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Drivers for Platform Business Model Innovation: Individuals in Control over their Personal Data

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Abstract

Personal data has become an important resource in today's market and in platform business models. In fact, the essence of many platform business models is to create value for an individual by offering a free service and to capture value by collecting and selling collected data. In this study, we analyse the drivers for platform business model innovation in the context of personal data used in the healthcare sector. Platform business models are shaped and designed with respect to the internal and external drivers in the market. However, few studies have increased our understanding of the drivers for platform business model innovation. For that, we conducted an exploratory study for five personal data platform providers that enable individuals to control the use of their personal data in digital services by interviewing the personal data platform providers and using company presentation material. The findings show that by adopting a human-centred approach to personal data, giving control over data to the individual, personal data platform providers change how value is created and captured. This research has managerial implications and contributes to the business model innovation literature by extending the current knowledge about drivers for personal data-based platform business model innovation in the healthcare sector.

Keywords: Business Model Innovation; Personal Data; Digital Platform; Driver; Healthcare.

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1 Introduction

In the 21st century, we have seen a rise in digital platforms. In fact, digital platforms—intermediaries that connect two or more actors and enable their interaction (Zhu and Furr, 2016)—have been transforming almost every industry today (de Reuver et al., 2017). For example, Airbnb (hotel industry), Uber (mobility industry) and Spotify (music industry) have changed the market and the way we consume products and services (Smedlund and Faghankhani, 2015). The shift from a product-centred business model to a platform-centred business model by many of the world's most valuable companies (Zhu and Furr, 2016), has piqued the interest of innovation

management scholars and spurred research with various viewpoints. These include research about open innovation platforms and business models (Chanal and Caron-Fasan, 2010; Chesbrough, 2007), business models and technological innovation (Baden-Fuller and Haefliger, 2013) and platform-based innovation management (Scholten and Scholten, 2012). There is also an increasing amount of research available related to data and innovation (see, e.g., Pikkarainen et al., 2018; Sonka, 2016; Prescott, 2016). At the beginning of the 2010s, platform business models such as Facebook were used as examples of winning business models (see Casadesus-Masanell and Ricart, 2011; Osterwalder and Pigneur, 2010). However, a more recent literature identifies a change in platform business models, especially concerning the use and collection of personal data (see Bataineh et al. 2016; Fruhwirth et al., 2020).

For example, in 2018, Facebook got publicity about their inability to manage which firms can have access to user's personal data on the platform (see Cadwalladr and Graham-Harrison, 2018). Large companies have also been criticized for the systematic collection and selling of personal data without the users' informed consent. In practice, this could mean that an individual has provided data to a service provider who, without the individual explicitly realizing it, passes the data to a tracking company that may again pass the data to a data aggregator that can sell the data further on to different organizations in their networks. (Martin, 2015.) In 2019, Google was issued a fine of 50 million euros for being unclear about how they collect the personal data of their users and for not having informed consent for the use of personal data for advertising purposes (Porter, 2019).

In light of these growing concerns, in this paper we focus on the drivers of platform business model innovation in the context of personal data used in the healthcare sector. We operationalize drivers as the changes or needs to which a firm must respond with business model innovation (Foss and Saebi, 2017). While value creation and value capture are identified as the key perspectives to business model innovation (Massa et al., 2017) in mainstream business model studies, the extant platform business model innovation literature (e.g. Gatautis, 2017) focuses primarily on the just the value creation aspect. Through this study, we propose a holistic framework for examining the drivers of the platform business model innovation, incorporating both value creation and value capture.

In the state-of-the-art innovation management literature, successful innovations are the ones that provide value to individuals and bring compensation to inventors as a return on investment (Sonka, 2016). Accordingly, there is a need for business model innovations that enable collaboration (and data sharing) across company boundaries (Sonka, 2016). In this exploratory study we focus on five digital personal data platforms with a platform business model that differ from prevailing platform business models regarding the use of personal data. Many prevalent platform business models are based on collecting and selling the individuals' personal data to third parties like advertisers (Kemppainen et al., 2018). The alternative platform business model we examine enables individuals to search for, control and share their personal data (Vescovi et al., 2014) therefore providing individuals and service providers ways to both create and capture value.

While business model innovation has been identified to be an important phenomenon (see Chesbrough, 2007), given the rise of digital platforms, there is a lack of understanding of the drivers for platform business model innovation. Therefore, this study aims to provide an understanding of the drivers for platform business model innovation, i.e. creating and capturing value for stakeholders (such as individuals and service providers) in a new way (Fehrer et al., 2018). In this study, we answer the question: What are the drivers for platform business model innovation in the context of personal data used in the healthcare sector?

In this research, we contribute to the platform business model literature and innovation

management literature by providing more understanding of the drivers for platform business model innovation.Accordingly, this paper answers the need to better understand how business model innovation is driven by the internal and external drivers in the market (Al-Debei and Avison, 2010).

2 Literature review

2.1 Business model innovation

Business model innovation does not always have to be disruptive – it can simply generate a change in the value creation, value appropriation or value delivery function of a firm that can result in improvements in the firm's value proposition (Sorescu, 2017). Companies with a business model innovation do not simply discover a new product or service, they also redefine the existing offering and how it is provided to the customer (Markides, 2006).

Based on our literature review on business model innovation, we can see that prior literature has divided business model innovation into two categories: (1) business model innovation of an established firm with established services and (2) a start-up that either adopts a prevalent business model or has identified new business opportunities and created a business model to address this opportunity. Instead of only be driven by the current markets, firms can act on the opportunities, design innovations and even create markets (Lusch and Nambisan, 2015).

