, i.e., stakeholders and decision makers at the county council or at the municipality level, expect to benefit from the possibility of re-allocating resources and reducing costs.

Business models

The very concept of a business model has a commercial connotation. In a health and social care context such a connotation may be controversial; not least in Scandinavian, where health services have mainly been provided by public actors without the aim of accumulating profit, or by entrepreneurs that follow policies and regulations from the state. However, there are a number of good reasons why we should talk of 'business models' for eHealth social innovation in social care. They are: (i) commercial firms and entrepreneurs play an important role for innovation and renewal in the social care domain, even in countries with strong public healthcare systems, (ii) actors that do not have the aim of generating a financial surplus, e.g., municipalities and county councils need revenues that cover their costs (e.g., information, distribution, and delivery of services). These revenues can come from taxes, but also from alternative sources such as fees for using the services paid by the individuals, organizations, or through a reallocation of resources, (iii) there is a need to create and capture value for the entrepreneurs to ensure that the market of eHealth social innovations for social care grows.

Business models are essential to allow the strategists to make decisions about how activities of an organization work to execute a specific strategy, to create a consistent logical picture of how social care services can be delivered or accessed, and to understand how organizations, entrepreneurs, users, stakeholders, can benefit or extract value from the interaction between them.

Research in business models for eHealth social innovations is relatively new. The term business model is still ambiguous in science and practice [18]. Business models are quite often confused with business process models or with strategy. Some people associate business models with detailed financial prognoses. Osterwalder (2010), defines a business model as: "The rationale of how an organization creates, delivers and captures value" [19,20]. However, this definition refers only to one side of the market. In this article we move further and focus on the identification of business models that support the two sides of the market.

Material and methods

This study was performed as a part of the R&D project "MoTFALL" (Modern Technology against Fall Accidents). The project was supported by the "The Swedish board of Innovation" and aimed (i) to develop and implement eHealth social innovations in the area of social care to reduce the number of falls that lead to injuries at home with special focus on the elderly population, and (ii) to identify and develop services that bring socio-economic and societal benefits for municipalities, entrepreneurs, citizens, and to the society as a whole.

According to Yin 2019 [21], case studies are appropriate when asking "how," "why," "what," and "who" questions. Further, case studies can be considered theory building [22]. An exploratory case study [21] was conducted to perform the study with the aim to capture participants' perceived challenges business models need to approach to be considered effective and sustainable both by private and public organizations. A case study methodology allowed us to study a contemporary issue of worldwide interest. Furthermore, the use of the case study methodology allowed us to perform the study in a real-life setting,

capture experiences and expectations from the two sides of the market, and deliver outcomes that can lead to an in-depth understanding of the demands and expectations [23] private and public organizations consider business models have to approach.

Data were collected in three phases

Phase 1: The primary type of data collected was the responses of the participants in the study. Semi-structured interviews were conducted at the beginning of the project. The interview questions were based on the concept of performance expectancy (i.e., the degree to which business models contributes to stimulate the development, implementation and use of eHealth social innovations in social care [24]). Representatives for entrepreneurs, municipalities, social care organizations as well as representatives from interest organizations participating in the R&D project (MoTFALL).² were interviewed and asked about: (i) which expectations and demands they have on business models, (ii) which pre-requisites business models need to fulfil to be considered effective for the two sides of the market, and (iii) the importance of business models to stimulate entrepreneurs to participate in the market of eHealth social innovations for social care services that benefit the elderly population. In total, 10 individuals representing the two sides of the market: two representatives for each category (entrepreneurs, decision makers and stakeholders, suppliers, and representatives from the local community and consumers), agreed to participate in the interviews. The interviews were performed by the first author of this paper in a one hour longer interview each.

The interviews allowed to obtain a richer understanding of the expectations of the two sides of the market, and of the issues and challenges entrepreneurs, the local community as well as social care organizations consider of importance to be able to develop and to implement sustainable business models for the area of social care . Data sampled from the interviews were organized in specific units to identify major themes or ideas that emerged as well as the challenges the respondents indicated of key importance to approach when selecting a business model for eHealth social innovations [21].The outputs of the interviews are presented in Table 1. Three tentative business models that could match the challenges mentioned by the interviewees were selected to be analysed in the next step.

Phase 2 According to Yin,2019 [21], trustworthiness stems from triangulating the data and maintaining a chain of evidence. Yin suggested further that having multiple sources of data helps to capture a broader range of perspectives, behaviors, and attitudes. To build a chain

Table 1.
Captured challenges and issues business models for eHealth social innovations confront.

