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BUSINESS MODELS FOR PLATFORM OPERATORS IN MYDATA BASED ECOSYSTEM – CONTEXT PREVENTIVE HEALTHCARE

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# ABSTRACT OF THE MASTER'S THESIS

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**Abstract**

In traditional personal data markets, companies collect vast amount of data about their customers, share the data across companies and use it for their own purposes. Individuals have only little or no control over how companies use the data about them. Today, for example transferring own health information from one healthcare provider to another is impossible, because people can’t access to their own data. However, empowering individuals and increasing their ability to control their own health data would increase individuals’ motivation and opportunity to take care of their health. The emerging trend is to move towards more human-centered model in personal data management and allow individuals to access and control their own data. In this research, MyData approach is taken, which is suggested as one of these human-centered models.

Purpose of this research is to examine what kind of business models there are for platform operators in MyData based ecosystem in the context of preventive healthcare. Aim of this research is to increase understanding about how MyData transformation can be supported with platform operator’s business models. A business model is a description of the roles and value propositions of a platform operator, interactions among the network of actors and platform operator’s value propositions in the ecosystem.

This research suggests novel business models for platform operators and illustrates how the ecosystem is shaped from a platform operator’s perspective. The method applied is a qualitative case study. The empirical material consists of questionnaire data from 22 organizations from ten different countries from the Europe and the US.

The research contributes to the discussion on networked business models and service ecosystems and creates new knowledge about platform operator’s business models in the context of preventive healthcare. The findings indicate that a platform operator supports actors in exchanging resources and enables value co-creation among individuals and other actors in the ecosystem in four ways: being a representative for individuals and service providers and/or building a trust-based network for actors, and/or facilitating interaction and/or offering a personal data store.

This research provides useful insights for managers about the different roles and value propositions a company can have in an ecosystem where an individual is in control over his or her data. The findings of this research provide managers with guidance and inspiration for the development of new MyData based services. This research provides a snapshot of what a MyData based ecosystem looks like today based on one case. Therefore generalization of this research to other ecosystems might be challenging. However, this research provides useful information about business models and the ecosystem for companies in different sectors.

**Keywords**
service ecosystem, value proposition, role, actor

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1 INTRODUCTION

This research is a Master’s Thesis in the field of Marketing. It presents how MyData, a human-centered model of personal data management that allows individuals to take control over their own data, transforms platform operator’s business model in the context of preventive healthcare. This research is part of a Digital Health Revolution project, and based on a new approach in personal data management, called MyData, which was presented in a white paper produced by Open Knowledge Finland ry and financed by Finnish Ministry of Transport and Communications in 2014.

This chapter presents background of the research, importance and aim of the research as well as presents the research questions. After that the research methods, key concepts and structure of this research are briefly described.

1.1 Background of the research

Vast amount of data about us is collected and saved to companies’ customer management systems, government registers and databases of online services that we use. However, people don’t understand how companies use their personal data for example in social media advertising, what companies have data about them and what kind of data. (Poikola, Kuikkaniemi & Kuitinen 2014.) Individuals also have only little or no control over how, for example, companies or government use or create data about them and their activities. MyData enables a new way of collecting and using personal data and minimizes the privacy lost from the customer’s perspective. (Poikola, Kuikkaniemi & Honko 2015.)

Today, for example transferring own health information from one healthcare service provider to another is impossible, because people can’t access to their own data (Poikola et al. 2014). However, empowering individuals and increasing their ability to control their own health data will increase individuals’ motivation and opportunity to take care of their health (Mandl, Simons, Crawford, Abbett 2007, Baudendistel et al. 2015). New human-centered health information systems are needed to solve the problem of fragmented health records and to empower patients. Personally controlled health record (PCHR) platforms are trying to solve this problem. (Weitzman, Kaci &
Mandl 2009, Baudendistel et al 2015.) In PCHR, users have the control over record access and content (Mandl et al. 2007). Well known companies have launched their own PCHR platforms in the recent years, for example Microsoft HealthVault and Dossia Cosortium, formed by some of the largest companies in the United States. According to Weitzman et al., Indivo was the first and original personal health platform, which enabled individuals to own and manage their health information. (Weitzman, Kaci & Mandl 2009.) In July 2012, Australia launched its personally controlled electronic health system called Nehta “Connecting Australian Healthcare” and its adoption is growing fast. Today about 2.2 million Australians and about 7600 healthcare organizations have registered to the system and over 1.5 million clinical documents have been uploaded. (Nehta 2015.)

However, the problem of personal health records, at least in the US, is that even if healthcare organizations have adopted PCHR, they lack of integration (Wang & Huang 2012), which means that individuals become locked into specific service providers (Poikola et al. 2015). Research shows that people want to share health records across healthcare providers and settings (Hing, & Burt 2007, Kerns, Krist, Longo, Kuzel & Woolf 2013) and integration could provide individuals better access to their data and it would also make communication easier with their healthcare provider (Tang & Lee 2009).

MyData is a new approach and paradigm shift in personal data management and processing that aims to provide individuals with a way to access, obtain and use their personal information, but not just the health information, but information from different sectors and all areas of life, such as medical records, purchasing data and traffic data from retail, health, banking, public services etc. In the core of MyData model is a MyData account, via which individuals can give services the authority to use their personal data and encouraging companies to give the control over data to individuals themselves. (Poikola et al. 2015.) MyData makes service convertibility and transferring data possible and protects against vendor lock-in situation (Poikola et al. 2014).

Today, individuals can’t access to their own information and can’t share it with other companies and services, for example with healthcare providers. Getting more data
about individuals would help health service providers to personalize and optimize health and wellbeing services as well as give alternative means for diagnosis. (Poikola et al. 2015.) However, in order to empower patients and enabling them to be more active in managing their health, companies and professionals have to understand patients’ changing role in the context (Baudendistel et al. 2015), thus individuals being their own data controllers. Because of the clear benefits of a human-centered model in the healthcare context, in this research, preventive healthcare context is chosen.

Case of this research is platform operator’s MyData based ecosystem in the context of preventive healthcare and the unit of analysis is an organization in MyData based preventive healthcare ecosystem. One of the actors identified is a platform operator, which is one of the most important actors in a network of actors as it enables interaction among actors by providing an infrastructure, services, rules, tools and/or technologies (Iansiti & Levien 2004, Bakos & Katsamakas 2008).

Aim of this research is to increase understanding about how MyData transformation can be supported with platform operator’s business models. This research adopts the perspective of service-dominant logic by Vargo and Lusch (2004) and is grounded on an integrated framework of service innovation by Lusch and Nambisan (2015). The three core elements of this research are a service ecosystem, which is an emergent actor-to-actor network of exchanging knowledge and skills (services) and co-creating value (Lusch & Nambisan 2015), a platform which provides support for actors in exchanging and integrating resources and therefore co-creates value in a service ecosystem (Breidbach, Brodie & Hollebeek 2014) and business model, which is a description of the roles and digital connections among a company’s stakeholders through which product, information and money flows and the major benefits to participants (Weill & Vitale 2001, 25, 37).

1.2 Importance of the research topic

Giving control over data to individuals and providing them with new ways to access their own personal information enables businesses to improve their business operation and create new services. It also opens opportunities to create new kinds of
data based businesses and new business models. (Poikola et al. 2015.) Research on business models in the context of e-health is limited, meaning research about services and systems combining healthcare and information technology, electronic health records and healthcare information systems (Chen, Cheng & Mehta 2013). Research concerning platforms’ business models and business models in “multi-sided markets” has been made (e.g. Osterwalder & Pigneur 2010, 78, Mettler & Eurich 2012, Muzellec et al. 2015) but with the researcher’s best knowledge there is still no previous academic research concerning business models in the field of human-centered personal data management, but the research has focused on technological issues like privacy and ownership or control over personal data (e.g. Zissis & Lekkas 2012, Weber 2015, Spiekermann & Novotny 2015).

In addition to the gap in research in the field of human-centered personal data management, business models are not very well understood as a research area (Osterwalder et al. 2005). Business model concept also lacks a theoretical foundation (Teece 2010). Therefore, as Teea Palo (2014) stated: “elaboration on the concept of business models is necessary”. Especially, research concerning actors and their interactions in the context of business models is neglected (Wirtz, Pistoia, Ullrich & Göttel 2015), although description of actors is very important particularly in the context of digital health, because the customers and stakeholders vary very much based on the digital service (Mettler, Eurich 2012). Research is also needed concerning the existence and management of multiple parallel business models within a single firm (Nenonen & Storbacka 2010) and concerning new alternative or complementary perspectives to ecosystems and technology-enabled interactions among companies and customers (Breidbach, et. al 2014). This research is trying to fill the mentioned research gaps concerning business models and the field of human-centered personal data management. Understanding about the model is also increased in the context of preventive healthcare by grounding the research to the context in conclusions. As noted, MyData is a relatively new approach in personal data management and thus more research about it is needed.
1.3 Purpose of the research and the research questions

Purpose of this research is to examine what kind of business models there are for a platform operator in MyData based ecosystem in the context of preventive healthcare.

To accomplish this objective, the research question is

What kind of business models there are for platform operators in MyData based preventive healthcare ecosystem?

This research aims to answer to the research question with the help of four sub-questions:

Who are the actors in a platform operator’s MyData based preventive healthcare ecosystem?

What roles does the platform operator have in MyData based preventive healthcare ecosystem?

What stakeholder value propositions does the platform operator have in MyData based preventive healthcare ecosystem?

Purpose of the sub-questions is to divide the main research question into smaller concepts and therefore making the research more focused and coherent. This research is structured based on the sub-research questions and they are being answered to in conclusions chapter 7. Answering to the sub-questions increase understanding about the platform operator’s ecosystem, thus who are the actors and what different roles and value propositions the platform operator has.

1.4 Research method

As many network studies, also this research is qualitative (Chandler & Vargo 2011). Qualitative research method is chosen because the aim is to increase understanding
about the phenomenon studied (Koskinen, Alasuutari & Peltonen 2005: 15–16), thus human-centered personal data management and new business models in this field of study. The research method is case study, which is an empirical research method and it is used to investigate a contemporary phenomenon in a specific context (Runeson & Höst 2009). Case of this research is platform operator’s MyData based ecosystem in the context of preventive healthcare. The case study is based on a questionnaire conducted by European Commission as part of their effort to gain a better understanding on the current landscape of services offered in this area in Europe, including new business models and their technological readiness. As the case is the ecosystem, the unit of analysis in this research is an organization in MyData based preventive healthcare ecosystem.

1.5 Definitions of the key concepts

*MyData* is a human-centered model and approach of organizing personal data that allows individuals to access and control data that is collected of them (Poikola, Kuikkaniemi & Kuittinen 2014).

*Business model* is a description of the roles and digital connections (relationships) among a company’s stakeholders through which product, information and money flows and the major benefits to participants (Weill & Vitale 2001, 25, 37). A value proposition provides a mechanism for creating stability within stakeholder relationships and help identifying opportunities for value co-creation (Frow and Payne 2011).

*Platform* is a physical or virtual customer touch point that provides support for actors in exchanging and integrating resources and therefore co-creates value in a service ecosystem (Breidbach, Brodie & Hollebeek 2014).

*Platform operator* is an organization that creates value for the ecosystem by enabling interaction among network of actors by providing an infrastructure, services, rules, tools and/or technologies (Iansiti & Levien 2004, Bakos & Katsamakas 2008).
Service ecosystem is an independent and self-adjusting emergent actor-to-actor network that has structures and social rules and where connected actors co-create value by service exchange (Lusch & Nambisan 2015).

Service-dominant logic (S-D logic) emphasizes that value isn’t created by a single actor, but by multiple actors as a co-creation, by exchanging knowledge and skills, instead of physical resources (Prahalad & Ramaswamy 2004, Chandler & Vargo 2011).

1.6 Structure of the research

This research is structured based on a broadened view of service innovation by Lusch and Nambisan (2015). The main themes of this research are

- preventive connected health (context of the research, discussed in chapter 2),
- platform operator’s service ecosystem (case of the research, discussed in chapter 3) and
- business model (interest of the research, discussed in chapter 4).

After the theoretical discussion, research design including description of the case study and data collection and analysis methods are described in chapter 5. Empirical data is analyzed in chapter 6. After that, empirical findings and theoretical review are compared together and discussed in chapter 7. In conclusions, the research questions will be answered to and a conceptual framework of platform operator’s business models in MyData based service ecosystem is presented (page 91). In addition, managerial implications and reliability of this research are discussed in conclusions. You can find the questionnaire that used in empirical research in appendixes.
2 CONNECTED HEALTH

Context of this research is preventive healthcare, which means increasing people’s awareness of their health (Jethwani, Kvedar, Kvedar 2010) and providing individuals with just-in-time information about their health when they are motivated in living healthier (Agboola, Ball, Kvedar and Jethwani 2013). Connected health can be used to deliver precise and personalized preventive care in an integrated and individual-centric way based on data collected by the individual and by connecting healthcare delivery systems together (Agboola et al. 2013). Therefore, in this research connected health is seen as an enabler of preventive and individual-centric healthcare in the ecosystem. In this chapter, topics of connected health, nature of preventive healthcare and MyData in healthcare sector are discussed. In the end, technologies used in or related to preventive connected health are briefly described.

2.1 Definition of connected health

There are many different words to describe digital health services and the new technology that enables a new kind of healthcare delivery. Connected health is one of them (Caulfield & Donnelly 2013.) Also, in different contexts, scholars use terms like digital health and e-health (e.g. Eysenbach 2001, Mettler & Eurich 2012). Digital health service, on the other hand, means a healthcare service that is provided digitally (e.g. Mettler & Eurich 2012, Landers 2013). According to Eysenbach (2001), e-health is about delivering and enhancing health services through the internet and technologies by the medical informatics, public health and businesses. Eysenbach has also presented a broader view to the e-health where it’s not seen only as a technical development but as way of thinking and as a commitment for networked thinking to improve healthcare locally and globally by using the technology. Scholars also use a term digital health, which is about using technology to improve healthcare locally and globally in a network. According to Caulfield & Donnelly (2013) connected health means connectivity of all of the stakeholders by the means of timely sharing accurate information through devices, platforms and people. Connected health is a model for health management that is designed around the individual’s needs in a way that the individual gets better care in a proactive and efficient way.
In this research, Caulfield & Donnelly’s (2013) viewpoint to connected health is adopted. Understanding connectivity allows us to understand the links between actors who interact and exchange resources within a platform (Breidbach, et. al 2014).

2.2 The nature of preventive healthcare

Organizations can influence on how people behave by increasing individuals’ awareness of their health and demonstrating how different actions influence to their health (Jethwani et al. 2010). According to Agboola et al. (2013), giving feedback to individuals isn’t alone enough to educate people but they key issue is to provide the information “just-in-time” by the healthcare providers, when individuals have the motivation to change their behavior.

*Personalization* is the key aspect in healthcare when trying to affect to peoples’ behavior or lifestyle in some way and improving patient wellness. Implementation of personalized services hasn’t always been possible, because of the difficulties in collecting and processing real-time patient data on individual context in a reliable way. Also, there haven’t been mechanisms to provide customized coaching that is consistent and informative to patients or users. One possibility to data-driven patient-centered care is to use a platform that connects patients and doctors in real-time and contains all the information transactions and contacts between the patient and healthcare services across time or providers. (Hsueh, Chang, Ramakrishnan 2015, 355, 359.) However, it is important to remember that even if digital health services make individuals’ lives easier, there can be technical barriers, for example, internet connectivity varies between homes (Landers 2013).

2.3 MyData in healthcare sector

MyData is an approach for organizing personal data in a human centric way and it can be applied in different sectors, like banking or health. Its primary objective is to enable the flow of data between sectors. Figure 1 illustrates the flow of personal data, consents and money between actors in the context of occupational health. Healthcare
requires data, which usually consists of test results and diagnosis. In occupational healthcare, it is normal that when individuals change jobs, the healthcare provider changes too. Currently, there is no good way to organize data logistics between the health providers, which is what MyData could provide. MyData would also enable getting more data about individuals, which would help in personalizing and optimizing health services. For example, all data from different sectors such as consumption data or activity tracking data could be used for healthcare services. The figure demonstrates that when using a MyData operator, and with a permission of the individual, the occupational health provider can access to data from various sources, which again helps them to provide more personal care to the individual. (Poikola et al. 2015.) Previous research demonstrates that using a program in which an individual has control over their data as a tool for health promotion in the workplace improves timely responses from participants (Bourgeois et al. 2008).

![Figure 1. Flow of consent, data and money in MyData model. (Poikola, Kuikkanen & Honko 2015).](image-url)
2.4 Technologies behind the connected health

Connected health uses technologies ranging from text messages to advanced technologies to deliver individual-centered care with an aim of empowering individuals, yet it allows people to maintain connections with their health providers (Kvedar, Nesbitt, Kvedar & Darkins 2011). Diabetes is good example of how technology can be used to help people in their lives. Diabetes is a chronic disease state that requires ongoing patient attention, meaning daily insulin infusion and constant monitoring. Technology makes disease management easier and more effective, allowing diabetics to get more information at understand what their blood sugar results mean and how to improve them. The digital smartphone and tablet technologies allow patients to take control of their own health information, and puts patients at the center of their care. Since diabetes can be controlled and even cured with changing the lifestyle, the new way of monitoring own health may change many diabetics’ lives in the future. (Chain Drug Review 2015.)