For established firms, business model innovation can be defined as the discovery of a fundamentally different business model in an existing business (Markides, 2006, p. 20) or as a new configuration of what the company has been doing—and how the company has been operating—to provide a new value proposition to customers (Souto, 2015). For an established firm, a new business model can create new opportunities for applying knowledge and technology in a different manner than competitors (Souto, 2015). Drivers for business model innovation for established firms may be new emerging technologies and innovations, as well as the changing expectations of the end-customers (Pynnönen et al., 2012).

The prior research suggests that for start-up firms, business model innovation can refer to creating value by challenging the existing business models and the current roles in the industry (Aspara et al., 2010). When entering a market, a start-up may adopt a traditional business model or innovate a new business model, for example, by choosing a new way of capturing value from stakeholders (Casadesus-Masanell and Zhu, 2013), thus new ways of generating revenue (Shafer et al., 2005). With business model innovation, a start-up may also unlock the potential of new technologies and break the constraints of old business models. When a firm exploits and applies opportunities in the market, such as technological advancements, new sources of revenue can be revealed, which would be impossible to capture with the prevalent business models (Souto, 2015).

It is good to note that most innovations are not created by only one company but rather within a network of companies (Smedlund and Faghankhani, 2015). This is especially true in the case of platforms that connect other firms and end-users to co-create value (Smedlund and Faghankhani, 2015). Simply put, a business model innovation describes a novel change to the key elements of a firm's business model (Foss and Saebi, 2017). In this study, business model innovation refers to new ways in creating and capturing value (Fehrer et al., 2018) in the platform business in the context of personal data used in the healthcare sector.

2.2 Platform business model innovation in the context of personal data used in the healthcare sector

A business model has a significant role in a firm's success in digital business and the complex digital environment (Al-Debei and Avison, 2010). A business model can be seen as a way a firm

creates value for customers (Rajala and Westerlund, 2007) or creates and captures value within a value network (Shafer et al., 2005).

The maturity of digital technologies such as the artificial intelligence, cloud computing, application programming interfaces and the emergence new data sources, such as the Internet-of-Things, mobile applications and social networks are some of the reasons for the rise of digital platforms and data-driven platform business models (Mijić and Varga, 2018; Yablonsky, 2020). Digital transformation of the healthcare industry is a trend that attracts also large platform providers such as Google, Apple, Amazon and Microsoft to explore new business opportunities in healthcare sector (Hermes et al. 2020). In healthcare, leveraging data and technology offer opportunities in creating people-centered and personalised healthcare services (Pikkarainen et al., 2018). For example, digital platforms and access to data support patients to take an active role in their own health by self-monitoring and self-care (Lupton, 2013; Pikkarainen et al., 2018).

In platform business model research, according to Bughin (2017), "platforms redefine value propositions for customers, reshaping the demand side of the market" and companies aiming to apply platforms' needs to innovate from a business model perspective. The "platform business model" is used to describe companies that develop platforms for their activities. As an example, Airbnb has redefined the accommodation service and how accommodation is provided to people.

Referring to Schweiger et al. (2016), term platform business model is not clearly defined because of the different levels of research addressing this phenomenon. Kim (2016) proposes the following elements:

1. Platform providers determine the rules and components of a platform, which are followed by the users of the platform;
2. Platform providers handle demand, supply and the external sides. Different suppliers and solution providers may take the role of supply-side parties. Consumers and end-users are deemed to be parties from the demand side.
3. Platforms enable and facilitate transactions and interactions between these parties.

In the vein of platform business model innovation (Gatautis, 2017), a platform is seen as a digital solution that allows firms to provide their products and services and gradually act as the value creation orchestrator supporting and facilitating cooperation between different market players. Apple's Health Kit is an example of a platform that creates value by bundling data from services and devices and Google Assistant of a platform that intermediate services and products to the patient (North and Chaudhry 2016; Gleiss et al. 2021).

Through the lens of service-dominant logic, neither individuals nor companies can create and capture value in isolation or even have all the needed resources (data) for value creation and value capture (Vargo and Akaka, 2009). Therefore, from the service perspective, in a platform business model, value is created and captured together among the platform participants, including the users of the platform (Smedlund, 2012). From this perspective, platform business model innovation encompasses both value creation and value capture.

Personal data has a crucial role in platform business models. In fact, data is the biggest asset of companies today and a form of capital, as argued in a report on "The Rise of Data Capital" (2016). Google, Amazon, Netflix and Uber are examples of platform providers that have realized the value of data and have disrupted the industry. In other words, they are in the data business (MIT Technology Review, 2016). In 2017, Facebook reported that 98 per cent of its quarterly revenue comes from targeted advertising (Reuters, 2017), which is based on data collected from individuals using the platform (Morey et al., 2015). Similarly, Google collects preferences and search-history data from its platform users for advertising purposes (Porter, 2019). However,

concerns over data privacy have increased among individuals, and as a solution, it has been suggested that a platform provider should focus on measures that increase the perceived control of the individual over personal data and ease of data access on a platform (Hoadley et al., 2010).

In this study, we focus on platform business model innovation in which individuals are in control over which third parties get access to a copy of their personal data if any. Thus, in this business model, individuals are empowered to access, aggregate and share their personal data with third parties, which is now being scattered in multiple locations such as service providers and applications (Martin, 2015).

In the context of this study, relevant personal data can be from any sector of life of the individual if the data exists digitally and can be used in providing a digital health service, for example, data relating to health history, digital communication, credit card information, purchase history, web search history, location, contact information, energy use and social media data (Morey et al., 2015). The context of this study is personal data used in healthcare, however, the studied personal data platform providers operate in other sectors too such as finance, social networks and entertainment. Table 1 illustrates value creation and value capture in platform business models and how personal data platform providers—the Hub-of-all-things as an example (see Holtby, 2018)—differ from the other platform business models from the personal data perspective.