Challenges	Issues
Structure of the market	Regulations, policies, and other institutional issues that influence the two sides of the market (organizations, entrepreneurs, consumers, users etc.)
Customer relationship	Mismatch between price principles and revenue expectations (profit vs societal benefits)
Accessibility to brokers and/or intermediaries	-Number of point of contacts for the marketing and/or for to access and distribute information about the services and its price -Quality of the producer or distributor, especially in the case of multi-homing alternatives.
Value added	Possibility to enhance and improve service quality, competitive advantage and increase effectiveness of the market.

of evidence that improve the case study reliability we, in the second phase of the study asked the participants (the interviewees) to participate in a focus group with the aim to discuss the business models selected during the phase 1. All interviewees accepted to participate in the focus group.

During the focus group the three business models selected were discussed to find (i) correspondence between issues the respondents considered as of key relevance for the market of eHealth social innovations (see Table 1), and (ii) expectations the business models must fulfil to serve the two side of the market.

The alternatives analysed were: (i) the community model, based on users' loyalty, and characterized by being accessible by a global community of contributors, often supported by voluntary donations (ii) the producer model, based on efficiency and customer service, and in where the ownership of the product or service is transferred to a buyer directly, and (iii) the brokerage model where a broker is a market maker that brings buyers and sellers together to facilitate transactions. The possibility the brokerage model offers a "search application "or an information system (not necessarily virtual based) to allow potential customers to search out price and availability as well as producer of a service was considered in the discussion.

The outputs of the focus group shown that the brokerage business model was considered as the model that matches better the expectations of the two sides of the market for the type of social innovations developed and suggested in the project. The requisites the participants in the focus group considered a business model must fulfil are presented in Table 2.

Phase 3: Representatives from entrepreneurs, health- and social care, from the local community as well as from non-profit organizations (i.e., patients' organizations, and municipalities (n = 7) were invited to participate in a final workshop to discuss and evaluate the accuracy of the model chosen. During the workshop they were asked to comment on the model strengths and weaknesses in relationship with the aim of the study. The discussion offered opportunities to identify issues different actors considered influencing the selected model's accuracy and validity.

Results

In this section of the paper the authors report on the results of the study. We begin the report with a description of respondents' answers captured during the interviews about challenges business models for eHealth social innovations in social care confront. In the next step we use the data sampled in the focus group to describe the respondents' expectation on the brokerage business model and the basic requisites the model needs to offer to motivate the two side of the market. Data captured during the final workshop are used to discuss the outputs of the study.

The outcomes captured during the interviews and presented in the table above indicate that business models for eHealth social innovations in social care need to consider: (i) the structure of the market (environment and context) in which services classified as social innovations are delivered and consumed. (ii) expectations of entrepreneurs and social care organizations to stay in the market, for instance the need to develop a sustainable customer relationship, the need to apply business models that include the possibility to apply different price principles and revenue models, (iii) in addition to good, commercialized ideas that spin out new business, intermediaries or brokers that support and coordinate the two sides of the market to diminish the number of point of contacts to access and deliver services are needed [25-28], and iv) the need to both create value for the communities (municipalities and regions) and to capture value for the entrepreneurs (i.e., have a large number of customers and users that are willing to pay for the services).

² MoTFall - Modern Teknik mot Fallolyckor. Project nr 2016 00609-Vinnova

Matching challenges: describing the model's basic requirements

Below we introduce the business model that matches the requirements identified by the respondents Table 2 shows (i) how the model is described and, (ii) which expectations the model might consider matching challenges and expectations of the two sides of the market.

Comments

Business models are often associated with reimbursement or revenue models and are used when a business opportunity appears, or when there is a strong need to develop pricing alternatives for services or products. The outputs of this study show that business models for eHealth social innovations aimed to serve the two sides of the social care

Table 2.

A brokerage-based business model for eHealth social innovation services for social care.