MyData infrastructure needs authentication services. When an individual transfers data to a service, the service organization must be able to know if the data is what it is argued to be. Technology may give us a solution to prove that the data is authentic. (Poikola et al. 2015.) For example the blockchain is a comprehensive information technology that can be used for any form of intangible or tangible asset registry, inventory, and exchange, including health data and information (Swan 2015, 7). Blockchain is based on automated consensus among networked users and it doesn’t have any central authorities. For example in the case of Bitcoin, the digital cash, encryption techniques, thus the blockchain technology, is being used to verify the transfer of money without a central bank. (Swan 2015, 9.) However, the users don't necessary have to trust each other in order to make the transaction, because with an algorithmic self-policing, the system is safe. Users can trust the system and they don’t have to establish and maintain trust with any transaction counterparty (another person) or a third-party intermediary. (Swan 2015, 10.)

According to Melanie Swan, blockchain technology could be used for health-related applications. Personal health records could be stored via blockchain like an electronic medical record (EMR) system. Blockchain would provide a structure for
storing health data on the blockchain so that it could be analyzed but still remain private. Individuals could give doctors or pharmacies access to their data as needed with a private key access. In the future, there might be different kinds of blockchains for exchanging and providing access to different kind of assets, including digital health assets. (Swan 2015, 7, 59.)
3 PLATFORM OPERATOR’S SERVICE ECOSYSTEM

Platform operator’s ecosystem consists of a platform operator that operates a platform and other actors in the ecosystem. In this chapter, the service ecosystem, platform and platform operator are defined. In addition to that, other actors and finally platform operator’s roles and value propositions in the ecosystem are described.

3.1 Definition of a platform

Service that is delivered in an ecosystem is usually very complex technically. There can also be lack of trust among the actors. This is why there is a need for a mediator who has trust of the actors and competencies to operate for example a digital health service. According to Mettler and Eurich (2012), the key actor in this kind of an ecosystem and in the platform model is the platform operator, whose value activities include service development, giving technical support and service delivery in the ecosystem. (Mettler & Eurich 2012.)

Edelman (2015) argues that platforms can help in understanding business models. According to Osterwalder and Pigneur (2010, 78), platform is an important business phenomenon and increasingly important business model pattern. Other patterns in the context of digital health are freemium and crowd-based e-health, which all can be used as a basis to describe sustainable business models for digital health. Mettler and Eurich (2012) argue that business model patterns are particularly useful, for the reason of guiding health service providers in bringing a digital health service to the market. The design patterns can be mixed up together and changed based on context. According to Osterwalder and Pigneur (2010, 55), defining business model patterns also helps us to understand business model dynamics and it also serves as a source of inspiration for creating own innovative business models.

Platforms are multi-sided in nature (Rochet & Tirole 2003, Tan, Pan, Xianghua & Huang 2015). Osterwalder and Pigneur (2010, 78–79) explain the multi-sidedness so that platforms bring together two or more interdependent groups of customers and create value by facilitating interaction among the actors, meaning that the platform
interconnects users from both sides of the market: the consumer and the producer of the content, good or service. They also argue that based on that, a platform creates value only if the other side of actors is also present. Similarly, Zhang, Levä & Hämmäinen (2014) highlight that the value flow is not only one-way but it’s in fact two-way, meaning that the customers interact with the platform by giving information and making monetary transfers and in return receive content transfer from the producer via the platform. Google, Facebook and the Financial Times are examples of successful (multi-sided) platforms. In healthcare context, the two sides of the platform are a health services provider like a doctor and a health service consumer (Mettler & Eurich 2012). Also, Apple’s iPhone and iPad can be seen as platforms that benefit the user, not just as gadgets (Lusch & Nambisan 2015).

Along with multi-sided markets, scholars use terms such as multi-sided platforms (e.g. Tan et al. 2015, Edelman 2015), two-sided platforms and two-sided markets. Platform and multi-sided market are usually used as synonyms, because as a concept, platforms were originally introduced as two-sided markets, which highlights that a market has two distinct sides that benefit from network effects by interacting on a platform (Rochet & Tirole, 2003). Multi-sided market is a relatively new idea that arises from network effects and the power of the platform operator. Network effect is a phenomenon, which happens when the platform grows in value to the extent that it becomes attractive to even more users. (Osterwalder & Pigneur 2010, 77–78.) Most multi-sided markets with network effects are considered as platforms (Rochet & Tirole 2003). From now on, in this research, term platform is being used to replace the term multi- or two-sided market.

A platform can also be seen as a virtual community that is the center of communication and interaction of participants and helps building relationships (Pawar et al. 2008). According to Osterwalder and Pigneur (2010, 78–79), a platform creates value by acting as intermediary between the two groups. Value can be created only if the platform attracts and serves all the customers at the same time. They also argue that value for a group of users depends on how many users there are on the other side of the platform. Therefore, one of the most important questions for a platform operator is whether it can attract enough of customers for each side of the platform and succeed.
The two sides of the platform may use different technology to connect to the platform. According to Beyeler et al. (2012, 315), a platform operator creates and upholds the infrastructure, and gets revenue from one or both sides of the markets. For example, on auction sites (like eBay and Yahoo), buyers and sellers interact to make a deal. On credit card payment systems (like Visa), merchants and consumers participate in the same system. The more content there is available in the platform, the more valuable it becomes for both sides of the market. (Choi 2010.)

In a platform model, there are two types of customer groups in a market that interact with each other and an intermediary, which provides a platform and enables customers to meet each other (Choi 2010). Hence, the platform model can be seen consisting of a platform, operator and user. The users, who define the sides of the market, can either be producers of the content, good or service on the platform, or consumers. Figure 1 illustrates the relationship of the classes and the flows of value created by platform use. The flows of value motivate decision makers in each class to interact. Users derive value from conducting a single transaction that the platform supports. This value may be different for producers and consumers. Users benefit from interacting on the platform, and pay fees to the operator, for both access and usage. (Beyeler et al. 2012, 316–317.)

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**Figure 2.** Main classes and flows of value in the platform model. (Beyeler, Kelic, Finley, Aamir, Outkin, Conrad, Mitchell, & Vargas 2012, 316).
According to Beyeler et al. (2012 316–317), there is usually more than one platform available to users to choose from and in that case platforms compete about the users for example on the basis of security. Also, according to Choi (2010), individuals can participate in multiple platforms at the same time, thus to engage in multi-homing, in order to gain maximal network benefits.

3.1.1 Platform in S-D logic

In S-D logic, platforms are seen as service platforms that serve actors as a venue for service exchange (Lusch & Nambisan 2015). In S-D logic, service refers to applying knowledge and skills for the benefit of others or the actor itself and also reflects to the process of doing something beneficial with others (Vargo & Lusch 2004, Vargo & Lusch 2008).

According to Lusch and Nambisan (2015), service platforms help transferring of information from its physical form or device and make an effective and efficient service exchange possible. They argue that service platform consists of tangible and intangible resources and it facilitates interaction and resources between actors. In S-D logic, resource liquefaction and resource density are considered as the key issues in the service platform. Platforms leverage resource liquefaction, which means decoupling of information from devices or the technology that stores or process it (Normann 2001 via Lusch & Nambisan 2015, Lusch & Nambisan 2015). Platforms also enhance resource density, which means mobilizing resources for a time, space or actor that offers the desired service in an effective and efficient way (Lusch & Nambisan 2015).

Lusch and Nambisan (2015) argue that organizations should design their offerings as a service platform that enables service exchange and value co-creation. According to their research, platforms can be seen as goods that are distribution mechanisms for service provision, meaning application of mental and physical skills. Therefore, tangible goods can be seen as appliances or platforms for service provision. They also argue that instead of designing a device, organizations should rather imagine the device as a platform for service innovation. (Vargo & Lusch 2004, Lusch & Nambisan 2015.)
Breidbach, Brodie and Hollebeek (2014) have also joined the discourse on service ecosystems by presenting a new perspective to platforms, an *engagement platform*. Breidbach et al. argue that platforms are not only tangible distribution mechanisms for service provision (see e.g. Lusch & Nambisan 2015), but they can be divided into physical and virtual and into temporary or continuous resource exchange platforms. According to their research, platforms can be seen as customer touch points that support actors in exchanging and integrating resources and thus co-create value in a service ecosystem. The interaction can either be customer-to-firm or customer-to-customer. They argue that four different kinds of platforms can be identified: operating, instrumental, enabling and supplying platforms.

First, *operating platforms* (e.g. Gmail or YouTube) facilitate interaction and value co-creation with customers and generate revenue by continuous resource exchange. Second, *instrumental platforms* (e.g. smartphone or home entertainment) enable customers to access a service provider’s operating platform and therefore are prerequisite for value co-creation. Instrumental platform facilitates continuous resource exchange but it also needs to be integrated with applications or software. Third, customers can access an *enabling platform* (e.g. Microsoft windowsstore.com) via physical instrumental platforms. Enabling platforms enable transactional exchanges and allow customers to access applications or software, thus it supports the operating platform. Finally, *supplying platforms* (e.g. Google walk-in store) enable customer-to-customer and customer-to-firm interactions also without exchanging any resources. (Breidbach, et. al 2014.)

3.1.2 Personally controlled health record platform

Healthcare providers haven’t been able to provide individuals with an easy access to their own health data. Generally patients’ health records are stored by and with health care providers and the individuals are not able to access the health data. People also have usually visited many health care providers and their health data is distributed. This makes accessing to data difficult and prevents providers to effectively providing personalized services for the individual based on his or her needs. (Steele, Min & Lo 2012.) Empowering individuals and increasing their ability
to control their own health data will increase individuals’ motivation and opportunity to take care of their health (Mandl, Simons, Crawford & Abbett 2007, Baudendistel et al. 2015). Therefore, new individual-centered health information systems are needed to solve the problem of fragmented health records and to empower patients (Baudendistel et al 2015).

The emerging trend is to move from a organization-centered model to more individual-centered model of information handling that enable individuals to store and access their health data using technologies (Eichelberg, Aden, Riesmeier, Dogac & Laleci 2005), but not only the health data but all personal data that an individual may have (Poikola et al. 2015). Personally controlled health record (PCHR) platform enables individuals to take the control over their own health data access and content (Mandl, et al. 2007, (Weitzman et al. 2009) and makes decision-making and health planning possible for individuals (Steele et al. 2012). Being an emerging concept, personally controlled health record has many different names such as an electronic personal health record system (Steele, Min & Lo 2012) and electronic Personal Health Records (ePHRs) (Bourgeois, Taylor, Emans, Nigrin, & Mandl, 2008).

Steele et al. (2012) have identified four platforms with which individuals can manage their health data. One is an USB or other portable storage-based PCHR with which an individual can manage health data without a network connection and devices anytime. However, having all the health information in an USB flash memory or in a secure digital card has many risks for example concerning interconnection and synchronization with other systems (Maloney & Wright, 2009) and the fact that the individual would be responsible of backing up the data (Steele et al. 2012). The second alternative is to have a web-based server (like Microsoft Health Vault) that is integrated and interconnected with systems used by healthcare providers like hospitals, employers or third parties (Simons, Mandl & Kohane 2005, Steele et al. 2012). Web-based platform needs an infrastructure to facilitate the interactions between users and health data sources. Users can access and manage their health data with portable devices in real time. With a cloud-based PCHR users and healthcare providers can access the PCHR through different devices like through the smartphone, table, PC or laptop. However, a hybrid PCHR can provide the best availability and flexible access of health data to the individual. Hybrid PCHR allows
using both local and remote location, meaning that the data can be managed through devices (like laptop, smartphone and smartcard) and through a web-based server. (Steele et al. 2012.)

3.2 Service ecosystem

According to Lusch and Nambisan (2015), service ecosystem is an independent and self-adjusting emergent actor-to-actor network that has structures and social rules, and which is created and recreated collectively by the actors. Common organizational structures and principles are important in a service ecosystem in order to facilitate service exchange and resource integration among actors. Actors are relatively free to enter and exit the service ecosystem as well as collaborate and exchange resources with each other. (Lusch & Nambisan 2015.)

Service ecosystem covers all the levels of service-for-service exchanges and complex networks (Chandler & Vargo 2011). In a service ecosystem, actors interact through institutions and technology to co-produce and exchange service offerings and co-create value (Lusch, Vargo & Tanniru 2010). According to Grönroos and Helle (2012) it is not enough that actors try to be productive separately but they should strive to become productive together by co-creating value. It is good to notice that value co-creation can be understood both from a transactional perspective, to be a joint action by a customer and a service provider during an interaction (see e.g. Grönroos 2012) or from relationship perspective (see e.g. Vargo & Lusch 2008.) This research contributes to the discussion on value co-creation by Vargo and Lusch (2004) and sees the customer as a co-producer of value.

Breidbach et al. (2014) argue that engagement is an important part of service ecosystems and define ecosystems as engagement ecosystems. Customer engagement can be seen as a sub-concept of service ecosystems, where the term “engagement” highlights that interaction and co-creation are engaging in nature. Engagement ecosystem is an aggregation of individual and mutually dependent engagement platforms, thus customer touch points. Breidbach et al. argue that in order to understand if, how and why platforms enhance resource exchange and integration,
we need to move from a singular perspective toward understanding of engagement ecosystems.

In this research, ecosystem is seen as the framework that bundles together actors, the actor network and platforms via which actors can interact with each other and exchange skills and knowledge. Also, instead of considering ecosystem as a bundle of platforms (Breidbach et al. 2014), in this research, an ecosystem is defined as a service ecosystem, which is an independent and self-adjusting emergent actor-to-actor network that has structures and social rules and in which connected actors co-create value by service exchange. (Lusch & Nambisan 2015.) The actors within the ecosystem are described in the next sub-chapter.

3.3 Actors in the ecosystem

According to Frow and Payne (2011), identifying actors in the ecosystem is the first step in building successful relationships among the actors. Also, according to Mettler and Eurich (2012), when analyzing business models especially in the healthcare sector, a description of actors involved is very important. Koivumäki, Pekkarinen, Saraniemi, Heikka & Lappi (2015) argue that actors in the context of MyData based digital services include a software and service operator, device provider, patient record data systems, public and private actors, individuals, service providers, support service providers as well as business service infrastructure providers and data storage service providers. In the context of a mobile virtual community, Pawar et al. (2008) argue that the three primary types of actors are the customers, service providers and a platform operator. In this kind of an ecosystem, the mobile phone acts as a service provider and the platform operator provides an infrastructure and means for the interaction between the actors as well as creates trusted relationships among the actors in the ecosystem. In this research, as suggested in network-centric S-D logic, actors are seen as resource integrators and not just as producers or consumers of value (Vargo & Lusch 2011, Lusch & Nambisan 2015).
3.4 Operator

In this sub-chapter a platform operator and MyData operator are defined. In this research, MyData operator and platform operator considered as the same.

3.4.1 Platform operator

When transforming office-based healthcare practice into continuous data-driven patient-centered healthcare, we need new ways to connect care and information transactions such as patient-generated data and recommendations about care, across “touch points”, which mean all the contacts between an individual, healthcare services and providers. One way to bring the individual and the service provider together is to have a platform, a data brokering mechanism that connects individuals to services in real-time online and facilitates a particular kind of interaction. It is a new service model, in which information is exchanged to provide real-time feedback loops of patient data, assessment and guidance for the individual. (Beyeler et al. 2012, 314, Hsueh, Chang & Ramakrishnan 2015, 359.) Platforms therefore bring together two or more interdependent groups of users and create value by facilitating interaction and transactions through the platform between these groups (Osterwalder & Pigneur 2010, 77, Beyeler et al. 2012, 314). Also known as “sponsors of platforms” platform operators can be seen as enablers of interaction among network of actors by providing an infrastructure, services and rules (Iansiti & Levien 2004, Bakos & Katsamakas 2008).

Osterwalder and Pigneur (2010, 97) argue that key activities of a platform operator are platform management, service provisioning and platform promotion. Platforms can also be seen as goods that are distribution mechanisms for service provision, meaning applications of mental and physical skills. From a service-centered perspective tangible goods are seen as appliances or platforms for service provision. (Vargo & Lusch 2004.)
3.4.2 MyData operator

MyData is a model for human-centered personal data management that is still being developed. The idea is that in the MyData ecosystem, there would be MyData accounts that provide individuals with a way to control their personal data from one place even if the data can be created, stored and used by many other services and companies. Organizations that act as MyData operators will provide the MyData accounts. MyData operators are organizations or other actors who maintain and develop key services in the MyData infrastructure, like anonymous services, authentication services (e.g. the blockchain technology that was discussed in sub chapter 2.4), data recording services and data controlling services. (Poikola et al. 2015.)