It is suggested that a personal data platform provider captures value mainly from the data-requesting service provider that pays for access to consensual and freely given personal data. In this business model, a data-requesting service provider needs to provide a value proposition to the individual and explain for what purpose the requested data copy will be used, for example, for research or personalization of the service. (Kemppainen et al., 2018.) In this study, the new way to create and capture value of personal data platform providers is referred to as business model innovation.

Table 1. Value creation and value capture in platform business models from the personal data perspective.

		Many prevalent platform providers in the data business	Personal data platform provider, e.g. The Hub-of-all-Things (the focus of this study)
Platform business model (Data perspective)	Value creation	Enabling individuals to search for information or connect.	Enabling users to control, access and share their personal data with the third party.
	Value capture	Data is shared without the individual's informed consent. Data is collected and used for targeted advertising or sold to third parties.	Data is shared with the individual's informed consent. Revenue is generated from the data-requesting third party. User consents to data sharing and gets something in return as agreed with the third party.

2.3 Drivers for business model innovation

In the extant business model literature—and applied also in this study—a driver refers to the changes or needs to which a firm must respond with a business model innovation (Foss and Saebi, 2017). With a business model innovation, a firm can respond to internal and external drivers (Al-Debei and Avison, 2010), such as pressure of tightening competition in the market (Johnson et al., 2008) major changes in the market or business environment (Voelpel et al., 2004). Other external factors can be market opportunities, laws and regulations, culture, size and nature of the

customer base, the competition level and technological advances (Al-Debei and Avison, 2010).

In prior research, many drivers for business model innovation have been identified (see Casadesus-Masanell and Ricart, 2010; Spieth et al., 2014; Voelpel et al., 2004; Johnson et al., 2008; Pateli and Giaglis, 2005; Wang and Kimble, 2016). Many researchers argue that advancements in information and communication technology are one of the technology-related drivers for business model innovation (Casadeus-Masanell and Ricart, 2010; Voelpel et al., 2004; de Reuver et al., 2009; Pateli and Giaglis, 2005). New data analysis technologies have also enabled firms to create more insights and information on the data (Bohlouli et al., 2013). However, not all authors use the same term when referring to business model innovation (Foss and Saebi, 2017). Authors also use the terms "business model reinvention" (Voelpel et al., 2004; de Reuver et al., 2009; Johnson et al., 2008) and business model change (Pateli and Giaglis, 2005) when referring to what we call business model innovation. Also, new regulations may drive business model innovation (de Reuver et al., 2009). As an example, the General Data Protection Regulation (GDPR) standardizes the legal framework for personal data management. The regulation also strengthens the individuals' rights over their personal data. Individuals have the right to get a copy of their data from their service provider and use it for their purposes. (European Commission, 2015.)

Previous literature in innovation management (Pikkarainen et al., 2019) discusses the drivers for data-driven services, for instance (1) the increasing cost of the healthcare system, (2) the use of electronic medical record systems, (3) differentiation from the competition and (4) creating new end-user value. On one hand, the existing literature paves the ground to understand the drivers for business model innovation in data-driven business (e.g. shifting from a firm-centric data business model to a network-centric data business model) (Pikkarainen et al., 2019). On the other hand, we argue that the drivers for business model innovation (particularly for platform business model innovation in the context of personal data used in the healthcare sector) are not identified holistically. Thus, this gap is addressed in this study.

Through a comprehensive literature review, we identified 18 different drivers for business model innovation from the prior studies. In Table 2, we list the drivers under four categories as follows: (1) technology-related drivers (screening the opportunities and risks in the technology field), (2) market-related drivers (screening the potential demand, expected benefits and risks involved in the market), (3) policy-related drivers (screening the legal requirements in the policy environment) and (4) competition-related drivers (screening the competition in the same industry) (Zhang et al., 2017). This categorization of drivers will form the basis for our conceptual framework and empirical analysis.

Table 2. Suggested drivers for business model innovation in the prior literature.

	Casadesus-Masanell and Ricart, (2010)	Spieth et al., (2014)	Voelpel et al., (2004)	de Reuver et al., (2009)	Johnson et al., (2008)	Pateli and Giaglis, (2005)	Wang and Kimble, (2016)
Technology-related drivers							
Advancements in information and communication technology	X		X	X		X	

	Casadesus-Masanell and Ricart, (2010)	Spieth et al., (2014)	Voelpel et al., (2004)	de Reuver et al., (2009)	Johnson et al., (2008)	Pateli and Giaglis, (2005)	Wang and Kimble, (2016)
Opportunities to introduce new technology with a new business model					X		
Opportunity to bring tested technology to a new market					X		X
Market-related drivers							
Sensing increased opportunities for value capture		X	X				
Change in customer/user behaviour or demands			X	X			X
Opportunities from new unserved customer groups					X		
Opportunities to fulfil customer needs that are neglected in the market					X		X
Sensing increased opportunities for value creation		X					X
Entering a new market/culture							X
Globalization	X						
Change in network roles		X					
Changes in the external environment		X					
Policy-related drivers							
Deregulation	X			X			
New regulation				X			
Competition-related drivers							
New entrants in the market				X			
Need to respond to a shifting basis of competition					X		

	Casadesus-Masanell and Ricart, (2010)	Spieth et al., (2014)	Voelpel et al., (2004)	de Reuver et al., (2009)	Johnson et al., (2008)	Pateli and Giaglis, (2005)	Wang and Kimble, (2016)
Need to prevent companies with a low-cost strategy from coming to the market					X		
Sensing potential for the future growth of the market							X

Based on the literature review on the drivers for platform business model innovation, a conceptual framework was created (Figure 1). In this framework, we combined a business model innovation framework (Zhang et al., 2017) that illustrates the drivers for business model innovation and the business model elements of value creation and value capture (Fehrer et al., 2018). Next, we discuss the research method and how we build on the conceptual framework with empirical findings in the context of personal data used in the healthcare sector.

