BUSINESS MODELS IN PUBLIC EHEALTH

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BUSINESS MODELS IN PUBLIC EHEALTH

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Abstract
Several countries develop strategies and policies to foster the use of eHealth services and stress the importance of business models to develop and implement digital services. Previous research on business models has however mostly focused on the private setting or a healthcare setting with multi-payer or market-based financial systems. In this paper, we explore the use of business models in eHealth as well as the consistency of such a model in a public healthcare setting. The study is performed through a case study of an eHealth service and to which we apply a business model framework. Data have been collected through interviews, documents and project meetings. The results show that all parts of the business model could be identified and provide an overview of the service but no clear guidance on how to reach a sustainable value in the future. It seems that, in the case of public healthcare, there is a need to add the notion of a societal value as well as issues related to future governance for the diffusion of the service to make the business model and the service sustainable.

Keywords: eHealth, Business model, Digital service, Public healthcare.

1 Introduction
Business models have been a focus for both practitioners and academics since the expansion of the Internet during the 1990s (Zott et al., 2011). Today, the interest ranges from types of business models that can be applied in a digital setting to how to design, develop and evaluate models. One area of major interest is business models for digital services (Nambisan et al., 2014) due to their ability to transform traditional industries such as travel, news media and entertainment. In healthcare, the delivery of health services and information through the Internet and technologies is captured by the concept of eHealth (Eysenbach, 2001; Pagliari et al., 2005). In a broader sense, the term does not only denote technical development but also a new way of working to improve healthcare locally, regionally and worldwide by using information and communication technology (Pagliari et al., 2005). In Europe, several countries have developed strategies to foster the use of eHealth services (European Commission, 2012). In these strategies, business models are perceived as an important focus and also part of policy work that aims to support the design and deployment of eHealth services (Moen et al., 2012).

Prior research on eHealth business models has mostly focused on a healthcare setting where reimbursements come from patients’ insurance companies or the employer’s insurance companies (Kijl et al., 2010; Van Ooteghem et al., 2010; Visser et al., 2010). A recent review of business models for tel- emedicine services states that previous studies have focused on multi-payer or market-based financial systems (Acheampong and Vimarlund, 2014). There are, however, few studies that discuss business models, their constraints and their structure for eHealth services that are publicly supported. The aim of this paper is to explore the use of business models in eHealth and consistency for business models in a public healthcare setting. In particular, the paper addresses the following research question: How does the public context affect the use of business models in eHealth? To answer this research question, we use the business model framework developed by Bouwman et al. (2008) and Spil and Kijl (2009) and explore its application in a public healthcare setting. We illustrate the analysis performed through
a case study of My referrals, an eHealth service that aims to be nationally distributed in Sweden. We further discuss how the model as such is affected when it is applied in a public setting.

2 Business models

Previous researchers have performed literature reviews in the area of business models (Al-Debei and Avison, 2010; Osterwalder et al., 2005; Pateli and Giaglis, 2004; Zott et al., 2011) and concluded that the concept often is defined in different ways to suit the purpose of each study (Zott et al., 2011). The lack of consensus has been connected to the newness of the concept (Osterwalder et al., 2005), its multi-disciplinary background (Pateli and Giaglis, 2004) and the innovative areas where the concept is investigated (Al-Debei and Avison, 2010). In prior studies, we found definitions of the concept (Rappa, 2001; Shafer et al., 2005; Timmers, 1998), descriptions of what constitutes a business model (Dubosson-Torbay et al., 2002; Gordijn and Akkermans, 2003; Hedman and Kalling, 2003; Osterwalder and Pigneur, 2010; Shafer et al., 2005), its relation to strategy (Shafer et al., 2005) and innovation (Chesbrough, 2010; Teece, 2010), as well as classifications of the concept and frameworks (Al-Debei and Avison, 2010; Pateli and Giaglis, 2004; Zott et al., 2011). Apart from the lack of consensus concerning the definition of the business model concept, there seems to also be a lack of consensus when describing the number of components that a business model should include.