Model	Description
A brokerage-based business model	<p>Brokers are expected to have the role as market-makers. They are expected to bring buyers and sellers together and facilitate transactions. Brokers are further expected to be intermediaries, negotiators or interpreters between parties who may not otherwise easily understand each other and to play a role in supporting business-to-business (B2B), business-to-consumer (B2C), or consumer-to-consumer (C2C) relationship. A broker for eHealth social innovations in social care is further expected to support: a marketplace exchange that offers services covering the transaction process that occurs between suppliers and providers, from market assessment to negotiation and fulfilment. an information structure that makes possible to find services that fulfil the requisites of the area. a buy/sell support-process that coordinate customers' order and buy or sell products or services, including support and information about (i) how services are delivered, and (ii) the revenue model used by different suppliers and providers. a search agent or a match-making agent, that can be used to search for the price and availability social innovations available, as well as information about similar services. the broker further is expected to guarantee the match between the specific request that the market for eHealth social innovations for social care presupposes, and the challenges entrepreneurs need to overcome to produce and offer services. The broker model is also expected to offer:</p> <ul style="list-style-type: none"> • Information about guidelines, and principles to apply regarding the ownership of the services, contractual arrangements, property rights regulations, and policies the social care market applies. • An intermediary that ensures adequate communication between the two sides of the market, especially if risk is a critical component, for instance during an earthquake or pandemic. • Guidelines about the procurement process and the different steps that are needed when doing business with organizations belonging the social care area. • Access to multi-home equivalent alternatives to increase the degree of competition in the market, increase social welfare but also to guarantee access to alternatives that are equivalent to each other even when they can have different prices. • Existence of networks that ensure business transparency, where institutions are scrutinized to ensure that they behave appropriately, and that stimulate the development of a brand or reputation that is sustainable over the time. • Information about alternative reimbursement models (i.e., freemium, subscription, purchase, etc.) and/or prices alternatives entrepreneurs apply to transfer services, or any other alternative model entrepreneurs develop and apply.

market must offer a structure that supports interaction and transaction between the different actors belonging the market and in which all different actors' benefit.

The results from this study shown further, that a major challenge to develop business models for eHealth social innovations in social care is related to the absence of intermediaries or platforms in which consumers and producers (entrepreneurs) can interact to reduce transaction costs, diminish information asymmetry, access to sustainable supply chains, and to stimulate comparative advantages. Furthermore, a business model for social innovations needs to be multi-sided, as they involve several interrelated groups.

The application of the brokerage business model is expected to encourage organizations to offer eHealth social innovation services to a large number of users, independent of their purchasing power, to match the market expectations, the price -sensitivity of the actors, and to contribute to increase quality control of the services offered in the social care area. Especially in circumstances in which multi-homing phenomena appears and several similar alternatives can be used for the same purpose (even when they can have different prices). In view of the challenges eHealth social innovations in social care bring to organizations, providers and producers, the broker business model is expected to have a strategic role in: (i) accelerating the diffusion of services, (ii) facilitating interaction, (iii) sustaining collaboration between the two sides of a market and (iv) supporting a 'pull and a push market' in which consumers and producers develop and exchange services from existing or developing technology [29]

While the e-Health market is rapidly becoming fundamental to the provision of social care, efforts to establishing a market in which consumers and providers can interact with each other and co-produce social innovations has increased during the last years [30]. A mayor difficulty for the e-Health social innovations market, is the need to cover several perspectives, including political, technological, and economic and in parallel offers trust, security and cost-effectiveness of the services and products offered to the consumers (patients). Brokers are thus expected to established links and to support the flow of up-to-date information amongst the actors [31]. They are also expected to incentive the two sides of the market to enhance cooperation and to solve externalities that affect the area, including laws, regulations, policies, market restrictions (for example, the price the consumers pay for the services, as in the case of the Scandinavian countries where the prices are regulated by policies and demand solutions such as subventions, roof prices, existence of public owned monopolies, etc.) or inefficiencies related to un-expected circumstances i.e., COVID 19, natural disasters etc.

Given the fact that the two sides of the market indicate the importance of the existence of brokers to scaling new collaborative ideas, and to encourage interoperability and cooperation, it is imperative to use a model that support and stimulate a win-win situation for all involved parties. It is consequently rational to argue that the organizations that today have the responsibility to acquire, implement and offer eHealth social innovations to their customers (i.e., elderly/), as for instance county councils or municipalities, be prepared to take the role as brokers and to develop the structure that supports a business model like the one proposed in this study.

Organizations that take the role of being a broker should, by being systemic intermediaries, contribute to avoid market inefficiencies such as transaction costs, asymmetric information, or other negative effects for the market (monopolies, cartel) and at the same time act as "watchdogs" contributing in this manner to open the social care area for several entrepreneurs in a market which is not particularly vulnerable to competition, and where the customers are segmented by their conditions, expertise or geographical location ([17-19,26, 30,31]).

Conclusions

For many years, the service industry (e.g., post and telecom service industry) has moved from a push market to a pull market that begins

with the demand rather than the supply of services. In such a market brokers are used to remove barriers for communication, build arenas for interaction between consumers, and producers, and to offer the necessary marketing infrastructure that allows to diminishing commercialization efforts, the use of distribution channels that made the services universally accessible, and the interaction of suppliers that produce demand driver services(1). If the market of eHealth social innovations aims to stimulate the two sides of the market of social care, it is necessary to listened to the actors involved and to apply value-driven approaches that made entrepreneurs find that their work is worth their investments and efforts.