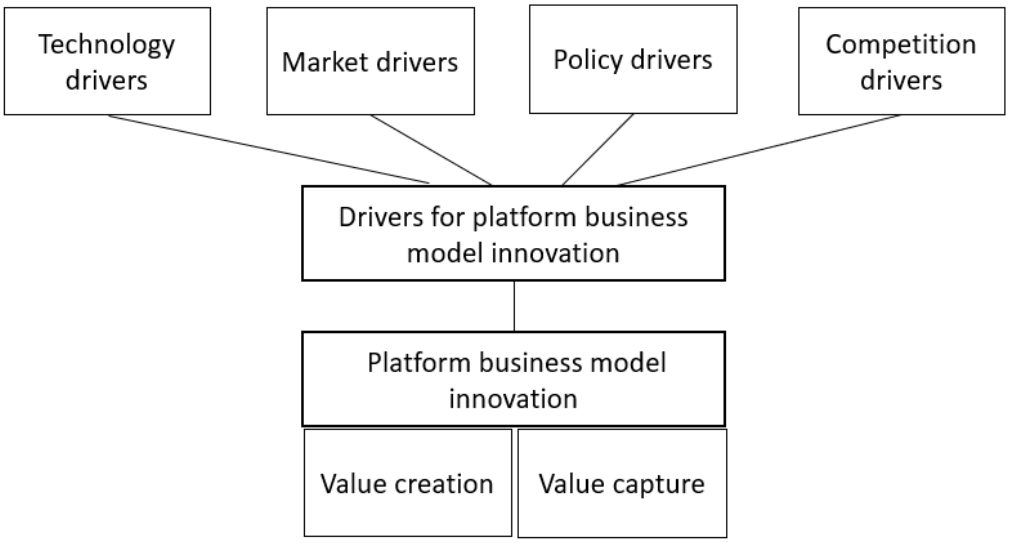

Figure 1. Conceptual framework of drivers for platform business model innovation in the context of personal data used in the healthcare sector.

3 Research method

3.1 Data collection and sampling

In this exploratory study, qualitative research techniques and interview method was considered as appropriate to gain more understanding of the phenomenon (Mason, 2004), thus of the drivers for platform business model innovation. The semi-structured interview was used as a data collection method (Kallio et al., 2016). The interviews were conducted via online communicating technologies. Five personal data platform providers were interviewed. They were all start-ups and small and

medium enterprises (SMEs) with an existing digital platform business model and digital platform solution implemented in the market. The firms, interviewees and time of the interviews with each firm are listed in Table 3. In one firm, two persons attended the interview, whereas in other firms, one person was interviewed. Interviews were recorded and transcribed.

The participants were selected because they were seen as active personal data platform providers in the market of personal data management. All the participants have created a digital platform and digital platform business model that enables pulling personal data from different digital services and sharing it with other digital services with the informed consent of the individual in the healthcare sector. All the firms also do business in Europe. In the interview, the researcher asked open-ended questions such as 'What have been the drivers or reasons for developing a personal data platform?'. Specific questions on drivers for business model development were asked based on prior research, such as 'What is the role of regulation or deregulation in developing your business model?' The questions were sent to the interviewees beforehand for their information. The semi-structured interview method (Kallio et al., 2016) also allowed the author to ask questions outside the predefined question list, for example, to clarify or ask more about the issue that was raised in the discussion.

During the interview, all the interviewees except one also referred to external and internal material created, which in their opinion would help the researcher to better understand their business model and the drivers for business model innovation. Firm E also provided the researcher with prefilled answers to the interview questions that were sent to them beforehand. The secondary data suggested by the interviewees were used as supporting material in the analysis process.

Table 3. Interviewed companies

Firm	Country	Interviewee	Time of the interview (minutes)	Supplementary material provided by the firm	Established
Firm A	Switzerland	Chief Operating Officer & Chief Financial Officer	78	- Company presentation	2015
Firm B	UK	Founder & Chairman	99	- Company presentation - Short video - Collection of news articles published by the firm	2011
Firm C	Switzerland	Co-Founder	73	- Publications published by people working in the firm	2015
Firm D	Australia	1.Chief Executive Officer & Founder 2.Chief Commercial Officer	80	- 4 articles on the firm's website - Videos	2012
Firm E	UK	Chief Executive Officer	58	- Written answers to interview questions in text format and links for more information	2007

3.2 Data analysis process

In this study, the aim is to provide an understanding of the drivers for platform business model innovation, i.e. creating and capturing value for stakeholders with the use of the qualitative method of thematic analysis. Before starting the coding of the data, the researcher highlighted all the parts of the text that on first impression answer the research question. This way, all the aspects concerning drivers for business model innovation were captured from the data before the detailed coding started.

The analysis process applied in this study contained the following steps. First, the researcher made sense of the data by reading it through several times. The interviews were recorded and transcribed. Next, the researcher developed and filled in an analysis matrix. (See Appendix 1.) After filling in the matrix, the researcher refined the suitability of the categories. Finally, the researcher created higher categories to provide a general description of the research topic. The analysis of the qualitative data was carried out by the first author of this paper and the results were discussed among the co-authors. This enabled consistency in the analysis process.