The business model canvas by Osterwalder and Pigneur (2010) includes nine components: key activities, key resources, cost structure, key partnerships, value proposition, customer segments, customer relationships, distribution channels and revenue streams. Chesbrough and Rosenbloom (2002) describe the business model components as value proposition, market segment, structure of the value chain, position in the value chain and cost structure. Another framework by Bouwman et al. (2008) is comprised by four main components: service, technology, organisation and finance. The model also includes the influences of external forces and takes into account market drivers, technology drivers and regulation drivers. In an extensive review, Zott et al. (2011) found that most contributions to the business model literature highlight the notion of value, financial aspects and the network between the firm and other actors. The authors also state that a business model is the combination of the three elements or components and not merely a revenue model, a value proposition or a network of actors.

In this study, we define business models as “a new unit of analysis, offering a systemic perspective on how to ‘do business’ encompassing boundary-spanning activities (performed by a focal firm or others), and focusing on value creation as well as on value capture” (Zott et al., 2011, p. 20). Thus, the concept is seen as a number of related components or activities that aim to create and capture value within a network.

2.1 Business models in eHealth and healthcare

The application of business models to the area of eHealth and healthcare is influenced by the prior work on business models in e-commerce. This area is diverse and covers different descriptions and definitions of business models. Studies either seem to focus on different frameworks of eHealth business models (Chen et al., 2013; Dwivedi et al., 2007; Hwang and Christensen, 2008; Kijl and Nieuwenhuis, 2011; Kijl et al., 2010; Lin et al., 2010; Lin et al., 2011; Spil and Kijl, 2009; Valeri et al., 2010; Visser et al., 2010) or on different ways to sell and buy eHealth services (Mettler and Euriich, 2012; Parente, 2000). Consequently, the research in this area can be divided into two streams, the first one characterized by frameworks of eHealth business models and the second one characterized by revenue models.

The first stream of research presents business model frameworks, each containing a number of areas that are defined by a number of components. This includes for instance the Business Model Canvas developed by Osterwalder and Pigneur (2010). The second stream of research focuses on different ways to sell and buy eHealth services and presents alternatives to revenue and distribution of eHealth services, including models such as freemium and two-sided markets. In this study, we focus on the
first stream of research, business model frameworks, as business models are a combination of the notion of value, financial aspects and the network between the firm and its actors (Zott et al., 2011). Hence, we view a business model as several different components and not simply a revenue model. Revenue models such as freemium could, therefore, be seen as a component in more extensive frameworks of business models.

In this study, we apply the Service-Technology-Organisation-Finance (STOF) business model framework (Spil and Kijl, 2009) because it has a strong focus on services and includes components common to other frameworks (for instance Dubosson-Torbay et al., 2002; Osterwalder and Pigneur, 2010) (including value proposition and the customer, network activities, resources and actors and financial issues). The framework also comprises the impact derived from external factors such as regulations and laws, technology and the market. These factors are believed to be important in our case as the healthcare context is affected by regulations connected to patient and information security. In addition, the service under study is delivered via a platform for open innovation, and thus, factors such as technology and market issues are likely to have an impact on the service and are therefore important to account for.

The STOF business model framework aims to describe how a company intends to provide two types of value – value for the customer and financial value for the provider (Spil and Kijl, 2009). This is defined by four components: service (S), technology (T), organisation (O) and finance (F) (presented in figure 1). The service component is characterized by a description of the intended value, delivered value, expected value and perceived value. It also includes the market segment for which the service is targeted. The technology component focuses on the technical infrastructure, service platforms and different devices and applications. The third component, organisation, focuses on the actors and their roles, activities and strategies. The finance component describes how revenue is generated, including investments, costs and pricing (Spil and Kijl, 2009).

Acknowledging the centrality of value in business models, the notion of value in this paper is explained according in the following paragraph. The value of an innovation is often described as originating from the capability of providing a commercial offering to the market (Kowalkowski, 2011; Zott et al., 2011). Drawing on the service-dominant logic an offering does neither “have value” (Tronvoll et al., 2011) nor is value produced and delivered by an organisation but co-created with the customer and others (Vargo et al., 2010). Vargo and Lusch (2016, p. 10) expand the concept of value, describing that “actors cannot deliver value but can participate in the creation and offering of value propositions”. Hence, a service provider does not produce value but offers value propositions.