The business model suggested in this article, is perceived by the respondents as effective to create dialogue and to find common solutions. eHealth social innovations have today a plethora of stakeholders. How to create a business model that stimulate the two sides of the market of social care is not simple. The outputs of this study contribute to change the traditional business-line thinking in social care in systems that are public owned, as well as to identify a roadmap or work-model that improve and stimulate the market and their actors.

Innovation researchers emphasize the importance of brokers to connect stakeholders who are not familiar to each other and to allow them to improve upon the new combinations that are essential to the demand of products and innovations and to maximize social welfare. The current imperfect interaction between the two sides of the e-Health social innovations in the social care market is often not a result of unwillingness of the concerned parties to interact with each other, but of a lack of capacity, structures, and incentives to interact effectively. Organizations that will play a role as brokers in the future can close the gap and contribute to develop long-term alternative. In further research it will be of interest to investigate under which circumstances private or public organizations are willing to take the role as brokers, as well as the pre-requisites that the brokers need to fulfil in public owned systems as the one existing in Sweden today. In future research it will be also necessary to sample information about the level of compensation, if any, the brokers will demand to sustain the business model and thus to contribute to the further development of the market of eHealth innovations for social care.

In this study we deliver a theoretical framework that can be, extrapolated, tested, and expanded in future studies [22]. Despite this restriction, the business model we suggest, provides a good picture of the challenges, and needs business models for social eHealth innovations in social care needs to approach for being able to stimulate and sustain advance and innovation of the area. The outputs of the study can be used by decision makers when discussing alternatives that accelerate the transformation of the market trying to find alternatives that stimulate the engagement of the suppliers, entrepreneurs, and social care organizations.

A challenge for brokers, will be how to contribute to sustain the value chain for consumers and producers and at the same time to take into consideration current regulations, policies, and other institutional constraints that influence the two sides of the social care market (organizations, entrepreneurs, consumers, users etc.). Future studies should need to investigate which issues contribute to sustain or to break the value chain in the social care area, and if some types of regulation or policy is needed if some organizations do not benefit or receive the advantages directly or indirectly from the use of broker as business model .

Funding

vinnova, grant number to Professor Vivian Vimarlund

Ethical approval

No needed (no data at the individual level has been sampled in this study)

Acknowledgments

This study is a part of a series of studies performed and belonging to the project "MoTFALL". The project was supported by Vinnova (The Swedish board of Innovation). Project nr 2016–00609-Vinnova.

Declaration of Competing Interest

The author reports no conflicts of interest in this work.