In MyData model, data flows from a data source to a service or application that is using the data with consent of the individual. The important part of MyData model is that flow of data is separate from flow of consent. Therefore, MyData account isn’t personal data storage, but its role is to enable consent management between the data source and service. However, MyData operators may decide to offer personal data storage services as value adding services for their customers in which case the data would flow through MyData account. (Poikola et al. 2015.)

In MyData ecosystem, as noted by Poikola et al. (2015), interoperability enables individuals to choose a MyData operator that suit them the best and they can change their operator anytime without losing their data. People may also have many MyData operators for different sets of data, e.g. one for health data, one for transportation data and one for financial data (Poikola et al. 2014).

Poikola et al. (2014.) have identified different MyData operators: they can be individual operators, fragmented organizations that don’t have an operator or technology based systems underneath. They argue that the organization model of an operator affects to the operator’s value chain, and how the operator starts building its business. Operator can either 1) charge individuals for a service, 2) act as a distribution channel for applications, 3) aggregate data on behalf of an individual or 4) offer added value services as a main primary service provider.
There are many alternatives in organizing a MyData operator. MyData operator could be a governmental licensed operator, a network, joint venture of companies, joint venture of individuals, governmental operator or independent commercial limited company. In a governmental licensed operator model, a government would give an operator a permission to offer individuals these services. A network would lean on technology and wouldn’t have an operator, but would base on peer-to-peer self-operator network. Individuals could also act as operators for themselves. In the model of a joint venture of companies, a group of companies would found a joint venture and start acting as a operator. Finnish health account service Taltioni is a good example of this. In the model of a joint venture of individuals, the individuals would be and own the cooperative together. In a model of a governmental operator, the government supervises the system. Examples of this are the Finnish KanTa and Swedish health account. An independent commercial limited company would also work after the operator model is common to people and the business models are clearer. (Poikola et al. 2014.)

To sum it up, in this research, platform operator is defined as an organization that creates value for the ecosystem by enabling interaction among network of actors by providing an infrastructure, services, rules, tools and/or technologies (Iansiti & Levien 2004, Bakos & Katsamakas 2008). MyData operator, on the other hand, is an intermediary organization that maintains and develops the key services, thus the MyData infrastructure (e.g. anonymous and authentication services) and enables digital consent management between data creators and data users, thus facilitates access to data via MyData accounts. (Poikola, et al. 2014.) MyData operator and platform operator are considered as the same.

3.5 Roles of a platform operator

Because MyData is still at the level of discussion and modeling at this point (Poikola et al. 2014), it is necessary to take the perspective of “intention of doing” to the roles, meaning examining, how the actors intend to act in the future and what roles they will adopt. In this research, actors, meaning organizations and users in the ecosystem, are considered as collections of different roles (Montgomery 1998) that
can be identified by describing the intentions of business actors and their preferences of changing a network by acting in a specific role (Anderson, Havila, Andersen & Halinen 1998).

In this research, the symbolic interactionist approach to roles is adopted, which suggests that roles must be claimed before they are performed, meaning that the role isn’t based on the actor’s position in a social structure. (Nyström et al. 2014.) In this research, the focus is especially on platform operator’s roles in the ecosystem, which is important because, according to Iansiti and Levien (2004), platform operator’s role in the ecosystem affects to the success of the platform.

Koivumäki, Pekkarinen, Saraniemi, Heikka and Lappi (2015) have identified three roles that service platform operators may have specifically in the context of MyData based digital services: 1) enabler of individual service offering and value co-creation, 2) coordinator and 3) gatekeeper. Similarly, Iansiti and Leviaen (2004) note that in order to improve its own position in the ecosystem, a platform operator should focus on providing benefits to other actors.

Heikkinen et al. (2007) argue that in the context of mobile networks, platform operators may take several different roles. For example as a planner, an operator connects the existing resources in the ecosystem and as an instigator it tries to influence on other actor’s decision-making process and change the environment in some way, aiming to get other actors active. (Heikkinen et al. 2007.) Similar to instigator, a “network weaver” has the ability to see who of the potential actors have similar interests and convinces the potential actors to join the ecosystem. (Heikkinen and Tähtinen 2006) A gatekeeper may take many different forms (Nyström et al. 2014), but according to Allen (1970), it is an organization that starts information and communication exchange in the ecosystem. However, an operator may become a gatekeeper even if it didn’t want to because of its connections or resources, for example technologies and knowledge (Heikkinen et al. 2007).

The roles described above give some kind of understanding what kind of roles there can be in an ecosystem and highlights that an organization may take multiple roles. However, it is good to note that the roles described above probably won’t suit in this
research since roles are context related (Story, O’Malley & Hart 2011). Because of this, Story, et al. (2011) have identified network-oriented roles that are not tied into any specific context because the actors performing those roles aren’t industry specific. They argue that an organization may have three different roles, connecting, integrating and endorsing. Actors who have the connecting role connect other actors who they think are able to develop and complete the project based on their technical knowhow. They also argue that the connecting role is relevant in bringing actors together and supporting partnerships. (Story et al. 2011.) The role is similar to a lead operator, which connects firms together and forms an operating network. (Snow et al. 1992). Finally, according to Story et al. (2011), actors performing integrating role connect activities, coordinate and set targets whereas endorsing actors are more focused on encouraging others to make products to the market.

Nyström, Leminen, Westerlund and Kortelainen (2014) have examined actors’ roles in open innovation networks, in which, similarly to a service ecosystem, actors can take multiple different roles (Lusch & Nambisan 2015) and in which some kind of coordinators or facilitators are needed, what we call platform operators. In their research, actors weren’t named, but only the roles that market actors can take. According to them, an organization may take a role of a coordinator, builder, messenger, facilitator, orchestrator and integrator. They argue that as a a coordinator an organization acts as a “focal network hub”, coordinates participants in the network and acts as a representative of a certain group of actors, for example the users. It collects information for example about the user needs and desires and then forwards the collected information to the other actors in the network. They have also found a role of a messenger that collects ideas from coordinators and other actors and forwards information and good ideas to the network. (Nyström et al. 2014.) It is similar to what is found by Knight and Harland (2005), called as “information brokers”. Builders, on the other hand, establish close relationships between actors, such as users and companies in the network, and a facilitator gives advice for actors of how to reach their goal and how to find the right direction. Orchestrator guides and supports network activities, establishes trust in the network to boost collaboration and inspires actors to work for the good of the network by acting as an example. Orchestrator orchestrates the whole network of actors. Integrator, on the other hand, integrates actors’ knowledge, technologies and other recourses and
outputs into a useful entity. (Nyström et al. 2014.) Similarly, as noted by Pawar et al. (2008), a platform operator can help other actors in the ecosystem to build relationships and facilitate content by providing them with an infrastructure.
4 BUSINESS MODEL

This chapter clarifies what a business model means in this research. Focus is especially on value co-creation and value proposition, because value proposition is considered to be one of the most important aspects of a business model (Lindgreen, Hingley, Grant & Morgan 2012) and value is always co-created in-use instead of delivered from one to another (Frow & Payne 2011). When analyzing business models especially in the healthcare sector, a description of actors involved is very important (Mettler & Eurich 2012). Actors in the network are identified in sub-chapter 3.3 Identifying the actors provides a structure for understanding value propositions and is the first step in building successful relationships among the actors. (Frow & Payne 2011.) Choosing a suitable business model is the key to the platform’s success (Rochet and Tirole 2003).

In this chapter, literature about business model is discussed from different viewpoints. Then, concepts of value co-creation and value proposition are discussed. Finally, the theoretical review is summed up and illustrated in a form of a framework of MyData based service ecosystem.

4.1 What is a business model?

Ten years ago Osterwalder et al. (2005) announced that business models aren’t very well understood as a research. After that, scientists from several of fields have researched the topic of business models, but the term isn’t always consistently applied (Wirtz et al. 2015). Along with a term “business model”, terms such as “business idea”, “business concept” or “revenue model” are being used (Magretta 2002). The use of business models depends on how they are perceived by the company, in which activities they are used within the company and at which levels the business models are used (Palo 2014).

Business models can also be viewed from many different perspectives. Concept of open business models puts a customer to the center and is focused on multiple actors co-creating value for the same customer (Frankenberger et al. 2013). According to Osterwalder and Pigneur (2010, 14–17), business model can be described through
nine “building blocks” that show how company intends to make money: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure. The model concentrates on how an organization creates, delivers, and captures value. Rochet and Tirole (2003) argue that the choice of a business model is the key to the platform’s success.

One view to the business models is a network-oriented view (Wirtz et al. 2015). According to Palo (2014), in order to utilize technology in a business model, market actors within the network are needed to deliver components and devices and to develop, produce and market the services. Thus, companies offering technology-based services need a business model that is considered as part of a network, not only as a business plan for example.

Weill and Vitale’s (2001, 25, 34) definition to business model focuses on value and interactions between actors within the network. They argue that a business model is a combination of “atomic” business models, thus building blocks that best describe the company’s activities. Companies can combine the building blocks to create tailored business models. Business model of an intermediary includes the roles and digital connections (relationships) among a company’s stakeholders through which product, information and money flows and the major benefits to participants (Weill & Vitale 2001, 25, 37, 47). Value proposition provides a mechanism for creating stability within stakeholder relationships and help identifying opportunities for value co-creation (Frow and Payne 2011). Similar to Weill and Vitale’s (2001) definition, Timmers (1998) defines a business model as architecture for information, service and product flows, including a description of various business actors and their roles, a description of potential benefits for the various business actors and a description of the sources of revenues.

In this research, platform operator’s perspective to business model is taken. The business model includes (adapting Weill & Vitale 2001, 25, Timmers 1998) roles of a platform operator, interactions among network of actors (flows of information, money and service) and platform operator’s value propositions (benefits) for the actors in the ecosystem in order to find opportunities for value co-creation. Therefore in this research, platform operator’s business model is being researched by increasing
understanding about platform operator’s roles and value propositions as well as identifying the actors in the ecosystem.

Business models don’t only describe the actions of different actors but they can be seen as analytical devices that actors themselves can use in their activities in the market. As a device, a business model doesn’t exist without its user. (Palo 2014.) Business models provide companies with a framework and thus can be used to discover the unique value proposition for the company in the value creation network (Osterwalder & Pigneur 2005). When used by the market actors, business models can bring change and stabilize the actions of market actors. Therefore, business model is beyond than just revenue logic or a business plan, but it is a device and a concept that has the potential to be used by the actors. (Palo 2014.)

There is relatively little discussion about what activities market actors perform with business models, but in order to understand business models as analytical devices, we need to understand what activities market actors can perform with the business models. Palo suggests that business models can be used in three levels: in an organization, in a business net and in a market. As analytical devices and tools for the market actors to use, business models can be used in identifying, developing and exploiting business opportunities, motivating people to do something, defining problems and predicting new solutions. (Palo 2014.) Palo also argues that by being networked in nature, business models are not seen as internal to a company but external thus interlinked with the business models of others and shared by market actors. However, this research contributes to the discussion on networked business models by emphasizing the different actors, their roles and value exchanges among the actors (Komulainen et al. 2006, Timmers 1998), not studying interlinked business models per se. In this research, business model is researched from a platform operator’s perspective and considered to provide a platform operator with a holistic understanding of the ecosystem and own role in it.

4.2 Value co-creation through interaction

Understanding value creation mechanisms behind technology is the basis of understanding business models (Mettler & Eurich 2012). In networks and service
ecosystems value is created in direct or in-direct service-for-service exchanges (Chandler & Vargo 2011) that occur when actors use resources such as skills for the benefit of other actor or the actor itself (Vargo & Lusch 2004). Therefore, value isn’t created only in direct actor-to-actor exchange but the service joins actors together both directly and indirectly as dyads, triads, complex networks and service ecosystems (Chandler & Vargo 2011).

In direct service-for-service exchange, value is co-created by both of the two actors and they both are active participants in the exchange process. This is called a dyad. In indirect service-for-service process, called triad, two actors serve one other via one actor that directly serves them both. Therefore, actors don't have to be directly connected to co-create value and serve one another. Multiple simultaneous triads and dyads and the service-for-service exchanges that co-create value are called a complex network. The final layer, so to say, is the service ecosystem that covers all the levels of service-for-service exchanges and the complex networks. (Chandler & Vargo 2011.) In a service ecosystem, actors interact through institutions and technology to co-produce and exchange service offerings and co-create value (Lusch, Vargo & Tanniru 2010). It’s not enough that actors try to be productive separately but actors should aim at becoming productive together by co-creating value (Grönroos & Helle 2012).

Service-dominant logic emphasizes that value isn’t created by a single actor, but by multiple actors as a co-creation, by exchanging knowledge and skills, instead of physical resources (Prahalad & Ramaswamy 2004, Chandler & Vargo 2011). In S-D logic, service means applying knowledge and skills for the benefit of others or the actor itself and also reflects to the process of doing something beneficial with others. (Vargo & Lusch 2004, Vargo & Lusch 2008, Lusch & Nambisan 2015).

When actors exchange for example skills, they get an access to resources that provide benefit and have value potential to them (Chandler & Vargo 2011). Resources create value by connecting actors, thus the value isn’t in the resource itself (Hunt and Morgan 1995). For example shared information or knowledge are resources that cannot be owned or controlled by a single actor, but multiple actors are
influencing to them through service intermediaries (Rindfleisch and Moorman, 2001, Chandler & Vargo 2011), here platform operators.

According to Chandler and Vargo (2011), actors integrate and exchange resources with other actors and simultaneously serve other actors in a context that is “a set of unique actors with unique reciprocal links among them” (Carrington, Scott & Wasserman 2005). Each actor brings something new to the context and affects other actors as well as the whole context. Thus, Chandler and Vargo argue that value co-creation is influenced by context that again influences the service and resources. Understanding how actors are linked together is important, because the links affect how resources can be used in a beneficial way for service (Chandler & Vargo 2011). In a healthcare context, value creation is based on interaction among parties (Mettler and Eurich 2012).

Chandler and Vargo (2011) argue that the complex connections that actors have with each other provide a context for the actors to experience value. Therefore, the actor’s service activities are seen as individual co-creation efforts. If actors are seen as producers and consumers, they are seen as producers and users of value (Lusch & Nambisan 2015), instead of co-creators. Involving customer in the co-creation process allows the customer become a co-producer and an operative resource (Vargo & Lusch 2004). Specific actor perspective to the value co-creation can be understood only within the actor’s context (Chandler & Vargo 2011). In this research, a platform operator’s point of view to value co-creation in MyData based ecosystem is taken.

4.3 Value proposition

According to Chesbrough and Rosenbloom (2002), business model should identify a market segment, a clear value proposition, structure of the value network, revenue mechanism, the cost-structure and profit potential of the business. From all of the functions described, value proposition is at the heart of business models (Lindgreen, Hingley, Grant, & Morgan, 2012). One could also say that a business model actually reflects a company’s value proposition, value creation and value capturing (McGrath 2010). Still less than ten percent of companies have successfully communicated and developed value proposition (Frow & Payne 2008) or considered it in a broader
context outside of the company (Frow & Payne 2011). Also, according to Mettler and Eurich (2012), companies offering digital health services lack of guidance and aren’t able to establish effective business models today. They either miss to communicate the value proposition to patients or they haven’t found a sustainable way to gain profit.

One way to begin to understand value propositions is to follow the categorization of Anderson, Narus and Van Rossum (2006). They argue that value proposition can be seen in many ways, either as all the benefits that a company delivers to target customers, or as favorable points of difference an offering has relative to the next best alternative on the market, of which both can lead the company to a pitfall of value presumption. This means that companies are assuming the favorable points of difference and what customers value. The third way of describing value proposition is to identify one or two points of difference, improving them and making the offering superior only on the few elements that will deliver the greatest value to the customer in the future, and what matter the most to target customers.

According to Osterwalder and Pigneur (2010, 22) value proposition describes the products and services that create value for customers, thus it is a “bundle of benefits that a company offers its customers”. Vargo and Lusch (2004) argue that companies can always offer value propositions, but a customer is the one who determines value, not the company. In service-dominant logic, customer is always seen as a co-creator of value. (Vargo & Lusch 2004.) Therefore, value isn’t only delivered to by one to another but it is co-created in-use (Frow & Payne 2011).

According to Frow and Payne (2011), value proposition can provide a mechanism for creating stability within relationships and help identifying opportunities for value co-creation. Still, research on value propositions that take into account multiple actors is very limited, and in business, many companies still see value proposition only in the context of a customer and company, instead of as a broader concept including all of the actors. The new holistic viewpoint to value proposition is called as stakeholder value proposition and can be used as a “value alignment mechanism” to help achieving a balance across actors. The value alignment enabling value proposition can be co-created by following the five steps framework: 1) Identify stakeholders, 2)
determine core values, thus increase company value, meaning value of company’s relationships with customers (customer and brand equity) and with the rest of society (firm reputation), (Abela & Murphy 2008) 3) facilitate dialogue and knowledge sharing between all relevant stakeholders through trust (Ballantyne & Varey 2006) 4) identify value-creation opportunities and 5) co-create stakeholder value proposition. (Frow & Payne 2011.)