At the beginning of the analysis process, when highlighting all the textual material of five interviews and thus selecting the material that will be further analysed by the researchers, we used the following criteria: (1) the text depicts a driver for business model innovation identified in prior research, (2) the text depicts reasons why the firm has created a data platform business model, (3) the text depicts a business opportunity or a subject for improvement that a firm has recognized in the market and addressed in their new business model. Highlighting all the text that fit the criteria resulted in 136 quotations that answered the research question. The density of the quotations varied from 2 lines to approximately 20 lines. After that, started the first round of coding of the quotations and filling in the analysis matrix. (One quotation can be coded with multiple codes.) As a result, a total of six categories was used in the final analysis. We will discuss the findings in the following section.

4 Results

Our findings show that a personal data platform provider's business model is a practical example of a business model that has emerged driven by changes in the personal data market, including regulative changes such as the Payment Services Directive 2 (PSD2) (see Pozzolo, 2021) and the General Data Protection Regulation (GDPR) (see Tankard, 2016) as well as the increasing collection of personal data by service providers and individuals, for example with wearable devices and applications. This section describes the drivers for platform business model innovation in the context of personal data used in the healthcare sector as shown in the interview data and through the conceptual framework of this study.

4.1 Drivers for platform business model innovation

Based on our analysis, the personal data platform providers have identified several opportunities for creating and capturing value by meeting the unmet needs of individuals, firms and researchers concerning the use, control and access to personal data. The business model innovation in this context is enabling users to control, access and share their personal data with the third party via the platform (value creation), and revenue is generated mainly from the firm or research organization asking for access to the data (value capture). The personal data platform providers studied in this paper enable individuals to control, share and use different types of personal data,

such as social media data (e.g. posts, comments and reactions), medical data (e.g. condition, prescriptions and medication), wellness and fitness data (e.g. steps, calories and sleep), financial data (e.g. purchases and transactions) and music data (e.g. music history). In the context of personal data in platform business in the healthcare sector, personal data mainly means medical data and wellness data that is collected from the individual, for example, at a doctor's appointment or via fitness wearable or digital health applications and shared via the platform with third-party services. One example is a digital platform provider that enables individuals to pull and view their own health records from different health service providers on a third-party service powered by the digital platform provider in order to get a holistic understanding of their health. It is good to note that in some cases, data not directly health-related is also relevant for the individual or for providing a (digital) health service to understand the person's wellbeing and health. For example, one of the personal data platform providers has a service provider/application on the platform that enables the individual to analyse online emotions based on the social media data. The personal data platform provider thus enables the individual to share the data from a social media platform to the third-party application and analyse what kind of posts the individual has created by using machine learning. The platform identifies a post either as a happy, neutral or angry post. Therefore, an individual gets a view of the emotions or feelings using social data.

The key driver for business model innovation observed in this study is the need for a platform business model where individuals have control over their personal data. Accordingly, the respondents feel that the current platform business model adopted by large platform providers in the market today is not considered as value creation for the individual and therefore a business model innovation. Thus, new ways to create and capture value with personal data are needed.

Our findings indicate that personal data platform providers create value for service providers and individuals by enabling access to personal data in a way in which the individual is in control over the data use and gets value from it in the form of personalized service.

The main finding of our study based on the expert interviews is the identification of six drivers for platform business model innovation. The drivers are the following: A need for (1) better data access for services and research, (2) data compliance and data protection and (3) external personal storage for service providers and individuals. Also, the data shows that business model innovation is driven by (4) the lack of individual empowerment and transparency in prevalent platform business models from the data point of view, (5) data silos and (6) technological maturity of the digital platforms and analytics. Next, we will discuss all six drivers.

Need for better data access for services and research

The first driver for platform business model innovation is the unmet need of individuals, researchers and service providers: How to get access to personal data in a simple way so that the individual is in control over the data and also gets value out of data-sharing. It was shown in the analysis that there is a gap between companies and organizations that create data and those that need the data. Besides, individuals do not have a clear picture of what data has been collected about them or if they can use the data for their own purposes, including the services they use. The personal data platform providers create value in the market by enabling the researcher and service providers to connect with individuals and their data in a manner that creates value for the individuals as well. This could be in the form of a personalized service or information about the research for which the individual donated their own personal data. Thus, the key driver for business model innovation of one of the personal data platform providers was a need for data access that they saw in the field of healthcare, as described by one of the respondents:

"So from doctors that say, hey, wouldn't it be nice if I knew what my patients do after the

operation when they leave the hospital? Wouldn't it be nice if they had a dedicated smartphone app, that basically records steps, well-being, whatever that is, data that is relevant for this operation? And so that's how we started." (Firm C)

Need for data compliance and data protection

It becomes clear from the expert interviews that the General Data Protection Regulation (GDPR) in Europe, which came into force in 2018, is a key driver for building novel value creation and capturing logic around the use, management and access to personal data. In the business model, a key element is consent management, which means that individuals are able to see which services use their data, for what purpose and can give and decline consent to specific services on the platform. Creating the consent service on the platform creates value for the individuals in terms of more control and transparency over the data use. The tightening data protection regulations in the European market has wakened many service providers of the importance of data privacy and transparency. Personal data platform providers see this as a business opportunity for creating a platform that takes care of the management of personal data and enables more control over the data by individuals.

In simple terms, regulation is driving innovation. (...) Regulation has reinforced our mission and purpose and opened up readiness for considering GDPR compliance solutions such as our consent management as a service capability. (Firm E)

From the data privacy perspective, one of the interviewed experts mentioned that many service providers already see the value of data differently due to the tightening data privacy regulations. No more is it considered purely a good thing to collect as much data as possible because a firm needs to have a reason to process the personal data it holds. Also, the data needs to be stored in a secure place to avoid data leaks and potential damage to its reputation. In the business model innovation of personal data platform providers, the data can be held by the individual on a secure platform outside of the firm. If a service provider does not need to know the person's identity, there is also a possibility to analyse the data on the platform and only send the result to the service provider with the consent of the individual.