References

- [1] Vimarlund V. E-Health two-side markets: implementation and business models. (Ed) Vimarlund V, Elsevier, 2016.
- [2] Phills Jr JR, Deiglmeier K, Miller DT. Rediscovering Social Innovation. *Stanf Soc Innov Rev* 2008. https://ssir.org/articles/entry/rediscovering_social_innovation.
- [3] Simon J, Millard J, Lauritzen JRK, Carpenter G, Schimpf G, Leszek P. Doing social innovation: a guide for practitioners. a deliverable of the project: "The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), *European commission –7th framework programme*. Brussels: European Commission, DG Research; 2014.
- [4] van Niekerk L, Manderson L, Balabanova D. The application of social innovation in healthcare: a scoping review. *Infect Dis Poverty* 2021;10:26. <https://doi.org/10.1186/s40249-021-00794>.
- [5] Cicellin M, Adriana S, Canonico P, Consiglio S, Mercurio L. Understanding the low cost business model in healthcare service provision: a comparative case study in Italy. *Soc Sci Med* 2019;240:112572.
- [6] Cheema AR, Abid M. Reproductive health services: "Business-in-a-Box" as a model social innovation. *Dev Pract* 2019;29(2):196–207.
- [7] Avelino F., Wittmayer J., Haxeltine A., Kemp R., O'Riordan T., Weaver P., Loorbach D., Rotmans J. *Game-changers, and Transformative Social Innovation. The Case of the Economic Crisis and the New Economy*, TRANSIT working paper, TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169, 2014. TRANSIT%20outputs/91%20Gamechangers_TSI Avelino et al. TRANSIT_workingpaper_2014.pdf.
- [8] Vimarlund V, Borycki E, Kushniruk A. Avenberg K Ambient assisted living: identifying new challenges and needs for digital technologies and service innovation. *IMIA Yearb Med Inform* 2021:26–34.
- [9] Caccioppo JT, Hawley LC. Perceived social isolation and cognition. *Trends Cogn Sci* 2009;13(10):447–54.
- [10] Mendes A, et al. Barriers to Social Innovation. TEPSIE 2012.
- [11] Bullinger AC, Rass M, Adamczyk S, et al. Open innovation in health care: analysis of an open health platform. *Health Policy (New York)* 2012;105:165–75. <https://doi.org/10.1016/j.healthpol.2012.02.009>.
- [12] Bullinger AC, Rass M, Moeslein K. Towards open innovation in health care. In: *The European Conference on Information Systems*; 2012. p. 5–15.
- [13] Kuenne CW, Moeslein K, Bessant J, et al. Towards patients as innovators: open innovation in health care. In: Mukhopadhyay C, Akhilesh KB, Srinivasan R, et al., editors. *Driving the economy through innovation and entrepreneurship*. New York: Springer; 2013. p. 315–27. https://doi.org/10.1007/978-81-322-0746-7_26.
- [14] Westley F. *The social innovation dynamic*, social innovation generation. University of Waterloo; 2008. viewed on 14 May 2012, <http://sig.uwaterloo.ca/research-publication>.
- [15] Kijl B LJ, Nieuwenhuis RM. Huis in't Veld Hermens, HJ Vollenbroek-Hutten. Deployment of e-health services – a business model engineering strategy. *J Telem Telecare* 2010;16(6):344–53.
- [16] Van Ooteghem JA, Ackaert S, Verbrugge D, Colle M, Demeester P. Economic viability of eCare solutions. In: Paper presented at the *3rd International ICST conference on Electronic Healthcare for the 21st century*; 2010.
- [17] Visser JJL, Bloo F, Vollenbroek-Hutten M. Video teleconsultation service: who is needed to do what, to get it implemented in daily care? *Telemedicine and e-Health* 2010;16(4):439–45.
- [18] Wass S, Vimarlund V. *Business Models in Public eHealth* Twenty-Fourth European Conference on Information Systems (ECIS), Istanbul, Turkey. Research Papers. Nr.73. http://aisel.aisnet.org/ecis2016_rp/73.
- [19] Osterwalder A, Pigneur Y. *Business model generation*. Hoboken: John Wiley; 2010.
- [20] Clark E, Singhal S, Weber K. The future of healthcare. Value creation through next-generation business models. McKinsey 2021. Jan 4 Available at, <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/the-future-of-health-care-value-creation-through-next-generation-business-models>.
- [21] Yin RK. *Case study research and applications. design and methods. sixth edition*. cosmos corporation. SAGE Publications, Inc; 2019.
- [22] Eisenhardt K, Graebner M. Theory building from cases: opportunities and challenges. *Acad Manag J* 2007;50:1. <https://doi.org/10.5465/amj.2007.24160888>. Available at.
- [23] Merriam SB. *Qualitative research: a guide to design and implementation*. San Francisco, CA: Jossey-Bass; 2009.
- [24] Venkatesh V., Thong J., Xu X. Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Q* 36(1), 157–78. doi:10.2307/41410412.
- [25] Vimarlund V, Kuziemyk C, Nohr C, Nykänen P, Nikula N. Brokers as catalysts for the E-health market. *Intell Inform Manag* 2017;9:177–88. <http://www.scirp.org/journal/iim>.

- [26] Zott C, Amit R, Massa L. The business model: recent developments and future research. *J Manage* 2011;37(4):1019–42.
- [27] Magretta J. Why business models matter. *Harv Bus Rev* 2002;80(5):86–92.
- [28] Yunus M, Moingeon B, Laurence Lehmann-Ortega. Building social business models: lessons from the Grameen experience. *Long Range Plann* 2010;43(2/3):308–25.
- [29] Chidamber S, Kon H. A research retrospective of innovation inception and success: the technology-push demand-pull question. *Int J Technol Manag* 1994;9(1): 94–112.
- [30] Gluckman PD, Bardsley A, Kaiser M. Brokerage at the science–policy interface: from conceptual framework to practical guidance. *Humanit Soc Sci Commun* 2021; 8:84. <https://doi.org/10.1057/s41599-021-00756-3>.
- [31] Schiavone F, Mancini D, Leone D, Lavorato D. Digital business models and ridesharing for value co-creation in healthcare: a multi-stakeholder ecosystem analysis. *Technol Forecast Soc Change* 2021;166:120647.