![The STOF-model, based on Bouwman et al. (2008) and Spil and Kijl (2009).](image-url)
Apart from including the four different components, the authors of the model stress the importance of having a dynamic business model that adapts to the changing environment. Changes in trends, technological development and political and legal changes may affect the business model and lead to changes in one business model component, which further affect other components. The model includes the influences of external forces and takes into account market drivers (influence of suppliers, customers, competitors), technology drivers (changes and innovations) and regulation drivers (privacy, intellectual property, regulations) (Bouwman et al., 2008). Despite the inclusion of external factors, there seems to also be a need to adapt the business model as the service develops and changes. This is characterized by three different phases: technology/R&D, implementation/roll-out and market. It is important to note that this is described as a linear process but that loops occur as the service and business model develop over time (Bouwman et al., 2008). In this study we describe the business model in the technology/R&D-phase.

3 Case description – My referrals

The eHealth service My referrals was developed during a two-year research project. The project is funded by Sweden’s Innovation Agency (VINNOVA) and includes actors such as healthcare providers, software developers, patient associations and research institutes. The service is built upon a national platform for open innovation and will be provided to citizens via the platform as a core service (Grönroos, 2007). The platform aims to allow new actors to enter the healthcare market and to develop eHealth services in collaboration with patients and healthcare providers. This is enabled through the use of open data, a software development kit (SDK) and application programming interfaces (APIs), which will allow third-party developers to develop new solutions.

My referrals intends to allow the patient to keep track of referrals as they are managed by different healthcare providers and professionals. The user receives information about when the referral was sent, by whom and its current status. The target users are all citizens who have an interest in viewing the status of current referrals. The ambition is to design a eHealth service that can be used by as many citizens as possible, including those with different disabilities. My referrals is accessible through the web on computers as well on tablets and smartphones. Thus, information will be available to the patient wherever she/he is located and not only at home or at work (Lundberg et al., 2013). The service will be provided to the citizens by the local county councils. When the service has been implemented, private companies and third-party developers can reuse the service and include parts of the service or rebuild it to provide other services to healthcare providers or citizens. In figure 2, the GUI of My referrals is presented.

![Figure 2. The GUI of My referrals in English, the original version is in Swedish.](image)

4 Methods

This work is based on a case study (Yin, 2014) where we have participated in a two-year open innovation project in the public healthcare of Sweden. During the project, we followed the development and
pilot implementation of an eHealth service called My referrals. As is common in case studies (Yin, 2014), the data collection consisted of several sources including semi-structured interviews, documents, project meetings and a workshop. The following section describes how we have collected data in order to identify and describe each business model component.

To capture the service and healthcare providers’ view of the business model, we interviewed representatives of a healthcare provider that considered implementing My referrals. The main focus of the interviews was to identify the value of the digital service and its impact on patients and the organisation but also what the revenue streams could look like. In total, five semi-structured interviews were conducted with healthcare representatives, including two improvement managers, one analyst of public health, one section manager of public health and one specialist physician with management responsibilities. By interviewing representatives with different professional roles and organisational positions, we aimed to obtain a richer understanding of the service under study and minimize bias. The interviews were conducted at the informants’ offices and lasted for approximately one hour. All interviews were recorded and subsequently transcribed.

In addition to personal interviews, we conducted a written interview with the project management team that focused on the service offerings, the technical infrastructure, involved actors and financial issues such as revenue, costs and pricing. The questions were later followed up on during a project meeting to clarify the answers. A semi-structured interview was also held with an entrepreneur and physician concerning previous experiences with business models in the Swedish public healthcare context. The interview focused mainly on different pricing alternatives and experiences from the public healthcare context. In addition to interviews, we studied documentation connected to My referrals such as marketing materials and project meeting notes as well as the demo version of the digital service. Furthermore, we attended eight project meetings and a workshop with representatives of the service provider and healthcare providers. The meetings and the workshop served as a way to have informal talks with the project management and gain deeper knowledge about the case and its context.

The data were analysed using the theoretical framework of the business model as a basis for coding the transcribed interviews and the documents, including meeting notes. The different components of the business model (service, technology, organisation, finance and external factors) served as codes whereby different quotations from the interviews and transcripts from the documents were categorized. The occurrences of similar quotations and transcripts were divided into sub-categories to describe the business model. Additionally, a process chart (appendix 1) was made to visualize the patient process before and after the implementation of the eHealth service. The process chart allowed us to compare the current patient process of referrals with the expected one after implementation and to corroborate previous data on possible service offerings. The informants validated the process chart.