"So we actually solve the healthcare provider's data protection problem, because we actually give those data to the user and enable the user to have full control over this data." (Firm A)

All in all, data privacy regulations are considered as drivers for innovation and a great opportunity for personal data platform providers but also for the service providers to think about new ways to create and capture value with personal data in collaboration with the individuals who have more and more control over their personal data and can share the data with services they use. For personal data platform providers, the GDPR and PSD2 as examples have provided a framework that has guided firms towards supporting the human-centred approach in personal data managing and service offering. The challenge, however, is the regulation to keep up with the technological advancements in the market to enable new data-driven innovations and value creation.

Regulatory drivers have already been used to make people participate better in the value chain and to be part of the data collection and consent management. They are drivers that enable individuals to participate in the value chain and be part of the data collection and consent management improving data access.

"regulatory drivers... actually drive the participation so that we focus with our technology on enabling the customer to be a part of that value chain by being part of the collection, consent

[. . .] and access to information" (Firm C)

Need for external personal data storage for service providers

"Businesses recognize that there's a value in not holding data." (Firm B)

Our findings suggest that there is a need for business model innovation in the market due to the shifting value logic concerning personal data. The expert interviews suggest that from the service providers' point of view, they do not see value in holding the data themselves or they do not want to hold the personal data due to compliance or other reasons. According to the GDPR, data concerning health is sensitive data and its use is prohibited with exceptions, such as having the explicit consent from the individual (Hoofnagle at al. 2019). Regulation is one reason why service providers do not always want to have access to personal data itself but are interested in the aggregated or anonymous data, which can be provided by the personal data platform provider as a firewall in between the service provider and the individual. A personal data platform provider will provide the service provider with the data or the result from the data, such as information about the individuals' preferences or lifestyle in order to provide more personalized services for their customers. Firm B explained the need for external data storage services as follows:

"So, we've got some businesses that are now going to be one hundred per cent using (our platform). So, what they'll do is, they'll ask for data, they'll process the results, and they'll push the results onto our (platform), which they'll use the next time." (Firm B)

Another perspective to the need for an external data storage for service providers is enabling individuals with the means to be in control of their data. Thus, rather than being the owner of the personal data, based on the interview data, service providers see it as beneficial to enable individuals to control their own data. From this perspective, individuals are the "one-stop-shop" for personal data for data-requesting service providers and therefore become an attractive partner and collaborator in the service. Accordingly, as stated by Firm A, some service providers find it important that individuals themselves are able to process their data on a platform provided by a personal data platform provider (a service that the service provider would not be able to provide for the individuals):

"A lot of companies, they just don't want anything to do with that (data). So, I want to build state-of-the-art devices, but I don't care about the data. (Give it to the user), let them have it." (Firm A)

Lacking individual empowerment and transparency

It is apparent that in future business models, an individual is no longer seen as a passive actor receiving a service and generating personal data when surfing an online platform, but rather an active actor controlling where personal data is provided, in what terms and for how long. The role of the individual is thus changing to be more active in managing personal data or copies of that data. In practice, personal data platform providers enable individuals to manage their data and aggregate it in their own account in a novel manner. This turns individuals into very attractive players in the data market from data-requesting companies' point of view.

"We want to enable the user to build individual solutions for themselves. So for example, if someone wants to have a diary from all the different health data that he thinks is relevant to him, and put it all together in his own diary that he can then share with a doctor, then we want to enable him to do that." (Firm A)

"The shift to a person-centred approach was a trend we spotted well in advance of the market

and have taken a leadership position in this area both in terms of concept and in having a live certified platform able to make the individual the point of integration." (Firm D)

It was noted that, in the future, it is more effective, and transparent, for companies to ask data from the individuals as trusted data points in applications and services rather than collecting data from other sources. Today, individuals do not have the tools to be active participants regarding using data in personalised services. Thus, personal data platform providers identified a need for individuals to be able to manage their own data and to identify and control the data flows between organizations and themselves.

"Individuals do not have the tools needed to be an active participant in their daily lives and how their data is managed and used. We saw the need for them to be able to manage their own data, their identity and control the flow of it between organizations and themselves." (Firm E)

Additionally, it was evaluated to be important that individuals will give their consent to the data usage as well as be continuously informed about the terms and conditions related to their data profile.

"The user should actually at least be informed, and not be informed by the small print in the terms and conditions that he's signing when opening the profile, but that he actually has to give his consent very specifically to certain data dealers." (Firm A)

Data silos

One of the drivers to make platform business model innovation possible is to open up the current data silos. Instead of the technological giants keeping all the data for themselves, the personal data platform providers can enable better (data-driven, human-centered and holistic) care, treatment and medicine development by opening data so that any organization can innovate and make solutions based on the data with the consent of the individual.

"So what we wanna do is to enable better medicine and better treatment, to break those silos up" (Firm A)

"And if we can open up all the data, can we do it in such a way that anybody can innovate (on) the data, not just the tech giants?" (Firm B)

Technological maturity of the digital platforms and analytics

The sixth driver emerging from the qualitative data is the maturity of the technology of the digital platforms and data analytics. Today, the technology is mature enough for companies to create platforms for a new way of sharing personal data. Also, the number of applications, wearables and devices collecting personal data has increased tremendously in recent years. According to the interviewees, this has created a need for digital platforms that enable individuals to gain more control over their own data in a more centralized manner. Platform business model innovation in the context of personal data used in the healthcare sector has been enabled by the technology that now enables building safe data storage and security for individuals for their personal data. Also, three of the interviewees mentioned that technology today enables better data analysis with artificial intelligence and machine learning, which they are also looking into.