Christopher, Payne and Ballantyne (1991, 20) have also highlighted that in order to provide the best value proposition, companies have to pay attention to the markets, not just the customer. Their six market domains stakeholder model, which is tested by scholars (Payne, Ballantyne & Christopher 2005) and is considered as a good model to consider stakeholder value propositions (Frow & Payne 2011), helps us clarify who are the stakeholders and what are their relationships in different contexts. The six groups of stakeholders are customer markets including e.g. intermediaries and final customers, referral markets, supplier markets including service providers, influence markets, recruitment markets, and internal markets including the employees. (Christopher, Payne & Ballantyne 1991, 21.) The model supports the idea that stakeholders can have multiple roles (Tzokas and Saren, 2004). Supplier and alliance markets can be seen as business partners that offer physical resources or services to company. In these markets, value proposition is about identifying value creation opportunities between the partners and own company (Frow & Payne 2011), for example case IKEA: what can our company provide for our suppliers (e.g. technical assistance and finding new business partners) and what do we get in return (e.g. high quality products, which is important part of the value proposition to the customer) (Normann & Ramirez 1993).

Business models with a multi-sided market pattern have a structure of having two or more customer segments, and each one of them has its own value proposition. In a platform, value is created in three main areas: attracting users or customer segments, matchmaking between the segments and reducing costs by facilitating transactions through the platform. (Osterwalder & Pigneur 2010, 97). Muzellec et al. argue that they key question to be answered is why would anyone want to join the platform. They argue that motives for joining can range as much as the benefits offered by the platform. From the business point of view, motives are related to usefulness of the
data and the size of the audience. Therefore, two different value propositions are needed to formulate, one for the end-user side and one for the businesses. (Muzellec et al. 2015.) However, it is good to notice that actors value different things based on their own goals, knowledge and context and therefore resource and knowledge sharing among the actors is the key in creating a value proposition. (Frow & Payne 2011.) If a company understands which of the activities are valuable to customers and other actors, it can modify its interactions and therefore improve customer service and reduce costs (Ballantyne & Varey 2006).

As demonstrated, in service-dominant logic customer is always seen as a co-creator of value and not a target (Vargo & Lusch 2004). However, Muzellec et al. (2015) challenge the way of thinking and argue that seeing customers as co-producers in the context of internet platforms may actually be “slightly inadequate”. They argue that it may not be the end-user who influences to the value proposition through an operator, but they are the business partners, who influence to the value proposition by forcing the platform operator to design services that appeal and create value for both individuals and companies. According to their findings, at least in a startup context, end-users seem to participate less actively in value proposition co-creation than Vargo and Lusch (2004) suggest. However, they see that the end-users actually are the value proposition for the businesses, based on the fact that the audience can be monetized by for example its size, demographic or behavioral characteristics that are interesting for advertisers. In spite of all the research conducted, there is still a need for further research on business models. (Muzellec et al. 2015.)

4.4 MyData based service ecosystem

In a service ecosystem, actors interact through institutions and technology to co-produce and exchange service offerings and co-create value (Lusch et al. 2010) and according to MyData principles, provide individuals with a way to control their personal data. In MyData model, data flows from a data source to a service or application with the consent of an individual. (Poikola et al. 2015.)

In this research, MyData based service ecosystem, thus a service ecosystem in which MyData principles are followed by actors in the network, is researched from a
perspective of a platform operator that is an organization that creates value for the ecosystem by enabling interaction among network of actors by providing an infrastructure, services, rules, tools and/or technologies (Iansiti & Levien 2004, Bakos & Katsamakas 2008). Business model of a platform operator describes (adapting Weill & Vitale 2001, 25, Timmers 1998) interactions among network of actors (flows of information, money and service), and what are the roles and value propositions (benefits to other actors) of the platform operator. Value proposition provides a mechanism for creating stability within stakeholder relationships and help identifying opportunities for value co-creation (Frow & Payne 2011).

Figure 3 illustrates the platform operator’s MyData based ecosystem in the context of preventive healthcare based on the theoretical review. The figure shows how different actors and services are networked with each other and co-create value by service exchange within the preventive healthcare ecosystem. In a healthcare context, value creation is based on interaction among parties (Mettler and Eurich 2012). The actors in the ecosystem are a MyData/platform operator that enables interaction among network of actors (Iansiti & Levien 2004, Bakos & Katsamakas 2008), a data source, an individual who has control over his/her data, a platform that is controlled by the MyData operator and a preventive health service provider that interacts and co-creates value with the individual, data source and MyData operator through the MyData account/platform for example by providing the individual with health services based on his/her own consented data.

The flows of value in the ecosystems are money flow, data flow, consent flow and interaction between the individual and service provider via a platform, in which information is exchanged to provide real-time feedback of patient data, assessment and guidance for the individual (Beyeler et al. 2012, 314, Hsueh, Chang & Ramakrishnan 2015, 359). The platform helps actors in exchanging services as a venue for service exchange, meaning applying knowledge and skills for the benefit of others or the actor itself and also reflects to the process of doing something beneficial with others (Vargo & Lusch 2004, Vargo & Lusch 2008, Lusch & Nambisan 2015). Next, the framework is expanded with empirical research about actors in the ecosystem as well as with the roles and value propositions of a platform operator.
Figure 3. Platform operator's MyData based service ecosystem in the context of preventive healthcare.
5 RESEARCH DESIGN

This research is a qualitative case study. In this chapter, research methodology, context of the case study and the data collection and analysis method are presented. Purpose of the empirical research is to collect information about what kind of business models platform operators have in MyData based ecosystem. Analysis of the empirical research will be conducted in chapter 6.

5.1 Research methodology

Research concerning new alternative or complementary perspectives to ecosystems and technology-enabled interactions among companies and customers is still needed (Breidbach, et. al 2014). Also, according to Frow and Payne (2011), there still a need for qualitative research to support the service-dominant logic perspective to value propositions. This research fills this research gap by focusing on business models of a platform operator from stakeholder value proposition point of view in the context of preventive healthcare and takes into account the ecosystem as a whole meaning interactions among network of actors as well as operator’s roles in the ecosystem. This is a single case study. The research consists of multiple interdependent variables in complex structures and therefore choosing single case study allows the researcher to go deep in one case (Dubois & Gadde 2002). The research is based on qualitative data, which is more common than quantitative data, as qualitative data provides richer and deeper description of the phenomenon (Runeson & Höst 2009). The unit of analysis is an organization in MyData based preventive healthcare ecosystem.

Case study is an empirical research strategy and it is used to investigate a contemporary phenomenon in a specific real-life context (Runeson & Höst 2009, Yin 1981). Choosing case study as a research strategy in this research is justifiable, because case study has been widely used and found suitable also in previous research about business models in platform businesses (e.g. Enders, Hungenberg, Denker & Mauch 2008, Pawar et al. 2008, Muzellec et al. 2015), in research about platforms and ecosystems within S-D logic (e.g. Breidbach, et. al 2014) and in research within S-D logic in general (e.g. Fyrberg Yngfalk 2013).
5.2 Case MyData based ecosystem

Case of this research is a platform operator’s MyData based ecosystem. In a service ecosystem, actors interact through institutions and technology to co-produce and exchange service offerings and co-create value (Lusch et al. 2010), and according to MyData principles, provide individuals with a way to control their personal data. In MyData model, data flows from a data source to a service or application with the consent of an individual. (Poikola et al. 2015.)

By taking a holistic view to ecosystem and not just focusing on a single actor or perspective, it is possible to explain if, how and why individual ecosystems will improve companies’ resource exchange and integration within and across service ecosystems (Breidbach et al. 2014). Ecosystem is the framework that bundles together actors, an actor network and platforms via which actors can interact with each other and exchange skills and knowledge. In this research, an ecosystem is defined as a service ecosystem, which is an independent and self-adjusting emergent actor-to-actor network that has structures and social rules and in which connected actors co-create value by service exchange. (Lusch & Nambisan 2015.)

5.3 Data collection and analysis method

The empirical part of this research consists of answers from 22 respondents from 10 different countries from Europe and two from the US. The respondents were organizations or companies that are closely working with, researching or offering personal information management architectures. Ten of the respondents were commercial companies, five were research organizations, two public bodies and five organizations answered to be none of the above but a Community Interest Company or representatives of an independent non-profit foundation or a non-profit organization or a non-profit think & do tank. Table 1 lists the anonymized companies that took part to the questionnaire, including their country, organization type and the primary customer audience. In the empirical part of this research, the identifiers are used to identify which of the respondents said what. C refers to a commercial company, R refers to a research organization, O refers to a non-profit organization and P refers to a public body.
The questionnaire was designed by the European Commission with collaboration of a MyData researcher at the Helsinki Institute of Information Technology. They both have close and broad connections around the world with organizations and companies that work with or research human-centered personal data management. After designing the questionnaire it was sent to those companies and researchers that are offering personal information management services or supporting the model and ecosystem of human-centered personal data management in November 2015.

The questionnaires consisted nine questions and they were open, excluding few questions about the organization type, its customer audience and technological readiness of the offering. However, the respondents gave long answers even in some of the closed questions. The questionnaires were divided in three parts as follows: 1) About yourself/ your organization (including describing business model, value proposition, service offering and the customer audience), 2) About personal information management architectures (including assessing technological readiness of own model and describing a convincing business model in order to obtain a ROI) and 1) What do you expect from the public sector? (see the questionnaire as appendix 1).

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Organization type</th>
<th>Customer audience</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>From a commercial company whose core business is to develop and offer personal information management architectures or substantial parts</td>
<td>individuals, companies</td>
<td>Switzerland</td>
</tr>
<tr>
<td>C2</td>
<td>From a commercial not-for-profit cooperative whose core business is to develop and offer personal information management architectures or substantial parts</td>
<td>individuals</td>
<td>Switzerland</td>
</tr>
<tr>
<td>R1</td>
<td>A researcher/ a research organisation and my/ our research is closely connected to personal information management architectures</td>
<td>individuals, companies</td>
<td>US</td>
</tr>
<tr>
<td>C3</td>
<td>From a commercial company whose core business is to develop and offer personal information management architectures or substantial parts</td>
<td>individuals, companies</td>
<td>UK</td>
</tr>
<tr>
<td>C4</td>
<td>From a commercial company whose core business is to develop and offer complete personal information management ecosystem architectures</td>
<td>individuals, companies, business analytics companies</td>
<td>Belgium</td>
</tr>
<tr>
<td>O1</td>
<td>None of the above but representatives of an independent non-profit foundation</td>
<td>Framework for individual users, companies and governmental organisations</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>C5</td>
<td>None of the above but a Community Interest Company</td>
<td>individuals, companies, business analytics companies</td>
<td>UK</td>
</tr>
<tr>
<td>P1</td>
<td>a public body</td>
<td>-</td>
<td>UK</td>
</tr>
<tr>
<td>C6</td>
<td>From a commercial company whose core business</td>
<td>individuals, companies,</td>
<td>UK</td>
</tr>
</tbody>
</table>
Qualitative analysis is about analyzing language and texts and enhancing data, not only reducing the data to summaries or statistics like in quantitative analysis (Gibbs 2002, 1, 3). In order to answer the main research question of what kind of business models platform operators have in MyData based preventive healthcare ecosystem, the analysis was focused on answering to the sub-research questions of who are the actors in a platform operator’s ecosystem and what roles and stakeholder value propositions does the platform operator have in MyData based preventive healthcare ecosystem. To do so, data analysis is focused on actors in the service ecosystem, platform operator’s roles and stakeholder value proposition. Abductive approach is taken. A conceptual framework based on theoretical review is modified based on empirical findings, but also with theoretical insights gained during the research.
process. Using abductive approach is fruitful when the objective is to discover new relationships or variables. (Dubois & Gadde 2002.)

Qualitative software Atlas.ti is used in the coding and the analysis process. The software focuses on relationships between codes and data. (Lee & Fielding 2009, 532.) With the help of the software, the analysis is made by coding the empirical data, thus tagging the text and giving the text a meaning (Bandara, Gable & Rosemann 2005). The coding process of this research is similar to previous qualitative case study by Bandara et al (2005) in the context of business process modeling. In phase 1, the material is coded. In phase 2, the coded data is analyzed, suitability of the categorization is confirmed and codes are refined. In phase 3, higher categories emerge from the text, which are used in the empirical analysis in the next section.

The empirical data is analyzed in chapter 6 and also more detailed descriptions of the analysis process and emerged codes are presented in the sub-chapters concerning roles and value propositions. Total 357 codes emerged from the text of which only the ones related to the research questions were further analyzed. In conclusions in chapter 7, I will mirror the empirical findings to the theoretical findings.
6 ANALYSIS OF THE PLATFORM OPERATOR’S BUSINESS MODELS

Aim of the empirical research is to increase understanding about the topic in the context of preventive healthcare by looking for answers to the following research questions from the data “Who are the actors in a platform operator’s ecosystem?”, “What roles does the platform operator have in MyData based preventive healthcare ecosystem?” and “What stakeholder value propositions does the platform operator have in MyData based preventive healthcare ecosystem?”. In this chapter the data is analyzed and finally a summary of business models for platform operators in the context of preventive healthcare is presented.

6.1 Actors in a platform operator’s ecosystem

The first sub-research question tries to understand who are the actors in a platform operator’s MyData based preventive healthcare ecosystem. The empirical findings revealed that there are many actors in the ecosystem. The respondents themselves could be identified as different actors but they also named many other actors in their answers.

The respondents included actors like research organizations, platform operators, commercial service providers, public organizations, consultancies, policy developers and technology providers. One actor may have different roles, offerings and can be identified for example as a technology provider and an operator at the same time. In addition to identifying the respondents, empirical research revealed many other actors in the ecosystem, such as an individual, third parties, fourth parties and personal data providers or so called “attribute providers”.

“In fact we are looking a multi-sided markets consisting of individual, corporates, services providers (apps), third parties, fourth parties, local government.” (C4)

As mentioned, total 22 different companies and organizations answered to the questionnaire. Next, the main actors in a platform operator’s MyData based ecosystem are described, namely a platform operator, individual, service providers,
policy developers and technology providers. These actors were discussed about in majority of the questionnaire answers.

6.1.1 Platform operator

In this research, a platform operator is defined as an organization that creates value for the ecosystem by enabling interaction among network of actors by providing an infrastructure, services, rules, tools and/or technologies (Iansiti & Levien 2004, Bakos & Katsamakas 2008). Based on the definition, ten of the respondents were named as platform operators (they either offer a platform of some kind already or, according to their answers, they are about to): C1, C2, R1, C3, O1, C5, O2, C7, P1 and C10, thus five of them were commercial companies, one research organization, one public body and two non-profit organizations. Only a few of the respondents were offering services for their customers at the time the questionnaire was conducted but were about to offer some kind of services related to personal information management in the near future.

The operators are listed in the following table 2. In this research platform is defined as a physical or virtual customer touch point that provides support for actors in exchanging and integrating resources and therefore co-creates value in a service ecosystem (Breidbach, Brodie & Hollebeek 2014). In the following table, the column “platform type” shows what kind of a platform the operator has.

It is still important to notice that even if some of the companies or organizations weren’t named as operators at this point, they may become operators later. Also, from another point of view and with different definition and interpreter some of the actors could be understood as operators already now. Also, it is good to notice that the categorization is made only based on their answers to the questionnaire.
Table 2. Platform operators of the questionnaire respondents.