5 Results

The results of the data collected are presented in this chapter. In summary, the most significant findings from the interviews, documents and project meetings are presented in the business model figure below according to the STOF-model.
5.1 Service

The main functionality of My referrals can briefly be described as collecting and visualising health information for citizens. My referrals is part of a national project that aims to develop services that visualize the patients’ care pathways. Parts of the project focus on referrals and a process that previously was managed by mail, where the patient simply has to wait for a letter to gain information about his or her referral. With this in mind, the development of My referrals started with the aim of giving patients the possibility of following the status of their referral, using smartphones, tablets or computers. Throughout the two years of the case study, tangible arguments for the service have been posed during presentations of the project and My referrals. These value propositions include better-informed patients, which was also mentioned during the interviews with the healthcare representatives.

"... the patient will have the possibility to get direct access to his or her referrals, using smartphones, tablets or computers... The new service will give the patients information about exactly when and by whom their referrals were sent, received, evaluated and replied to."

- Official document

"Value proposition for the patient is better service, empowering the patient, a more active patient and increased patient security and service quality."

- Internal project presentation

Apart from a better informed patient, the patient service is also believed to be improved, especially because the patient can access information digitally. It is also a means of reducing anxiety because patients are better informed and do not have to be dependent on specific phone hours to obtain information about their referrals. A pilot study that included 15 patients who tested the service reported that the service was useful and that the patients did not have to worry about the status of their referrals.
'Now you will not have to wait in a phone queue to reach your general practitioner only to know if they have gotten an answer - thanks to My referrals.'

"Imagine that you are at work and you call [the healthcare provider] during a break and then you are automatically given a telephone appointment by the callback system but at that time you are occupied with something else. Well, if you are home reading a good book and have all day...but if you are active and on the move then the callback system cannot always help you."

"However, also for the patient, the citizen... that you feel safe and secure. That is what it is about. That you have control over your situation...so it is a really important argument, that you will feel safety."

From the point of view of the healthcare provider, the service could add value by reducing the number of phone calls concerning referrals and thereby also reducing administration. At a regional specialist clinic, the number of referrals is approximately 345 each month. One interesting value proposition that was mentioned is that the visualization of referral statuses could be an incentive to improve the internal process within healthcare organisations. If patients can actually see where the delays take place, the problem is declassified and the healthcare organisation could be encouraged to improve the process.

"The value propositions for the healthcare provider are improved information security, a decreased number of patient inquiries concerning referral statuses and a more efficient service delivery."

"Of course if the patient could see the status of the referral and where it is located that would put pressure on...or focus on that we have misbehaved. Because then the patient could see that it has been bang, bang, bang and then it stops. Then, there is something wrong with the system somewhere if all referrals stop at the same place along the way."

5.2 Technology

The development of My referrals is part of the national project My care pathways and a way to improve the national eHealth in Sweden. Hence, the service will be provided via the national platform for citizen e-services (www.minavardkontakter.se). In order for citizens to access the platform and the service, they need an electronic identification (distributed by the patients’ bank) or a temporary code.

"When the patient logs on to My healthcare contacts they will be able to view his or her healthcare pathways. The patient needs an account in My healthcare contacts and access to a smartphone, tablet or computer."

In addition, healthcare providers have to connect the electronic healthcare record or referral system to the national platform and make patient data accessible via the API services. This is performed through service contracts and a precondition for service delivery. All county councils in Sweden have signed a contract to share patient-related information via the national platform. Security issues connected to patient data are managed by the national secure service platform, and the individual healthcare provider does not have to engage in legislation and regulation requirements to provide My referrals to the citizens.
“The healthcare provider only has to connect to a service contract. There is no need for any special development/implementation by the healthcare provider.”

- Project management

“Even if there is a long chain of events that need to happen: there is a need for a service contract; the providers of electronic healthcare records need to adjust to the contracts; healthcare providers need to send in forms to give access to information; citizens need to want the information. However, when the processes and routines are established and it has happened a couple of times, it will work better and better.”