"Certainly we use state-of-the-art technology for the platform. I think the progress in cloud computing and machine learning (. . .) has been tremendous in the last eight years, which is starting to be utilized." (Firm C)

4.2 Summary of the findings

Table 4 summarizes the key findings of this study. The table lists all six drivers for platform business model innovation that were identified in this exploratory study in the context of personal data used in the healthcare sector. In the table, the drivers for business model innovation are categorised according to the categorization in the literature review: policy driver, market driver, technology driver and competition driver. Based on the analysis, some of the drivers for business model innovation in this context belong to more than one higher-level category. For example, based on the analysis of the authors, "lacking individual empowerment and transparency" is both related to policy and market drivers. In general, the personal data platform providers sense an opportunity to meet the unmet needs of service providers, research organizations and individuals, and an opportunity to create and capture value in a new way in the context of personal data used in the healthcare sector. Based on our analysis of the drivers for business model innovation, we can see that the conceptual framework created in this paper does not fully explain the phenomenon. The findings indicate that the drivers for platform business model innovation in the context of personal data used in the healthcare sector are mainly market- and policy-driven. Our findings indicate that competition or technology-related drivers for business model innovation were not considered as crucial as the others, although for example the rise of the Internet-of-Things was mentioned as a driver for data generation and future services perspective.

Based on the interview data, the strongest drivers for platform business model innovation are new regulations and policies on personal data in addition to the need for better data access and control over data for individuals. Overall, the expert interview shows that the personal data platform providers see that adopting a different platform business model from the personal data perspective when comparing to some of the biggest platform providers such as Google or Facebook can give them competitive advantage. Thus, the interviewed personal data platform providers are creating competing platform business models in regard to personal data, comparing to the prevalent platform business models where data is considered mainly as source of revenue. Creating trust and transparency in the data market among individuals and firms, enabling individuals to control their own personal data and enabling service providers to access data on the individual's terms remain the foundation for the business model innovation in this context.

5 Discussion and Conclusion

Theoretical implications

In the prior literature, platform business models such as Facebook's has been used as an example of a winning business model (see Casadesus-Masanell and Ricart, 2011; Osterwalder and Pigneur, 2010). However, a more recent literature identifies a change in platform business models, especially concerning the use and collection of personal data (see Bataineh et al., 2016; Fruhwirth et al., 2020).

Studies show that exploiting new opportunities in the market, such as technological advancements or data, requires business model innovation (Souto, 2015), thus new ways to create and capture value (Fehrer et al., 2018). The unit of analysis of this study is a platform business model, in which individuals are empowered to control their personal data, thus access, aggregate and share their personal data with third parties – data that is today scattered in multiple locations such applications (see Martin, 2015).

In this paper, we focus on analysing the drivers for business model innovation in the context

Table 4. Summary of the key findings of this study on drivers for platform business model innovation

Drivers for platform business model innovation	High level categories
1. Need for better data access for services and research	Market driver
2. Data compliance and data protection	Policy driver
3. Need for external personal storage for service providers	Market driver
4. Lacking individual empowerment & transparency	Policy driver, Market driver
5. Data silos	Market driver, Competition driver
6. Technological maturity of the digital platforms and analytics, e.g., better data analytics tools, and artificial intelligence and machine learning	Technological driver

of personal data used in the healthcare sector. A driver refers to the changes or needs to which a firm must respond with a business model innovation (Foss and Saebi, 2017). In this exploratory study, we studied five digital personal data platform providers that have adopted a platform business model that differs from the prevalent business model in platform business from the data perspective. By enabling the individuals with the tools to use and control over their personal data (Hoadley et al., 2010, Kemppainen et al., 2018), the personal data platform providers change and challenge how value is created and captured in a platform business in the context of personal data used in the healthcare.

Our findings reveal six drivers for novel value creation and capture of digital personal data platform providers in the context of personal data used in the healthcare sector. These are a need for (1) better data access for services and research; (2) data compliance and data protection, (3) external personal storage for service providers, (4) individual empowerment and transparency in the prevalent platform business models from the data point of view; (5) data silos and (6) technological maturity of digital platforms and analytics.

Overall, this study makes a number of key research contributions. First, the study sheds light on the key drivers for a unique yet high impact business model innovation, the platform business model innovation in the context of personal data used in the healthcare sector in the European market. These keys drivers are classified into four categories: policy, market, technology and competition. In doing so, we extend the discussion in the area of business model innovation from the innovation management perspective. The conventional focus in the existing business model innovation literature has been focused on a firm-centric approach (Xu et al., 2018).

However, to overcome key challenges in data-driven services and business proposed by (Pikkarainen et al., 2019), the platform business model concept provides the solution in terms of (1) improved technology for better data acquisition, sharing and management and (2) a better governance model in the health service network and ecosystem. Thus, this study provides solutions to these pressing issues proposed in the previous literature. Our analysis brings a new perspective between a company and its digital platform towards a more network- and ecosystem-oriented view,

particularly in the healthcare sector, where personal data is heavily regulated and an indispensable resource for new health innovations (Pikkarainen et al., 2019).

Second, this study enriches the theoretical perspective of business model innovation, expanding Gatautis' (2017) value creation focus on platform business model innovation. This study incorporates both value creation and value capture into a holistic framework. Our research shows that six categories of drivers can be identified at the levels of policy, market, technology and competition. From the innovation management perspective, European public policymakers who work with topics such as personal data use in healthcare and platform business models, need to consider all these areas to develop more effective innovation policies to stimulate and encourage more and better data-driven and human-centric innovations, which in turn have more societal and economic impact and also places the individual at the centre. From the digital platform provider perspective, European policymakers need to rethink the implication of the current top-down approach to regulate data management policies at the national level, the health industry and ecosystem level, and the individual company and hospital level. This research provides evidence that market, technology and competition can also be the driving forces for innovation. Thus, a bottom-up approach for innovation can also be fruitful, providing education in the value of data and personalised data-driven services for citizens, thus empowering individuals in leveraging the full potential of their personal data (such as medical, wellness and social data) in healthcare services in a holistic manner.