<table>
<thead>
<tr>
<th>Company</th>
<th>Platform type</th>
<th>Organization type</th>
<th>Customer audience</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>A platform for health data exchange</td>
<td>From a commercial company whose core business is to develop and offer personal information management architectures or substantial parts</td>
<td>individuals, companies</td>
<td>Switzerland</td>
</tr>
<tr>
<td>C2</td>
<td>An international network of secure personal data platforms</td>
<td>From a commercial not-for-profit cooperative whose core business is to develop and offer personal information management architectures or substantial parts</td>
<td>individuals</td>
<td>Switzerland</td>
</tr>
<tr>
<td>R1</td>
<td>A physical device and cloud hosted services</td>
<td>A researcher/ a research organisation and my/ our research is closely connected to personal information management architectures</td>
<td>individuals, companies</td>
<td>US</td>
</tr>
<tr>
<td>C3</td>
<td>An app, a local library for personal data</td>
<td>From a commercial company whose core business is to develop and offer personal information management architectures or substantial parts</td>
<td>individuals, companies</td>
<td>UK</td>
</tr>
<tr>
<td>O1</td>
<td>A scheme and an open standard to give individuals control over their data</td>
<td>None of the above but representatives of an independent non-profit foundation</td>
<td>Framework for individual users, companies and governmental organisations</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>C5</td>
<td>Platform/ trust framework based on open standards and APIs</td>
<td>None of the above but a Community Interest Company</td>
<td>individuals, companies, business analytics companies</td>
<td>UK</td>
</tr>
<tr>
<td>P1</td>
<td>Analytics/Intelligence hub approach within the city</td>
<td>a public body</td>
<td>Not specified</td>
<td>UK</td>
</tr>
<tr>
<td>O2</td>
<td>Digital Identity and reputation platform</td>
<td>None of the above but from a non-profit organization</td>
<td>individuals</td>
<td>Spain</td>
</tr>
<tr>
<td>C7</td>
<td>A login-service for consumers to register automatically with vendors</td>
<td>From a commercial company whose core business is to develop and offer personal information management architectures or substantial parts</td>
<td>individuals</td>
<td>Denmark</td>
</tr>
<tr>
<td>C10</td>
<td>Data interchange software &amp; registration and hosting services of “personal clouds” &amp; a personal server device</td>
<td>From a commercial company whose core business is to develop and offer personal information management architectures or substantial parts &amp; A researcher/ a research organisation</td>
<td>individuals, companies</td>
<td>Austria</td>
</tr>
</tbody>
</table>

The operators are different in a way what they have to offer for the ecosystem. For example C1 is an individual operator that connects individuals, companies and organizations via its platform. One respondent called a platform operator as a fourth party intermediary. They argue that an operator’s job as a fourth party intermediary would be acting as a representative for individuals.
“(…) creating "fourth party intermediaries" whose job it could be to represent users, exposing data anonymously, for strictly specific purposes (example: "A family of four is on the market for a new car, attached is a rich set of anonymized data allowing you, the vendor, to submit a proposal which we may forward to the customer").” (O4)

To be more specific, four different kinds of operators were identified: 1) those offering consent and data management services for individuals and data outsourcing or other services for companies, 2) digital identity providers, 3) trust framework creators and 4) those offering almost everything from data and consent management to digital identity services. The latter probably won’t become the most used but the value adding services on the platform will be provided by other actors in the ecosystem. The empirical findings also revealed that the actors in an ecosystem don’t agree who should act as a platform operator and if established commercial companies or a public organizations should act as ones. Because the topic was discussed in so many answers, the answers related to established service providers and public organizations are now analyzed.

**Established service providers as operators**

According to the empirical data, established commercial actors from many different sectors, such as phone operators, banks and telecoms are interested in becoming part of the personal data management ecosystem mainly because they see it as an opportunity to come up and provide with new interesting services as well as improve their brand by becoming more trustworthy in people’s eyes. One of the respondents thinks that it is likely that commercial actors will become “digital agents” for their customers or members in customer-focused sectors. Trusted and well-known brands will probably have a head start but there should be given a chance for small companies and start-up businesses also to become digital agents too and engage with customers equally.

“discussions are underway between major phone operators, banks, insurance companies, energy providers, and small providers of PIM platforms, to provide services in 2016” (O4)
“I have recently had concrete talks with a major French telco, and am also aware of a Swiss telco which has expressed interest in personal data management architectures. The motivation for telcos here seems to be 1. To provide an interesting new service, but also 2. To be viewed by their customers as the privacy-protecting “good guys”, rather than hostile surveillance agents.” (C10)

According to the data, established commercial service providers like retail banks and telecom operators are interested in becoming platform operators in the future, however, not all of the respondents were excited about established well-known commercial companies offering personal data management services as part of their offering. They argue that data and services should be separate and not mixed up like it is today. To solve this trust-problem, commercial companies could, for example found a new entity for personal data management and keep it separate to the service, in order to have trust among people as a platform operator. Many respondents see service providers mainly as attribute providers, meaning companies that support the model and ecosystem of human-centered personal data management by providing individuals with a way to access their own data and share it with other providers and actors. This may also be because the service providers are customers for many of the respondents that act as operators or technology providers for instance.

“We promote a strict separation of DATA (aka: the ecosystem infrastructure provider) and SERVICES (companies, banks, telecoms, SPs, ...). Of course if banks / telecoms separate themselves these functions it can be done (Orange / Cozy), but should be scrutinised! (...) If a bank or telecom is in services it should focus on those and leave the personal data management to somebody else or... setup a separate entity doing only that.” (C4)

Public organizations as operators

Public organizations support the new model of personally controlled data management and are also consumers in the new emerging ecosystem. Especially in
the healthcare sector, public organizations will benefit from the ecosystem because it allows better exchange of patient’s personal data between actors beyond borders of sectors.

“We would expect various public sector organisations (government departments, charities etc) to be significant contributors to and consumers of personal attributes in an open and trusted marketplace. There are many public sector ‘use cases’ where significant value can be expected through the accelerated exchange of personal attributes, for example integrated social and healthcare, and inclusion of currently excluded populations.” (P2)

The empirical data suggests many different roles for the public sector in order to support the adoption of new personal individual-centric information management. A question whether a public organization should set up a platform with commercial actors offering services on top of them resulted arguments both in favor and against. However, the majority of the respondents thought that a public sector should rather support the development of the emerging human-centered market than set up a platform.

6.1.2 Individual

“The key is to recognise that Value is co-created by firm and users during the use context. So users serve as a resource in the value creating process. Particularly in the personal data economy, it is the users who can put all disparate personal data (from silo-led industries) together and add value to it through bundling different data sets according their use context.” (R2)

“More generally, the vast majority of users will not (and probably never) relate with their data, rather with the benefits that the data provides through applications and services.” (O4)
The ecosystem of human-centered personal data management won’t work without individuals onboard. In order to get individuals onboard, a working and understandable consent management services must first be developed. In the model of human-centered personal data management, an individual is seen as a controller of his/her own data. He/she has the control over how the data is used by companies, for what purposes and with whom it is shared and under what conditions. Individuals add value in the value creating process by actively bundling their datasets together. However, having lots of data in one place is not enough. The value comes from the benefits that an individual experiences as a positive side effect of having control over own data and being able to bundle it.

“Personal data is by definition personal and its secondary use by third parties is therefore strongly restricted without the explicit consent of the data subject. Giving data subjects the control over the secondary use of their data by providing a secure personal data infrastructure that is owned by the citizens (cooperatives) and not multinational companies will unleash the value of personal data.” (C2)

Therefore, individuals probably won’t value owning or controlling their own data per se, but the value is in using the data for own purposes to get personalized services, get better understanding of what one is buying from grocery stores and what can be learned if the data from grocery shopping is combined with health data from the hospital or the occupational health provider. Based on the data, the individual is assumed to be more interested in the analytics and the benefits that he data provides for him/her.

“[PIM should be seen as a way to empower people with their own data, which means:] Using one's own data to one's own ends, usually through apps and services provided by third parties, which may or may not (and preferably should not) require personal data to circulate towards the third party's servers” (O4)
6.1.3 Service providers

“By internalising the “person” into the value co-creation with firms, recognising their effort in bundling data according to their use context, the service providers will be able to serve context and offer much more personalised services for better return – paid services.” (R2)

“Service providers and app-builders that make use of the ecosystems API & APP management framework to develop, store, publish, discover & manage their APIs and Apps.” (C4)

Service providers can be seen as app developers that provide applications for individuals on the platform and as companies that use individual’s data to provide them with personalized services. Service providers offer value-adding and personalized services for individuals based on individual’s data. Service providers interact with individuals and other organizations in the ecosystem via a platform. The interaction among the actors is based on trust and value co-creation, meaning that when an individual shares his/her data via the platform, he/she will get personalized service with better price and on the other hand, the service provider will get to know better with the customer. Also one possible scenario as mentioned above is that service providers include consent management service as part of their offering, thus enable interaction among network of actors and become platform operators themselves.

6.1.4 Policy developers & technology providers

“We are business model and technology solution independent, focusing on standards, protocols and the Scheme Rules that participants in the marketplace will need to agree to abide by.” (P2)

Two of the respondents support the emerging trust network by developing anf providing operators and other actors with policies and standards. They, for example, promote consent management for companies that need to adapt to the new way of doing business within a small period of time because of the up-coming European
General Data Protection Regulation (GDPR). These organizations are facilitators that connect actors and spread the knowhow about the new emerging human-centered personal data ecosystem and new business opportunities.

“Our work on a consent receipt standard is designed as a vehicle to carry trust marks, and to support trust frameworks. Our work is a facilitator. By providing people with a record of consent people are able to get transparency over personal information sharing and its use. Helping people assert rights independently of organisation infrastructure.” (C6)

In addition to policy and standard developers, technology providers were identified in the empirical analysis. A platform operator may offer technological support and services for other companies that want to adopt the new model for personal data management. A technology provider may also be a company that focuses on serving companies and offering technology support in the field of human-centered personal data management.

“Our approach is twofold: to identify those brands (in fact the majority of non-digital native brands) that need the differential of good privacy assurance as part of their offering and to provide cost effective support for new businesses coming into the personal data market.” (O3)

“This if for companies which want to offer to their clients to host their personal cloud. We bring them our tools and skills so that their cluster is robust, scalable, secure, up to date, compact…” (C9)

One of the respondents offers tools and knowhow for companies that want to manage personal cloud services without breaching privacy for their customer, meaning end users. The value proposition of the company for business partners includes aspects of privacy, giving control over data to individuals, experiencing better interaction and value co-creation by using the technology provided.
“[With our app], a company can have an unbeatable digital intimacy with its clients, without breaching privacy. This makes possible to compete against cloud giants by using their own data and even more.”(C9)

6.2 Platform operator’s roles

The second sub-research question is what roles does the platform operator have in MyData based preventive healthcare ecosystem? Platform operator was defined as an organization that creates value for the ecosystem by enabling interaction among network of actors by providing an infrastructure, services, rules, tools and/or technologies (Iansiti & Levien 2004, Bakos & Katsamakas 2008). From the questionnaire respondents C1 and C2 were the only ones focused on personal health data. What’s interesting is that both of these companies are cooperatives from Switzerland. One of the companies is focused on data from electronic health records used by hospitals and physicians to fitness and well-being data and the other, on the other hand, is focused on medical and mHealth data. Other operators were so-called general-purpose and cross-sector working platforms supporting any kind of personal data. The operators either offer personal data store and/or other services by themselves or just offer a foundation for other actors to build on services.

The respondents’ answers revealed many different roles for different actors. This research focuses only on the roles of a platform operator. Empirical data revealed that platform operators have different roles and services. Still, the biggest change in thinking and acting within an ecosystem when moving towards human-centered personal data management is in understanding the differences of data ownership, data control and co-creating value with an individual based on his/her own data. Within the emerging ecosystem of different networked actors like personal data holders, analytics providers or identity management providers, it is not about who has the ownership of data but how companies and the individual can mutually benefit of the sharing data with the consent of an individual.

“There are many roles to be filled in an ecosystem: the core PD processor, the analytics provider, the trust guarantor, API
While a ecosystem provider himself, should not need (to have) access to any personal data., many stakeholder still think in terms of ‘data ownership’. We need to work towards a Europe that simply dumps this ownership concept, and instead talks about the Access & Usage rights of ANY ecosystem stakeholder, including companies and end-users. Managing these rights is what the ecosystem is about. Notably in healthcare they get distributed. really fast.” (C4)

Roles of a platform operator that came up from the data are an agent, facilitator, data aggregator and a trust framework creator. The identified roles are similar, thus they are based on facilitating or handling data, but are still slightly different. Table 3 shows the groundedness of the codes, meaning how many quotations relate to the specific role. Row of “respondents” shows how many and which companies or organizations have named the role in their answer. Not all of these companies or organization have the role mentioned but they have identified this specific role of an operator and therefore enhanced understanding of the characteristics of the specific role.

<table>
<thead>
<tr>
<th>Code/ role</th>
<th>Groundedness</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent</td>
<td>6</td>
<td>P2 C7</td>
</tr>
<tr>
<td>Facilitator</td>
<td>5</td>
<td>C1 P1 C6</td>
</tr>
<tr>
<td>Trusted partner</td>
<td>1</td>
<td>C1</td>
</tr>
<tr>
<td>Fiduciary</td>
<td>1</td>
<td>C2</td>
</tr>
<tr>
<td>Data aggregator</td>
<td>1</td>
<td>C3</td>
</tr>
<tr>
<td>Trust Framework creator/ Scheme authority</td>
<td>7</td>
<td>P2 O1</td>
</tr>
<tr>
<td>Ecosystem provider</td>
<td>4</td>
<td>C4</td>
</tr>
</tbody>
</table>

Table 3. Codes describing platform operator’s roles, their groundedness and respondents that named the role.
Facilitator includes roles of a trusted partner and fiduciary. Similarly, a trust framework creator (also known as a scheme authority) and an ecosystem provider are two different names for describing a same role. The trust framework creator role (including ecosystem provider) had the most quotations, 11 in total. One possible reason for not having more quotations for code “trusted partner” and “fiduciary” is that C1 and C2 were the only cooperatives answering to the questionnaire and their business model and role in the ecosystem may be slightly different to other operators. Only one operator mentioned a role of a data aggregator, but for them, this was the key role. Next, the roles are described.

6.2.1 Agent

Agent is one of the roles that a human-centered personal data management ecosystem enables. Being an agent is about connecting an individual and a service provider and therefore creating greater value for an individual comparing to the situation that an individual would interact with a service provider without the agent. An agent is a blinding filter between the individual and the service provider and provides both of the parties with accurate information so that they can better trust each other and co-create value. An agent allows an individual to interact with vendors that accept certain rules. An individual can be sure that the transaction made via an agent is secure and a service provider can be sure that the information given is accurate and up-to date. Figure 4 illustrates what the market would look like when an operator takes the role of an agent based on the empirical data. The figure doesn’t show the data source, because its role wasn’t mentioned, but focuses on illustrating the interactions between an individual, a service provider and an operator.

In a classic two-sided model, there are an individual, a service provider or another content producer and a platform that facilitates the interaction. In an agent model, we can talk about a 4-corner market, where the operator’s role as an agent is to enable more personalized and suitable services and prices for the individual based on the assessment of profitability that is made based on his/her own data. The parties in the 4-corner market are the individual, individual’s agent (a platform operator), a vendor and the vendor’s own chosen agent.
“Vendors (companies) and customers (individuals) will finance each their chosen agents in the upcoming 4-corner market. We do not necessarily see vendors “pay for information” but rather to lower the price offered to a potential customer based on an assessment of the profitability of the sale/transaction.” (C7)

![Agent model](image)

Figure 4. Platform operators as agents for individuals and companies.

“Also with a 4-corner market model, in many cases the vendors may not need/require the information themselves. Their agents may serve as a blinding filter, that provide intelligent (e.g. risk based) recommendations to the vendors and may manage both payment and delivery services in coordination with the consumers agent. Think banking extended from simple payments to integrated management of trusted transactions.” (C7)
An agent may be an already established commercial company like a retail bank or a telecom operator, or it may be a start-up company established to fill the need of an individual to get more personalized service from service providers.

“... we currently experience a rapidly growing interest from larger companies well positioned to step into the role of agents for the vendors. This includes traditional fintech and telco companies. While we expect that new smaller entrants (like ourselves) will have a greater chance to fulfill the role as agents for the individual consumers.” (C7)

6.2.2 Facilitator

Three organizations described a role of facilitator: a commercial cooperative, a public body and a commercial company. A facilitator is a connector that connects individuals and organizations by facilitating interaction like data transaction between companies and individuals who want to share their data for the use of research or in order to get personalized services from companies. Individuals may even be rewarded in some way when giving their consent to share their own data with academic research. Researchers may ask for data and tell about the possible rewards on the platform. An operator will get revenue streams from the research organization or the company that is asking for data. Individuals may participate on research projects that they find the most important for them or they may choose not to participate in research and keep all of their data as their own. Basically acting as a facilitator is offering individuals with a consent-as-a-service.

“[The company] will connect organizations seeking data for commercial or academic research, with users who consent to share their data for research in exchange for compensation or gratis. (...) [The company] receives a transaction fee from the researcher for facilitating the above mentioned interaction as well as handling the transfer of the benefit.” (C1)

In addition to commercial companies, also a public body may take a facilitator role in the ecosystem. Public bodies have to change how they work today, thus be more
human-centric in their operations. A public body in the UK has tried to build a
government-as-a-platform, but failed because of lack of agility. Now they are
developing a new kind of a hub or platform in collaboration with a platform
technology provider, in order to remove silos. The “hub” will gather, store and share
data in order to better understand customers and it is run by the public body.

It was interesting that operators that focus on facilitating health data, called
themselves as trusted partners or a “fiduciaries” rather than facilitators. They help
individuals to manage their personal data and enable individuals to share the data, as
they want, in a secure way.

“Cooperatives act as the fiduciaries of their members’ data. They enable to manage their personal data, share them with their doctor and participate in clinical research and citizen science projects.” (C2)

Trusted partner was also used to describe a facilitator. Even if only two cooperatives,
named a role of a trusted partner/fiduciary, trust was mentioned by 10 respondents,
trust exchange network by 4 respondents and trust framework by 8 respondents. Also
words “trusted source”, “trusted system”, “trusted service”, “trusted transaction” and
“growth through trust” were used in the answers. It is clear that trust is a necessity in
the human-centered personal data ecosystem.