- Project meeting notes

5.3 Organisation

The most important actors for the provision of My referrals are argued to be providers of electronic patient records, healthcare providers and the private companies that take part in the project. This includes companies that have engaged in the development and design of My referrals. Providers of electronic patient records and the private development companies are important actors in connection to the service contracts that are needed to make patient data accessible for the service. Healthcare providers will be the service providers for the citizens.

“Important actors are Stockholm County Council, Callista, Chorus, providers of electronic healthcare records and healthcare providers.”

- Project management

Another important actor, due to the future national distribution of the service, is the agency called Inera, which coordinates eHealth initiatives in Sweden on behalf of all regions and county councils. Inera will manage and administer My referrals on a national level, while Stockholm County Council still owns the service and is the only actor that can distribute the service to an international market.

“After the development, Inera will take over the responsibility for the national implementation and use of the digital service My referrals. The ownership of the digital service My referrals will reside with the Stockholm County Council.”

- Official document

Today it is unclear how support and user questions will be handled, but there is a need to provide a helpdesk for technical questions to the end user. Neither service providers nor healthcare providers are aware of what the support solution would look like.

“All services that will be implemented will have a management and administration agreement that regulates questions such as support. This service is not in a phase that allows us to draft such an agreement.”

- Project management

5.4 Finance

The project and development of My referrals are financed by Vinnova, Sweden’s innovation agency. It is not yet decided how the service will be financed in the future, but it will be offered for free to the citizens due to the public healthcare context.

“The service was not included in the first project budget. A decision was made to include it since healthcare providers showed great interest and we had resources available since previous development work had been carried out under budget.”

- Project management

Because it will be managed and administered on a national level, Inera will most likely handle the responsibility for support. Consequently, it is likely that the healthcare provider will have to pay for the service. Today, it is difficult to quantify the price of the service and the positive effects of implement-
ing My referrals. However, healthcare providers’ administration concerning referrals will likely be reduced.

“The service is not in a stage where we have been able to start estimating the long-term governance and further development. First, we have to test the pilot version and ascertain if there is a wider interest. Our responsibility has been to develop the service, not to estimate the economic effects.”

- Project management

5.5 External factors

Looking at the external forces (market, technology and regulation drivers) that influence the business model, it seems that the market for the specific service is preserved for the studied project. As more and more data and APIs will be available via the national platform, more actors will have the ability to enter the market. This might result in new services that can change the value of My referrals.

“The size of the market, in Swedish eHealth, has been discussed a lot and that the county councils are too few customers. The county councils also work together and do not allow single hospitals to purchase on their own. Scandinavia is a bit like a public monopoly...either we regulate the regulated market, or we create opportunities.”

- Notes from workshop

Concerning regulations, there are several laws regarding patient security and patient information and data. For instance, the Swedish law states that there is also a need to inform the user about secure login, direct access to patient information and support (The Swedish Data Protection Authority, 2015). Hence, changes in regulation might affect the business model. There is also the restriction of public procurement, which regulates purchases in public organisations.

“We have the general agreement for public procurement, where you are restricted to prices, etc. There is not much freedom of action in relation to that.”

- Project meeting notes

6 Analysis

The analysis of the results show that the applied business model framework served as a way to identify value propositions for both citizens and healthcare providers and to clarify the service offering. The results also show that external factors that affect the business model, such as changes in legislation, seem to be important in the public healthcare setting. In our case, the functionality of the eHealth service follows political decisions and healthcare laws concerning for instance privacy and security of health information (The Swedish Data Protection Authority, 2015). It is interesting to note that, in contrary to the results shown in the private sector, the market forces seem less important in this case. One possible explanation, for this type of eHealth services, can be the limited competition that exists in the public market which offers less incentives to compete in the production of services for citizens (Lindgren and Jansson, 2013) and less need for public organisations to generate profit.