“Unclear what sustainable business models exist but I believe that supporting building of trust between data subjects and data users is necessary for any to succeed.” (R1)

“Hence the need, not only for end2end trust assurance (offering-side), but also for trust perception (demand-side). (...) The ecosystem becomes a value exchange network.” (C4)

The respondents argue that data provided by an individual via a platform is accurate,
because the data that an individual consents to share with companies or research
organizations can be validated. Accurate data increases not only knowledge and
engagement but also trust among stakeholders. Those operators or ecosystem actors
who lack of trust in the eyes of stakeholders probably won’t survive. Data violation and security breaches may lead to bad reputation for the company, with whom no one wants to collaborate with. One way of becoming a trusted partner in the eyes of others is to join a trust framework, which will be discussed more in sub‐chapter 6.2.5.

6.2.3 Data aggregator

“[The company] aggregates all a user’s data (social, financial, health, purchases, positional and more) into a single LOCAL library under the users direct control and ownership on their device(s) and personal cloud of their choice – hence their library is 100% private to them.”

(C3)

Data aggregator is a role that can be understood in many ways and in fact, some might say that an operator can’t take a role of a data aggregator in an ecosystem based on human‐centered personal data management, where it is about placing an individual to the center of everything. It is important to notice that even if an actor has taken a role of a data aggregator, sharing or aggregating of data will always need an individual’s consent. The platform or the operator itself doesn’t aggregate data per se but it’s the individual who has the decision power over what data is aggregated and from what sources. In fact, traditional data aggregation companies in general are seen as bad guys – they are those companies who have very complicated and long consent clauses, and those that make use of the individuals data in unethical way, thus not being transparent of how and when they are using an individuals’ data. In the model of human‐centered personal data management, it is the individual who should be his/her own data aggregator and data controller. An operator will help individuals to achieve this goal.

“The innovators who build new services on top of a personal data ecosystem are seeking to deliver something not easily achieved until an individual is on a position of being their own data aggregator and controller.” (C5)
When talking about data aggregator in the field of human-centered personal data management, and when an operator takes a role of a data aggregator, it isn’t only about an operator aggregating or collecting all data from an individual but it means providing individuals with a highly secured (decentralized) platform, where individuals can hold their data from health information to academic records thus, *providing individuals with a data store*. Basically data aggregation is done by the individual or by the platform operator on behalf of an individual with the consent of the individual. From an operator point of view, when data is aggregated from lots of people, with their own consent, the value that all of the datasets provide together is huge. This value is used in improving individuals’ own wellbeing and health, not operator’s profit making. Value is returned to the individuals who provided the data in the first place.

“The value is in the aggregation of diverse datasets (genome, medical, fitness, nutrition etc) from thousands people. This value can only be unleashed for medical research, better treatment and prevention when citizens are empowered to control access to their own data.” (C2)

6.2.4 Trust framework creator

Trust Framework creators, also known as scheme authorities or ecosystem providers (probably mostly non-profit organizations) are building so-called trust frameworks, thus building a foundation for other actors in the ecosystem to operate in a human-centered way in personal data management. The framework is built on idea of giving control over data back to individuals. A trust framework that is maintained by the operator, enables individuals to take control over their own data and on the other hand, enables commercial or non-commercial service providers in the ecosystem to adopt the human-centered model for personal data management, co-create value and offer new personalized services for individuals based on individuals’ own data.

“We would not envisage there being a ‘centralised infrastructure’ and particularly not one controlled by a nation state government. However, we would expect there to be some sort of ‘not-for-profit’ body in charge of setting the Trust Framework/ Scheme rules. In order to have the
maximum impact and enable the most widespread and accelerated
growth of personal attribute sharing, such a body would need to be seen to be independent of any one commercial organisation, or sector.” (P2)

“However, we do have a societal opportunity to invent a completely new and independent role of ecosystem provider, which JUST does that (managing access & usage rights of ANY ecosystem stakeholder, including companies and end-users).” (C4)

Individuals may access their data via the trust framework on the servers of trusted, participating organizations that are licensed by the operator. So in this case, a platform is the trust framework. Trust framework creator is different to a facilitator in a way that it tries to create a framework and ecosystem, not a single platform, at least in principle, because in a trust framework, the individuals have to access “a trust layer” or a platform first and after that are able to access their data on the servers of participating organizations. Data transactions are therefore done within the framework, not via a platform provided by a single organization. In a trust framework, data remains stored on the servers of the other companies and a trust framework creator is the one who connects individuals and organizations on the framework and creates rules and regulations of how to operate. Figure 5 illustrates the model of a trust framework creator, concentrating on the interactions (data and consent flows) and how the ecosystem is structured based on those interactions.

“Individuals can access their data which are stored (and remain stored) on the servers of participating organisations which have been licensed by the [company] (in its role as Scheme Authority) to connect to the Trust Framework, a new trust layer on the internet (“The New Internet”). Individuals may access the trust layer in order to access their data through the authentication procedure of their choice.” (O1)
6.3 Platform operator’s stakeholder value propositions

Aim of the third sub-research question is to increase understanding about stakeholder value propositions of a platform operator in MyData based preventive healthcare ecosystem. Value creation for stakeholders is a central part of business models (Bolton & Nie 2010). However, for service organizations the challenge is that value co-creation must be operationalized in such a way that it doesn’t have a negative impact on other indirect business stakeholders, such as public sector actors. Taking an ecosystem stakeholder perspective to value propositions is a way to tackle this challenge. (Frow & Payne 2011.)

Answers concerning value propositions were analyzed from 10 of the respondents, which are identified as operators in this research, because the aim is to identify platform operator’s value propositions. The operators are C1, C2, R1, C3, O1, C5, P1, O2, C7 and C10. Also, in order to minimize the risk of over analyzing the answers, the analysis was focused only on two specific questions concerning the business model, value proposition and offering of the operator:
- “Please describe as succinctly as possible your business model and the value proposition” and
- “Describe below (without reference to external document) the exact kind of service and possible linkages to other services, the benefits for the individual and for companies working with personal information and the revenue model.”

Stakeholders in the ecosystem of human centered personal data management have been identified in sub chapter 6.1. In this sub-chapter, value propositions for stakeholders are analyzed. As argued, a platform has to formulate two different value propositions, one for the end-user side and one for the businesses. (Muzellec et al. 2015.) The empirical research revealed that platform operators have developed value propositions only for individuals and businesses from all of the identified stakeholders. However, two value propositions were found for researchers as well. Also one mutual value proposition for companies and researchers was found from the analysis: access to individual’s data. Figure 6 illustrates the coding and analysis process from first phase coding to formulating broader categories from the codes. Total 46 codes emerged from the text, of which 9 categories were formulated. These categories, thus platform operator’s value propositions for individuals, companies and research organizations are now further analyzed.
6.3.1 Value propositions for individuals

“If a firm can understand a holistic contextual use case, and offer its services to serve that context, it 1) allow firms to better the value proposition of the offering, and 2) providing users much better service.” (R2)

Platform operator’s value propositions for individuals are as follows: have all your data in one place, share your data with others, get a digital identity, contribute to research and release the value of owning your data. In practice, it is possible that operators combine these propositions in different ways based on their offering and customer segmentation. Also, the use case or context may affect to the formation of a value proposition.
**Have your data in one place**

“[The company] offer an international network of secure personal data platforms on which individuals (...) manage and control the secondary use of their personal data.” (C2)

“(…) physical device and cloud-hosted services to enable individuals to manage access to and use of their data.” (R1)

When using a platform offered by the platform operator, an individual can manage access to his/her own data, collect and organize the data from one place, without having to visit many websites or log in many services in order to know what data is collected from him/her. An individual may retrieve data to the platform, into his/her own personal data store and organize the personal data that is collected of him/her by multiple organizations and companies.

“Users who can store, manage and share their health data free of charge. Data can be entered manually or through automated feeds (API layers) from any source and in any format. Sharing data will always require granular informed consent by the user and such consent can always be withdrawn.” (C1)

The data can be about the individual’s line activity, social network activity or it can be other “life data”, like health data that can be retrieved to the personal data store with the consent of an individual from hospitals or private healthcare providers. Having all the data in one single place makes it easier to understand the big picture and what things affect to one’s own health and how the individual can improve health with his/her own preventive actions.

“A set of utilities that allows them to collect and organise data from their own line activity e.g. address books, bookmarks, browsing history, location data, credentials and social network activity” (C5)
“[The company] is therefore a librarian for the user with the unique proposition of being LOCAL and covering ALL their life data.” (C3)

**Share your data with others**

When using a platform, there are no data “silos” that isolates the data to certain places but the data can be shared with other companies. Data can be shared with a third party, for example with a service provider with the consent of an individual. An individual can distribute and share his/her own personal data seamlessly across sector borders and get personalized service when sharing data. An individual can track and manage where his/her data flows, why and for what purpose. He/she can also decide not to give consent for other companies to access his/her data.

“A consent and permissions management utility that allows them track where, when and with whom who they have shared their data and for what purposes” (C5)

**Get a digital identity**

Privacy is one of the words that appeared in many answers and also in value propositions for individuals. Respecting individual’s privacy is important. A platform operator enable individuals to log in anywhere where specific standards are supported and therefore people don’t have to create a new username and password in order to log on new websites. Individual don’t have to reveal identity to all of the websites they visit but they can make identification in one place and visit other websites and services via the platform. Thus, an operator may offer a privacy-friendly portable identity or a profile for the user. Via a digital identity provider, an individual can negotiate better prices with service providers based on his/her preferences and reputation data.

“[The company] provides a profile of the user which is of relevance to the person or entity which is ultimately accessing such profile in a user-consented, privacy-respectful and secure fashion. [The company]
can be seen as a People Search and Rating Engine for individual users and as an aggregated Digital Identity user profile for enterprises.” (O2)

**Contribute to research**

A platform is not only a good channel to share own data with doctors, but it also provides individuals with a way to contribute to science that matters to them. They can participate in research project and clinical research that they feel that are important to them by sharing their (health) data with research organizations. People will also get non-monetary or monetary benefits of the transaction. The benefits could also be personalized for each individual taking part to the research.

**Release the value of owning your data**

Individuals can negotiate better prices with vendors via a platform. In this case, the operator acts as a purchasing agent, an intermediary between the individual and the service provider and allows individuals to discover and negotiate better prices based on their own data. When having control over their own personal data, individuals are able to use the data as they want, share it and get personalized services, including better deals, in return. Thus, individuals will get more value from the transaction or interaction with the service provider if they do it via a platform. For example purchasing insurance from a service provider could be a good example of this. If an individual has very healthy lifestyle, he/she could get better deal from an insurance company compared to a person that doesn’t provide his/her data to the company or just doesn't have as healthy habits. In this case, being able to prove to the company in a secure way that my habits are healthy benefits the individual. Also, from service provider’s point of view, they can trust that the data provided is accurate because it comes from a trusted source via a trusted platform.

“[The company] focuses on being an purchasing agent for consumers that allows these to discover and negotiate (often automatically) with service and product vendors based on preferences and reputation data.” (C7)
However, surprisingly, not many operators are talking about the value that is generated from analyzing and combining data, for example getting better information about their own health or purchasing habits. Operators are focused on the data store and consent management services and seem to forget to mention the value that is generated from combining and analyzing different datasets. Still, when operators try to convince the other side of the market, meaning businesses, to join the platform they do highlight the value that is being generated from combining different datasets from different users using the platform in the value proposition (more in the next sub chapter 6.3.2). This may be because companies already understand the value of data, but individuals are just starting to understand how valuable their own data is for companies and for themselves. Data store, for example, is much more understandable service for individuals. However, this may change as the ecosystem and the model of human-centered personal data management matures. Also, many of the operators don’t themselves offer data analytics services but welcome new businesses to develop such services on their platform.

6.3.2 Value propositions for businesses

**Give control over data to individuals**

“We provide a set of consent management API services that allow organisations to outsource the securing of consent to a central service familiar and consistent to the individual and easy to integrate into their existing systems and services.” (C5)

“It allows permissioned sharing of data based on “link contracts”. We provide XDI software, as well as consulting services.” (R1)

Because of the EU general data protection regulation it is soon mandatory for companies to give control over data to individuals. Operators may include this new challenge as part of their value proposition to the business-side of the market. The message is that when using our platform or the software that we offer, you can give control over data to individuals (consent-as-a-service). The service can be seen in a form of consent management API services, meaning that companies can outsource
their consent management to an operator that will take care of all of the privacy issues concerning consent management. In addition to outsourcing consent management, operators may offer personal data collection and storage services for companies and making sure that data is stored and handled in a secure way and individuals will have control over their own data.

“Project partners have the benefits of approaching their customers/citizens with a trusted solution ensuring all personal health data collected by their product and/or service will be stored, managed and owned by these customers/citizens within a legal cooperative structure that is non-transferable.” (C1)

Get rich data

When joining the platform, a company is able to combine accurate data from individuals on the platform with their consent, therefore get rich data. This data comes also with less cost, because collecting of data on the platform with the consent of an individual is more efficient than data collection is today with surveys and other data collection methods, because of there being a single source for data collection that is normalized and machine readable. Companies can approach individuals via the platform and request data from them. They can combine data from individuals or different kinds of profiles and access to varied sets of data.

“We offer API connections which allow organisations to access rich personal data subject to the consent and control of the individual. This data can be delivered either in raw form or processed via what we described as question and answer APIs that can provide the insight, status or analytics answers instead of the raw data e.g. age verification, patterns of economic or social activity, income range, preferences, intentions and any number of other variants and combinations.” (C5)

“Organisations can discover what is available from any connected individual’s personal data store following consent and combine data
from multiple individuals to deliver aggregated and anonymised information” (C5)

Therefore, rich data is personal data that is accessible via the platform. Rich data is accurate, efficient, normalized, machine-readable, comes with less cost and is shared with the consent of an individual. Rich data isn’t just raw data of an individual but it can be a combination of datasets from multiple people, which increases knowledge of a certain topic for an individual and the service provider, with a consent of an individual. It is good to remember that individuals probably won’t share their data if they don’t see the benefits that they would get in return.

“This [Permission Access capability] allows a business to access “Rich data” which is wider, deeper, 100% accurate, permissioned, efficient (single source, normalised) increasing knowledge, engagement, trust, innovation ability whilst meeting all current and projected data protection acts. Businesses get orders of magnitude better data than is otherwise available today, at orders of magnitude less cost.” (C3)

**Become a trusted actor in the ecosystem**

Platform operator’s value proposition can also be about helping companies and different actors in the ecosystem to adapt to the new model of human-centered personal data management, become trustworthy actors and change the way companies operate today into a more human-centric way of doing business. When joining a platform, or the trust framework, a company becomes a relying party or a trusted actor in the ecosystem in the eyes of an individual. A company may become a verified attribute provider, meaning that it is seen as a trustworthy company that gives control over data to an individual and is part of the trust ecosystem. It may be that the need to be viewed as a trusted actor becomes more vital when the ecosystem and model of human-centered personal data management matures and people become more aware of their rights over their personal data.
“We enable organisations to make use of the (...) platform to act as a postman, digital letterbox and set of API services for rich data access and exchange. Our platform enables organisations to become verified attribute providers and relying parties for verified attributes held by the individual” (C5)

Access to individual’s data

“In mid-2016 [the company] will allow businesses to approach users direct to ask to access data using our Permission Access system.” (C3)

This value proposition was mutual for companies and research organizations and was named by two commercial companies, which are similar platform operators in respect of their offering. When joining the platform, a company or research organization can access to varied sets of personal data of an individual that is stored in other companies’ servers or even on the platform. With the consent of an individual, a company or researchers will get access to this massive data aggregation and use it to its own purposes for example in service or product development or in academic research. The value is be co-created, meaning that when an individual gives his/her consent for an organization to use specific data, profile or more generic information formulated from the data, he/she will get something in return, for example monetary or non-monetary benefits.

“[The company] will connect organizations seeking data for commercial or academic research, with users who consent to share their data for research in exchange for compensation or gratis.” (C1)

“Researches receive the benefit of access to a transparent source of data at a lower cost compared to options available today from the large data aggregation companies.” (C1)

Not only big corporations collect data from their customers for their own purposes but nowadays also individuals collect information about their own health all the time with sensors, applications and devices. When joining a platform, organizations will
get an access to personal data that wouldn’t be possible without the platform, or it would be very time-consuming and expensive. Also, the data wouldn’t be as accurate as provided via a platform, directly from other companies’ servers or devices like heart rate monitors. Data collected by the individual and collected by other companies is accessible for organizations with the consent of an individual.

“With user consent, data collected by the user through other means can also be shared with the partners for a more comprehensive look at the target healthcare objectives.” (C1)

6.4 Business models for platform operators in the context of preventive healthcare

The empirical data revealed that companies and organizations, especially platform operators, are now at the stage of gathering other actors around them. Organizations are building new innovative services for individuals and companies, they are experimenting what could be done together in order to build up a working trust framework for individuals and other actors to operate in. However, many of the respondents still focus very much on their own service and securing their own side, even if according to the answers, human-centered personal data management is more about collaboration and creating trust among actors, not only about competing like in a conventional business model and environment. It is certain that many different business models are likely to emerge, as operators are very different in respect of roles and value propositions.

“The creation of a central Trust Framework would allow many types of market participants and wider access to individuals, with multiple business models likely to emerge.” (P2)

As for the context of preventive healthcare, none of the operators are preventive health service providers, but intermediaries that provide individuals with a way to control their own data from health data to all “life data” so that an individual can use the data in order to take better care of his/her health. An individual may also share that data to health service providers or data analytics companies to combine the data
and understand it better. It is possible that new businesses will emerge to do just that and focus on offering individuals guidance and digital coaching based on their own data, digitally.

Some operators are focused on specific types of personal data, like health data, fitness data and quality certified electronic health records. Still, the majority of the operators market themselves as generally purpose platforms, where individuals can store and give consent to transfer any kind of data from company to another. This enables individuals to get better and personalized service in healthcare but also in other sectors, like in personal training services. In conclusions in chapter 7, the framework of platform operator’s MyData based ecosystem (Figure 7) is enhanced with empirical findings.
7 CONCLUSIONS

In this chapter, theoretical conclusions are presented by reflecting the theoretical and empirical findings together and the research questions are answered. Based on theoretical review and empirical findings, a framework of a platform operator’s MyData based ecosystem in the context of preventive healthcare is presented. Finally, managerial implications, reliability of the research and future research avenues are discussed.

7.1 Theoretical conclusions

This research contributes to the discussion on networked business models, which emphasizes the different actors, their roles and value exchanges among the actors (see e.g. Komulainen et al. 2006, Timmers 1998) as well as discussion on service ecosystems, value co-creation and value proposition. The existing literature has discussed about platforms as value enablers (see e.g. Lusch & Nambisan 2015, Breidbach et al. 2014), as well as identified different roles and actors in an ecosystem (see e.g. Nyström et al. 2014, Eloranta & Turunen 2015) but no such previous research was found in the field of MyData. This research brings greater detail to these discussions by describing what does the MyData based service ecosystem look like from a platform operator’s perspective, who are the other actors and what roles and value propositions does the operator have in the MyData based ecosystem.

Purpose of this research was to examine what kind of business models there are for a platform operator in MyData based ecosystem in the context of preventive healthcare. MyData based ecosystem is a network of actors that support the development of MyData based services and infrastructure, thus adopt a model of human-centered personal data management and praise giving control over data to individuals. The ecosystem includes different actors, which will be discussed in the first sub-chapter. In this research, business model was perceived from operator’s roles and stakeholder value proposition perspective. Empirical research revealed that roles and value propositions of a platform operator match with each other and they complement each other surprisingly well. Some of the empirical findings concerning actors were somewhat similar to findings from theoretical literature. However, the
findings regarding roles and value propositions were unique compared to previous literature conducted in different contexts, and therefore it could be argued that MyData as a new model and paradigm shift to personal data management changes the ecosystem. The actors, roles and value propositions of a platform operator are discussed in the following sub-chapters.

*Aim* of this research was to increase understanding about how MyData transformation can be supported with platform operator’s business models. Platform operators may have different business models and support the MyData transformation in many ways. In general, platform operators are enablers of value co-creation, thus enable individuals to take control over their data by building trust frameworks or platforms and facilitating interaction among network of actors.

**MyData based ecosystem in the context of preventive healthcare**

According to the empirical findings, human-centered personal data management (MyData) ecosystem allows individuals to take control over their data and therefore supports individuals to take better care of their health. Individuals are able to use their (health) data as they want for their own purposes, for example combine data from different sources and share it across borders to organizations that can use the accurate data to help the individuals take better care of themselves.

The context of this research was preventive healthcare. Only two of the respondents were focused on health related data, however, all the other operators were so called general purpose platforms, thus individuals may use the platform as they want and facilitate or store any type of data in the platform. Therefore, preventive healthcare in the field of MyData is about involving individuals in taking care of their health by giving them the possibility to control any type of personal data they have and about allowing individuals to share the data with other organizations and companies in the ecosystem.

The empirical findings revealed that the MyData based ecosystem is based on interactions among the actors via a platform or a trust network. The actors in the ecosystem are now gathering other actors around them, starting collaboration and
developing the infrastructure and rules. In this research, MyData based ecosystem was defined as a service ecosystem, in which actors interact through institutions and technology to co-produce and exchange service offerings and co-create value (Lusch et al. 2010) and according to MyData principles, provide individuals with a way to control their personal data (Poikola et al. 2015). The empirical findings revealed that companies and organizations from different sectors are now developing MyData based services and their technological readiness is already very good. However, some of the actors are still focusing more on their own service instead seeing themselves as part of an ecosystem, which is necessary in order to provide individuals with a way to manage their data across different companies and sectors.

This research supports the argument of Caulfield & Donnelly (2013) that connected health is about connectivity of all of the actors by the means of sharing accurate data through devices, platforms and people. When individuals share their data via the platform for example with their doctor, the doctor can be sure that the data is accurate and the individual gets better service because the doctor has a better understanding of the individual’s health. As noted by Agboola et al. (2013) connected health can be used to deliver precise and personalized preventive care in an integrated and individual-centric way based on data collected by the individual and by connecting healthcare delivery systems together. However in MyData based ecosystem, it is not only about connecting healthcare systems together, but also connecting individuals and actors in the ecosystem together via a platform and release the value of personal data by value co-creation by offering him/her personalized services or offers based on his/her own data with consent of the individual.

The empirical data revealed that the organizations and companies think that when individuals have control over their data and they are able to share it freely with organizations, organizations are able to offer truly personalized services based on individuals’ own data. Hsueh et al (2015, 355, 359) have argued that personalization is the key aspect when trying to affect peoples’ behavior or lifestyle and when trying to improve individual’s wellness. Therefore, MyData can be considered as a very important model and driver in preventive healthcare.
Next, the actors in a platform operators ecosystem as well as roles and value propositions of an operator are discussed. The ecosystem of a platform operator, including interactions among the actors and other findings of this research are presented in figure 7 (page 91).

7.1.1 Actors in a platform operator’s ecosystem

The empirical analysis revealed many actors in MyData based ecosystem. The actors identified were research organizations, platform operators, individuals, service providers, public organizations, consultancies, policy developers and technology providers. Also personal data providers or so-called “attribute providers” were identified that are companies that provide individuals with their own personal data when asked and share data with other organizations with consent of an individual.

Empirical data revealed that there are public and private actors in the field but it is still not clear what their role in the ecosystem should be: platform operators or just attribute and service providers? This should be researched more. It was also found that in many cases data storage service providers are not separate from the platform operators in many cases. The research shows that many of the platform operators offer a data store for individuals in addition to enabling interaction among parties in the ecosystem. Still, there are operators that focus on consent management and welcome applications providers and service developers to join the platform and offer value-adding services for individuals.

Koivumäki et al. (2015) have identified different actors in MyData based market, some of which were similar to this study. The actors identified in this study are also similar to the findings of Pawar et al. (2008) in context of mobile virtual communities. They name three primary types of actors: customers, providers and a community platform operator, which provides an infrastructure and means for the interaction between the consumers and service providers. In the ecosystem of this research, where value is created by multiple actors as a co-creation (Prahalad & Ramaswamy 2004, Chandler & Vargo 2011), an individual, a platform operator and a service provider are the key actors. However, there are also many other actors in the ecosystem that are needed, for example policy developers that set common rules
for actors interacting with each other in the emerging and developing MyData based ecosystem. In other words, in MyData based ecosystem, identifying a platform, user and producer isn’t enough, but there are many other actors as well that are needed in order to co-create value for an individual based on his/her data.

When comparing empirical findings to theoretical review, it is clear that there are similarities but there are also differences. For example, actors like device providers (Koivumäki et al. 2015) weren’t named in the empirical data. On the other hand, many actors were found both in the theoretical and empirical part but only with different names. A service provider (Koivumäki et al. 2015) in a MyData based ecosystem can be seen as an applications provider that provides individuals with personalized service on the platform with applications. A service provider may also be a traditional company that asks for individual’s data in order to offer personalized service. The roles that came up from the analysis will be described in the next sub-chapter.

7.1.2 Platform operator’s roles

The second sub-research question asks what roles does a platform operator have in MyData based preventive healthcare ecosystem. In this research a platform operator is considered as collection of different roles (Montgomery 1998) that can be identified by describing intentions and preferences of changing a network by acting in a specific role (Anderson et al. 1998). In this case, the intention is to give control over data to individuals and offer services that support this intention.

Empirical analysis revealed four different roles in MyData based ecosystem for a platform operator. An operator can be an agent, a trust framework creator, a facilitator and/or a data aggregator. Refining from the roles identified from the empirical analysis, a platform operator supports actors in exchanging resources and enables value co-creation among individuals and other actors in the ecosystem in four ways: 1) being a representative for individuals and service providers and/or 2) building a trust-based network for actors, and/or 3) facilitating interaction and/or 4) offering a personal data store. This research increases understanding not only what kind of roles platform operators may have in general but also contributes to the
discussion about preventive healthcare and personal data management since no previous research has been found about roles in personal data management ecosystem or in the context of preventive healthcare. Next the identified roles are presented more closely.

**Agent: a representative for individuals and service providers**

According to the empirical analysis, an agent is a *blinding filter between an individual and service provider*. It provides both of the actors with accurate information so that they can co-create value: an individual will get better service, and a service provider gets accurate data from the individual to which it can base on an offer, for example an insurance. Also, an agent allows individual to interact only with vendors that accept certain rules and principles. This means that an individual can be sure that the transaction made via an agent is secure and a service provider can be sure that the information given is accurate and up-to date.

Similar to a role of a coordinator by Nyström et al. (2014), an agent acts as a representative of a certain group of actors and collects information for example about the user needs and desires and then forwards the collected information to the other actors in the network, with the informed consent of an individual. In MyData based ecosystem the service provider or a “messenger” (Nyström et al. 2014) could collect data from individuals via its own agent and based on the rich accurate data, develop new individual-centric services for all of its customers. This is how the value of enabling individuals to control their own data could be released for those individuals as well who doesn’t want to share data for one reason or another. When an individual has control over his/her data, it can be shared with hospitals, personal trainers, and healthcare providers in order to get personalized service and support for preventive care.

In line with Spiekermann and Novotny (2015), from privacy perspective, as an agent an operator makes sure that the interaction among the actors is private and individuals are able to give consent in a user-friendly way. However, the empirical data revealed that providing individuals with a way to give consent is a basic service of a platform operator and therefore is part of every role. In traditional model, where
consent isn’t asked from individuals, in the context of e-business, an “intelligent agent” or an “online shopping agent” look for good deals for individuals based on their search history on the internet (Weill and Vitale 2001, 170–171). However, in MyData based ecosystem, the offering or service is based on varied sets of data provided by the individual himself/herself, making the interaction efficient and the deal will be as personalized as possible.

**Trust framework creator: building a trust based network**

A trust framework creator builds and provides other actors with a foundation, a framework to operate in human-centered way. Individuals may access their data via the trust framework on the servers of trusted, participating organizations that are licensed by the operator via a trust layer or in other words, a platform. In a role of a trust framework creator, a platform operator does not only offer a platform but creates a sustainable and collaborative network. A trust framework creator wants to change the data management environment to be more human-centered and it convinces other actors to join the network with value propositions. A trust framework creator is therefore an enabler of value co-creation. Trust framework creators are often non-profit organizations and therefore their aim isn’t profit maximizing but creating a sustainable network for everyone to interact.

The role of a trust framework creator hasn’t been found in previous research, which is probably because research on platform operator’s roles hasn’t been conducted in the field of human-centered personal data management. However, some similarities could be found from the roles identified in other contexts. For example similar to a role of a lead operator and builder (Snow et al. 1992), an operator connects actors together and forms an operating network as well as tries to establish close relationships between actors. Also, like an orchestrator (Nyström et al. 2014) or an instigator, a trust framework creator orchestrates the network and tries to change the personal data ecosystem into more human-centric, aiming to get other actors active.
Facilitator: facilitating interaction

A facilitator is focused on facilitating interaction among actors in the ecosystem. In MyData based ecosystem, an individual has control over his/her own personal data and the data flows via a platform only with consent of an individual. An individual can interact with different organizations and companies via the platform, share data, receive benefits, get personalized service based on his/her own data, network and gather data from different sources and share it to the whole network or with specific organizations with specific terms. According to empirical analysis, a facilitator facilitates data transactions and value co-creation between companies and individuals who 1) want to share their data for the use of research or 2) want to get personalized services from companies. Researchers and companies may ask for data from individuals via the platform.

In the empirical data, a facilitator was also called as a trusted partner that helps individuals or business and governmental partners to manage and share personal health data with doctors and clinical research for example. Trusted partner is very much similar to facilitator described above, but with a difference that the importance of trust within the network and among parties is highlighted. Also, the role seems to be adopted only by organizations focusing on health data. It is interesting that the only companies that focus on health data were both cooperatives and saw themselves as trusted partners. Again, these roles don’t exclude one another but an operator may have many different roles. However, because of the overlapping features with a facilitator and a trusted partner, these roles are considered as one role. Those operators who lack of trust in the eyes of stakeholders probably won’t survive long as trust is the key in MyData based ecosystem. Data violation and security breaches may lead to bad reputation for the company, with whom no one wants to collaborate with.

In the literature review, Nyström et al. (2014) have identified a role of a facilitator, but it isn’t suitable in the context of MyData based healthcare ecosystem. However, Allen’s (1970) definition of a gatekeeper has similar features to the empirical findings. Allen suggests that a gatekeeper starts information and communication exchange, networking, gathering information from different sources and spreading
the information to the whole network. Based on the analysis, a platform operator as a facilitator enables information and communication exchange, networking, gathering information from different sources and spreading the information to the whole network, but not start it only facilitates the interaction among the actors via the platform.

**Data aggregator: offering a personal data store**

As a data aggregator, a platform operator provides individuals with a highly secured personal data store on the platform, where individuals can hold their data from health information to academic records. Data aggregation is done by the individual or by the platform operator on behalf of an individual with the consent of the individual. Data store is a basically a service on top of a platform that isn’t mandatory for data transactions but it enables individuals to make sense of their own data better and have it in one place.

Data aggregator is a similar role to integrator that integrates actors’ knowledge, technologies and other recourses and outputs into a useful entity (Nyström et al. 2014), but in this case when it is about personal data management, an operator integrates individual’s personal data from different sources into one single data store so that an individual can use it in one secure place instead of having datasets in multiple locations. In e-business context, data aggregators collect and analyze information from multiple sources and allow users to compare offerings or prices to (Weill and Vitale 2001, 164). However, the empirical data suggests that in MyData based ecosystem, the service will come to data, not the other way around, meaning that people are in the position to choose what services or companies can have access to their data and for what purposes the data is be used. For example, an individual may allow an analytics company to compare and combine his/her data in order to make better sense of the data aggregated. Individual’s aggregated data isn’t sold to companies e.g. advertisers like in traditional models (Weill & Vitale 2001, 175), but value can be co-created between an individual and a company that requests the data.
Discussion about the roles

MyData is still at the level of discussion and modeling (Poikola et al. 2014) and that is why no settled roles exist in the network yet. Companies may also take different roles when they provide different services (Spiekermann & Novotny 2015). Also in line with Poikola et al. (2014), this research suggests that an operator can either charge individuals for the service, act as a distribution channel for applications, aggregate data on behalf of an individual or offer added value services as a main primary service provider in the service ecosystem. However, it is likely that operators will also charge companies and organizations for the service that they offer since many of the respondents thought that services provided in the ecosystem should be free or relatively cheap for individuals.

Koivumäki et al. (2015) have identified three roles that service platform operators may have specifically in the context of MyData based digital services: 1) enabler of individual service offering and value co-creation, 2) coordinator and 3) gatekeeper. From the list, one could say that the role of a gatekeeper is slightly inadequate in the context of MyData based ecosystem, because in MyData based ecosystem, an individual has control over his/her own personal data, which means that in fact, the individual is the gatekeeper of her own data and controls if data flows, where it flows and for what purpose. However, Heikkinen et al. (2007) argue that a gatekeeper can cause radical changes, because it can decide whom or what is included in the ecosystem. The empirical data showed that one of the responsibilities of a platform operator is to keep those organizations that breach the rules and breach data security, out of the platform or the trust framework. So in a way, a platform operator is a gatekeeper but not over data but over rules as it controls that all parties follow the rules set by the operator. As Nyström et al. (2014) have found, an organization can take many different forms as a gatekeeper.

As argued, value is always co-created in-use (Frow & Payne 2011), and also in healthcare context, value creation is based on interaction among parties (Mettler and Eurich 2012). The data showed that value co-creation in-use happens in the interaction between stakeholders via the platform, thus when sharing data and interacting in various ways. All in all, the data on platform operator’s roles in
MyData based ecosystem revealed that a platform operator is an enabler of value co-creation between an individual and other actors. Next, the platform operator’s value propositions are presented.