By definition, a business model focuses on value creation and value capture (Zott et al., 2011). Our study shows that, when applying a business model framework, it is possible to communicate the value propositions of the service, to give an overview of the infrastructure and the involved actors and to plan for finance of support and administration. Still, the results indicate that the value of an eHealth service in a public setting cannot be restricted to the end user and involved organisations. The results from both the interviews and the project meetings identified values that could benefit the society, something that is not included in the business model. As previously identified, several public services offer values not only to an organisation or a customer/citizen but also to the society (Chesbrough and Di Minin, 2014; OECD, 2011). The identified value propositions include a better informed patient, improved patient service, reduced administration and incentives to improve internal healthcare processes. These value propositions are likely to not only benefit the individual patient but also the socie-
ty at large in a long-term perspective. For instance, the mentioned value propositions also include the ability to provide a nationally improved patient service, reduced administration of publically funded organisations and better use of our collective resources. Hence, the acknowledgement of the societal value of an eHealth service needs to be incorporated into the business model.

The output of the results is illustrated in figure 4 in which we show how the social value of the service can be incorporated as an important component of the business model.

Figure 4. Suggestions on how to expand the STOF-model to the public healthcare setting.

Previous studies argue that a business model provides a systemic perspective on how to “do business” (Zott et al., 2011) and a way to deliver sustainable services (Stroetmann, 2013). It is also argued to be a way to reach successful deployment (Spil and Kijl, 2009) and a reduced failure rate of eHealth services (Kijl et al., 2010; Spil and Kijl, 2009). During the project meetings we observed that the diffusion of the eHealth service seemed to be of importance to all actors, still it is not discussed in the business model concept at this stage. The analysis of the results shows that the components of the business model provide an overview of the service but do not provide clear answers on how to proceed to reach successful deployment or a sustainable service. Therefore, we suggest the inclusion of issues related to the governance for diffusion of the eHealth service. There seems to be a need to acknowledge the importance of governance concerning the diffusion of the eHealth service at an early stage in the innovation process. Without awareness and strategies on how to reach successful deployment at an initial stage the road towards a sustainable service is less clear. In the same way as with other business model components, it would be important to acknowledge this throughout the entire innovation process and as the business model is adapted to changes and evolves (Bouwman et al., 2008).

7 Conclusions

Until today business models have mainly been applied in the private sector (Dahan et al., 2010). In this paper, we drew on the work by Bouwman et al. (2008) and Spil and Kijl (2009) and applied the STOF-model to My referrals, an eHealth service that aims to be nationally distributed in Sweden. Our study shows that when the business model framework is applied to a public eHealth context, it is possible to visualize the value of public eHealth services and provide an overview of involved platforms, applications, actors and financial issues (Kijl et al., 2010; Spil and Kijl, 2009). In the public setting, legislations and regulations seem to be important for business models as they have impact on the requirements of the eHealth service.

However, due to the importance of the societal effects of a public service the awareness of the societal value needs to be incorporated into the business model. This would highlight the importance and fu-
ture possibilities of different eHealth services for individuals, organisations and the society. Despite the fact that the business model of the studied eHealth service has been identified, it seems that there is no assurance that the service will be sustainable or successful. We conclude that business models can be used as a concept in the public healthcare context but it needs to be elaborated on and include factors such as future governance for the diffusion of the service to make the business model and service sustainable. Without clear future governance and diffusion of the services at an early stage, success it seems cannot be reached, nor a service offering that uses our collective resources in the best possible way.

Theoretically, we expand the notion of business models to the area of eHealth and public services by applying the framework to a public eHealth setting. In addition, societal value and governance for diffusion of the eHealth innovation are incorporated as important components of the business model concept. Furthermore, we suggest how business models can be used in practice, in public healthcare, even if the term “business model” does not match the traditional scope of a public organisation. By highlighting the societal values of a public eHealth service managers can draw attention to the implications of a future service on a public level and incorporate important elements such as enhanced patient involvement (Snyder and Engström, 2016) and the possibility to improve efficiency, quality and equity in healthcare (Eysenbach, 2001).

In the future it would be interesting to study the relevance of the inclusion of the suggested elements in other settings and alternative arrangements like services for specific patient groups and public services provided in collaboration with pharmaceutical companies. It will also be necessary to identify indicators that capture the societal value of public eHealth services and to incorporate them in the business model. Single case studies can provide important insights to theoretical concepts (Yin, 2014), however in order to further advance the contribution to theory, future research should involve multiple case studies that focus on how the societal value of a service can be included in the business model and how business model are used by decision makers in public eHealth.

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References


Appendix 1

Figure 5. Process chart describing the patient process before and after implementation of My referrals.