7.1.3 Platform operator’s stakeholder value propositions

The third sub-research question was about platform operator’s value propositions for stakeholders in MyData based preventive healthcare ecosystem. The empirical data revealed that platform operators have taken a stakeholder perspective to their value propositions, meaning that they have value propositions for other actors too than only the customers: for individuals, research organizations and businesses holding and/or requesting data. With the researchers best knowledge, there is no previous research about what value propositions platform operators have in the context of (human-centered) personal data management.

The empirical data revealed that platform operator’s value propositions for individuals were “have your data in one place”, “share your data with others”, “get a digital identity”, “contribute to research” and “release the value of owning your data”. When using a platform, there are no data “silos” that isolates the data but the data can be shared with other companies in a secure manner, for example for medical research, own doctor or personal trainer. However, for example having data stored in one place probably isn’t valuable by itself. What benefits the individual is value that is generated in-use as a result of using own data for own purposes and having control over own (health) data. For example, when using a platform, an individual can get better idea whether his/her lifestyle is healthy by combining and analyzing data in one place, varying from health data to purchasing data and maybe sharing that data with other actors in order to understand the data better or get better service. Data store is therefore an additional service and some kind of interaction needs to happen in order to create value for the individual. As service-dominant logic emphasizes, value isn’t created by a single actor, but by multiple actors as a co-creation, by exchanging knowledge and skills (Prahalad & Ramaswamy 2004, Chandler & Vargo 2011).
Based on the data, value propositions for businesses were “give control over data to individuals” and “get rich data”, “become a trusted actor in the ecosystem”. In addition to these, value proposition “access to individual’s data” was mutual for businesses and researchers. Value co-creation in-use is generated in the interaction when an individual provides businesses with own data via a platform in return of a reward from a service provider. A platform operator will charge a fee from the service provider. Also when companies join the platform, they are able to give control over data to individuals and become trusted actors in the ecosystem, which are the prerequisites to interacting with individuals in a trust-based network. A platform operator does not only enable in-direct value co-creation for stakeholders via the platform but builds and provides companies and organizations with a framework where the interaction and value co-creation may occur. As Chandler and Vargo (2011) have argued, in indirect service-for-service process where two actors serve one other via one actor that directly serves them both, actors don't have to be directly connected to co-create value and serve one another.

Value propositions found from empirical analysis were knowingly formulated into propositions for stakeholders, starting with a verb “keep”, “contribute”, “give” et cetera. This is because a company can only offer value propositions, but in the end, customer is the one who determines value, not the company (Vargo & Lusch 2004).

My findings support the findings of a previous research on platforms’ business models by Muzellec et al (2015) that a platform formulates two different value propositions for the two sided of the market, for individuals and businesses. However, MyData based ecosystem unique in a way that the role of a research organization is highlighted as one of the key actors and value propositions for research organizations are also done. The data shows that, at least the companies and organizations think, that the opportunity to share own data for research is one reason why individuals would like to use the platform.

7.1.4 Business models in MyData based preventive healthcare service ecosystem

There are many possibilities for MyData operators when it comes to business models, roles and new services in the emerging human-centered data management
ecosystem. Operators and other actors are now developing their business models and trust frameworks. What is still uncertain, is how do these models work together and if the actors together are able to form a trust network that provides an individual with a way to control and use their own data for their own purposes and effectively share, store and process the personal data across sectors and organizations to improve their own health.

In a traditional personal data based ecosystem where data is owned by organizations, not all of the possible combinations of business models are suitable. Weill and Vitale (2001, 302–304) argue that some business model combinations in one firm may be in conflict and require careful handling during implementation. For example, in a traditional model, a role of an aggregator (called as intermediary business model) might conflict with a role of a trust framework creator (called as shared infrastructure business model) in the area of information, because the firm would have access to very valuable information as an aggregator but it would also provide a shared infrastructure for multiple providers to operate and compete more efficiently. The providers might think that information gathered in the framework is used for the good of a platform only and they would leave the framework. Weill and Vitale suggest that transparency and negotiation with customers is necessary in this case. In MyData model, transparency is in very important role but most the important thing is that an individual is in control over his/her own data. In MyData model, if an operator would adopt roles of a trust framework creator and a data aggregator, thus would offer individuals with a data store too, there shouldn’t be no fear among others that the operator would somehow use the individual’s data for its own benefit as the platform wouldn’t own the data. In a role of a trust framework creator, a platform operator creates a sustainable and collaborative network and as a data aggregator it would offer data store services on top of the service. However, how suitable these models would be together in practice, should be studied more. As Weill and Vitale (2001, 30) argue, there is a lot of potential in combining business models as it can create powerful and customized value propositions for customers.

Complex connections that actors have with each other provide a context for the actors to experience value (Chandler & Vargo 2011). In this case the context to experience value is the network of actors in MyData based service ecosystem. Figure
7 illustrates the service ecosystem of a platform operator in the field of human-centered personal data management. The figure shows that the service ecosystem is structured so that an operator facilitates interaction between an individual, service providers and data sources and enables value co-creation among the actors. When comparing the figure for example to a traditional platform model (see figure 2 in page 20), where two ‘sides’ of the platform are recognized: a customer and a producer (see e.g. Beyeler et al. 2012, 315.) it can be seen that MyData based ecosystem is structured the same way. However, in MyData based ecosystem, the role of an individual and value co-creation in the ecosystem is highlighted. Value co-creation is generated in the interactions for example when an individual provides service providers or research organizations with own data via a platform in return of a reward from a service provider. Interaction is also made between an individual and a data source when an individual access to his/her own data via the platform and that is hold by the data source. An individual may access the data and use it as he/she wants and on the other hand, an organization gains trust among the individual as an attribute provider. Other interactions illustrate the data, consent and money flows among the actors.

Other actors in the ecosystem are policy developers, public organizations and technology providers that support ecosystem of human-centered personal data management by providing a platform operator with technology and by setting common rules for actors. As noted, value is created by multiple actors as a co-creation by service exchange (Prahalad & Ramaswamy 2004, Chandler & Vargo 2011).

In practise, there probably will be many platform operators that take different roles in the ecosystem. An individual may also want to use multiple platforms at the same time. The following figure illustrates what the ecosystem would look like from one operator’s point of view in a human-centered personal data management ecosystem, thus in MyData based service ecosystem.
7.2 Managerial implications

This research provides information both for companies that want to become platform operators and for companies that want to adopt a human-centered way to personal data management. First, companies that would like to become platform operators in the future may use the presented illustration of a platform operator’s service ecosystem as a framework or tool when trying to understand what could be the company’s role in the ecosystem when individuals are provided with a way to control their own data. The framework illustrates possible business models that the company could take in the ecosystem, meaning different roles and value propositions. In order to enable value co-creation among the actors in the ecosystem, platform operators have to attract many different actors, namely individuals, service providers and research organizations to join the platform or the value framework that it offers. Therefore, companies have to create value propositions both for individuals and the businesses.
Second, when the European general data protection regulation (GDPR) comes into power in 2018 (European Commission 2015), at least by then, companies have to allow individuals to control their personal data that is held by the company. Managers for example from healthcare sector may reflect their current business models and data management to the findings of this research and use the findings as a practical tool when transforming their data management into a more human-centered or when developing new services.

7.3 Reliability and limitations of the research

Quality of case study research can be examined by investigating construct validity (are the operational measures correct for the concepts being studied), external validity (is the study generalizable) and reliability (can the data collection procedures be repeated with the same results) (Yin 1984, 36–38). Construct validity can be improved by using multiple sources of evidence and by establishing a chain of evidence during data collection (Yin 1984, 37). This research was based on one questionnaire but total 22 companies and organizations from the field of human-centered personal data management from Europe answered to it. MyData model is still new and therefore the amount of respondents can be seen as satisfactory. The data provided the researcher with a good understanding of what the MyData based ecosystem is like at the time the research was conducted. However, because the researcher wasn’t part of the data collection process, no detailed information about data collection process can be given. This is why the data analysis process was described as detailed as possible, both in general level describing the analysis process (see page 46) and also describing how the higher categories emerged from the codes and led to findings (see figure 6 in page 67).

Also, when resolving validity of this research from the code-based analysis point of view, it is difficult as the method is flexible and there still isn’t an agreement of how the analysis should be validated. One way of validating the analysis could be considering the effort devoted to coding. (Lee & Fielding 2009, 542.) The data was read and coded multiple times, enriching the coding and making sense of the data. In total, two months was used in coding and making notes in order to understand codes’ relationships and understand the big picture. When starting to develop higher
categories from the codes, the codes were once again refined and after that conclusions were made. Because of the careful coding and analysis process, it could be said that this research is somewhat valid.

Reliability of this research can be examined by asking ourselves that if the data collection procedures would be repeated, would we get the same results? (Yin 1984, 37). This is a qualitative research and the analysis was based on the researcher’s subjective understanding of the material. It may be that with another interpreter with different academic background we would get slightly different findings from the same data. However, in the analysis, qualitative software Atlas.ti was used with the help of the analysis, which guided the analysis process and made it structured. Also, during the analysis and coding process, the researcher kept the research questions always clear in mind so that the focus of the analysis stayed clear. However, what comes to generalization, this is a qualitative research and the aim is not to generalize but rather provide new knowledge and understanding about the phenomenon. The respondents represent the ecosystem thus the case studied very well, being non-profit organizations, commercial companies and research organizations offering different kinds of services. In that sense, the research can be seen as generalizable. However, the research is based on only one case study, so there is a possibility that generalizing the research to other ecosystems is challenging.

**Limitations**

While providing new knowledge about platform operator’s business models this research also has limitations, which at the same time open up new avenues for future research. The future research avenues will be discussed in the next sub-chapter.

This research is based on one case study and only one questionnaire material. The questionnaire material was rich and it represents the case of this research, but for example by interviewing the companies in the ecosystem the researcher would have gotten a broader understanding about the interactions, roles and actors in the ecosystem. The researcher could have also asked questions and observed the respondents. However, the same questionnaire material was also analyzed and coded by other researchers from the Helsinki Institute for Information Technology for the
use different academic papers. As the researchers from HIIT were familiar with the respondents of this research, we had fruitful discussions about the answers and the respondents of the questionnaire, which definitely helped the researcher with the analysis process and making sense of the empirical data even if there was no opportunity to interview the respondents.

One important finding from the material was also that non-profit organizations, including those that were named as platform operators in this research, didn’t name clear value propositions for their stakeholders. However, commercial companies that aim to become or already operate as platform operators, named several value propositions for individuals, businesses and also for research organizations. This may have influenced the research in a way that the findings are more applicable in a commercial company than a non-profit organization.

Also, one limitation of this research and also noted by Mettler & Eurich (2012) and Palo (2014) is that business models are complex, have several definitions and therefore are challenging to research. In this research, business model was studied from networked perspective, meaning examining the actors, roles and interaction in the ecosystem, as well as the value propositions. By defining a business model clearly at the beginning of this research, it was possible to keep the research focused.

7.4 Future research avenues

It is good to notice that because MyData based ecosystem is constantly developing, the roles described in this research may change and new roles and actors may emerge. Also, companies and organizations that are now developing services based on MyData are just starting their business and it may have affected to their answers. This research provides a snapshot of the ecosystem today but any research concerning business models in the future in the context of human-centered personal data management would add great value to the discussion. The results of this research could be used as a foundation for future research as an example of what the ecosystem looked like in the early stage. In addition to Mydata, new examples are needed about platforms’ business models (Mettler & Eurich 2012).
Also, this research takes a platform operator point of view, leaving the individual perspective unstudied. MyData is a human-centric model and therefore value propositions should be studied from individuals’ perspective as well. As noted by Chandler & Vargo (2011), specific actor perspective to the value co-creation can be understood only within the actor’s context. Also, companies can always offer value propositions, but in the end, customer is the one who determines value, not the company (Vargo & Lusch 2004).

Finally, I would like to point out that because the MyData based ecosystem is still developing, no one really knows what kind of actors the ecosystem will need in order to create value for the individual and if there is a need for a platform operator or not. A world without intermediaries like platforms could emerge, or at least it would be technically possible for example with the blockchain technology. With the blockchain technology the users don't necessary have to trust each other or an intermediary in order to make a data transaction, but they can trust the system (Swan 2015, 10). The empirical findings revealed that trust is necessary in MyData based ecosystem, which is logical because it is all about sharing and storing personal data. If individuals would be ready to trust a technology to handle their personal data management, there would be no need for platform operators, as we know them today and have defined them in this research. However, even if something is technically possible doesn’t mean that individuals are ready for it. This is why more research is needed about individuals’ attitudes towards technology in MyData based ecosystem.
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**Internet references**


APPENDIXES

Appendix 1. Questionnaire

I. About yourself/ your organisation

1. I am
   o From a commercial company whose core business is to develop and offer personal information management architectures or substantial parts thereof;
   o From a commercial company that has another core business but develops/ experiments with/ supports the roll-out of personal information management architectures;
   o From a public body and my/ our role is…
   o A researcher/ a research organisation and my/ our research is closely connected to personal information management architectures
   o None of the above, but…

2. If you are from a commercial company:
   a) How long have you been in the business of developing/ offering personal information management architectures:
      o Less than 1 year
      o 1-3 years
      o More than 3 years, since:
      o We are about to launch the service with a planned launch date of…
   b) What is the size of your company? Consider the entire organisation even if legally it is split into separate entities?
      o 1-10 colleagues;
      o 10-50 colleagues;
      o 50-100 colleagues;
      o More than 100 colleagues.
c) Are you offering personal information management architectures against some form of payment?
   
   ○ Yes
   
   ○ Not yet, but we are about to
   
   ○ No and we are not planning to.

   d) Please describe as succinctly as possible your business model and the value proposition.

   With your service, which is your primary customer audience? Are they

   ○ Individuals
   
   ○ Companies that would like to improve the relationship with their clients through a new approach to the use made of the data they hold about them (including mashing such data with data other organisations hold about them)?
   
   ○ Business analytics companies that draw insights from (aggregated) data about individuals and their behaviour (coming from a single or multiple sources) and have selling such insights as a main business activity.
   
   ○ Other

   Describe below (without reference to external document) the exact kind of service and possible linkages to other services, the benefits for the individual and for companies working with personal information and the revenue model.

   e) Are you focusing on specific type of data/ specific areas of application (e.g. health-related information)? If yes, please explain

   3. If you are a researcher: What are your relevant research topics (please attach relevant publications)

   ○ Legal: concept of consent
   
   ○ Legal: concept of anonymity/ pseudonymity
   
   ○ Technical: machine-readable expression of privacy preferences
   
   ○ Technical: forms of associating rights to individual datasets (‘watermarking privacy preferences into the data’)
   
   ○ Technical: Exchange protocols;
II. About personal information management architectures

4. How do you assess the technological readiness of your model for a more wide-spread adoption of such solutions in terms of:
   - identification/authentication of the individual;
   - vulnerability and security of 'personal data clouds', in view of the decentralised nature of the architecture;
   - machine-readable expression of privacy preferences and related exchange protocols and
   - technical assurances preventing illicit use of personal data retrieved from a 'personal data cloud' further downstream?

5. How do you assess the potential of 'personal information management architectures' to ensure access to personal information for a wider range of organisations and its potential to provide better quality of such data?

6. Personal information is the key mode of compensation for a wide range of offerings through the Internet offered at non-monetary charge ('for free') to the individual. Personal information management architectures have a disruptive potential. Also, they come with a cost.

   What is a convincing business model in order to obtain a return on investment and what are the chances that this business model will be sustainable? Who should be the party financing the value chain (the organisations requiring personal information or the individual?)?

7. Roll-out of personal information management architectures face the problem of two-sided markets (the uptake in the offer of personal information management services depends critically on the expected number of consumers whereas consumers are only likely to use – and pay for? – such services if the offering is convincing to them). How in your assessment will this problem be solved? What is your approach?

   Could you see established commercial actors (e.g. telecom operators, retail banks, etc.) make personal data management architectures part of their commercial offer on the basis of the technology you offer (please explain)?

III. What do you expect from the public sector (at the level of municipalities, regions, Member States, the EU)?
8. What role do you see for the public sector in general in order to support a more wide-spread adoption of such solutions? Should such support be:
   - Technical (e.g. set-up of a core platform by the public side with commercial actors offering services on top of them)?
   - Financial (direct subsidies for operations, tax breaks, research grants to test pilot applications)?
   - Facilitating more wide-spread adoption by top-down implementation

9. Should the European Commission
   - Support the development of personal information management systems through additional research and if so: In what areas is additional research needed?
   - Facilitate interoperability by setting up a process ensuring the emergence of interoperable standards (for representation of data, metadata, for exchange protocols) in order to ensure also the right to data portability foreseen under the future General Data Protection Regulation?
   - Soft promotion and what exactly could be done?
   - Other?

THANK YOU FOR YOUR CONTRIBUTION!