Third, this research has been focused on start-ups and small and medium enterprises (SMEs) in platform business in the context of personal data used in the healthcare sector in the European market. It contributes to bridging entrepreneurship studies with innovation management and business model research. The study has a relevant impact on start-ups and SMEs as the research outcomes show that personal health data is particularly important for SMEs to create and capture new value and gain competitive advantages over the established large incumbent companies. The study shows that data is a new competitive advantage for SMEs. Based on our findings, a digital platform provider uses data in a human-centred manner by providing the individual with the means to control their personal data. This is an important finding because in the healthcare sector, in some cases the biggest challenge companies face in innovation, especially companies leveraging technology that is new for the industry (like machine learning), is access to data in a lawful, trustworthy and transparent manner (Kemppainen et al. 2019). This can lead to a new research avenue to understand how access to data can shape and affect an organization's innovation practices in healthcare.

Managerial implications

This study has several implications for innovators and practitioners in the healthcare industry. The managerial implications are as follow: First of all, the drivers identified in the study help healthcare innovation managers and practitioners to have a holistic view on the key aspects that can affect data-driven and human-centred innovations. Going beyond the context of the paper, similar drivers or categories of drivers can also be applied in other domains and industries.

This study focuses on platform business model innovation. The findings suggest that the emerging human-centred approach to personal data management and platform business model have significant economic and innovation impacts. It is especially for the SMEs to gain a competitive advantage in the market. Using the platform business model and technology for providing better access to personal data for individuals and how the SMEs can navigate and develop the technology and business model innovations in this area can play a significant role, not only for the growth of the company itself but also for national economies. In this vein, digital platform providers bring

new opportunities for value creation and value capture for other companies, such as pharmaceutical companies and health technology companies that need access to data in compliant and transparent manner in order to provide a digital health service for the individual.

Based on the qualitative analysis, platforms are considered as a new opportunity for business model innovation. However, companies need to be careful when evaluating the opportunities. As platforms gain more market power, the question is what kind of relations service providers should develop with platform providers and how to compete in the market if platforms are not used. Therefore, the innovation managers or top management in the SMEs need to be aware and informed of the different aspects that can affect the success of their business model innovation.

Limitations and future research

In summary, the current paper identifies and proposes drivers that affect business model innovation in the context of personal data in platform business in the healthcare sector. The study aims at enriching the current understanding of the high-level drivers to foster human-centred and data-driven platform innovation in healthcare. The work is based on an interview study that was conducted using the platform business model as a unit of analysis, consisting of five companies doing platform business in personal data context in healthcare sector. All of the companies have already been developing the digital platform business model, and some are already using it. Therefore, they were selected for the study as appropriate participants who could provide needed insights.

The limitation of this exploratory study is that the research mainly involved start-ups and SMEs. On one hand, the study has demonstrated its focus on start-ups and SMEs, building the ground that connects innovation, entrepreneurship and the business model. On the other hand, the study does not include large companies or multinational firms. Another limitation of this study is the size of the sample of five companies, and it was restricted to only personal data in platform business in the healthcare sector. However, although this study focused on the healthcare sector, it is good to note that the studied digital platform providers do business in other sectors as well, thus enabling digital services in finance and social media to access personal data via the platform with the consent of the individual. Going forward, future research can collect data from large incumbent companies to examine and validate the framework of this study or, on the other hand, study the phenomenon from another context, for example finance. Future studies can investigate differences in drivers in different country markets or cultures and examine how these factors can affect the practices of platform business model innovation. Additionally in further research, platform business model innovation needs to be distinguished from an ecosystemic business model (See Iivari et al., 2016) which refers to a business model that is negotiated and implemented by multiple firms in a business ecosystem (Gomes et al., 2019). Future studies can ask for example: Is the personal data platform an ecosystem or is the personal data ecosystem a platform in healthcare? Also, how the distinctions of platform and ecosystemic business models can affect innovation requires further investigation. In this study we focused on the business perspective of personal data platform providers. To understand the drivers for all the sides of the multi-sided market, we encourage future studies to study the other sides of the platform as well, thus the individuals and service providers. Future studies can also evaluate whether the drivers identified in this study can be applied beyond the healthcare sector since personal data can have a broader scope and is not limited to healthcare. Other contexts can be related to social media, mobility, telecommunication and so on. These research endeavours can lead to more generalizable theories and concepts regarding how innovation management and practices are influenced by data, especially in the era of digitalization and data economy in different sectors.

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Appendix 1. Qualitative data analysis matrix

Higher level categories from the literature	Policy driver	Market driver	Technology driver	Market driver & Competition driver	Market driver		Policy driver & Market driver	
6 categories emerging from the empirical data: Drivers for platform business model innovation in the context of personal data used in the healthcare sector	Need for data compliance and data protection	Need for better data access for the services and for the research	Technological maturity of the digital platforms and analytics	Data silos	Need for an external personal data storage for service providers		Lacking individual empowerment and transparency	
Codes emerging from the empirical data	- Companies in the market have a need for better data protection - Need for support in being compliant with the tightening data protection regulation - GDPR driving the innovation - GDPR to enables new busines opportunities for service providers - GDPR to enable to access data in a compliant way	- Need for data and access to data in business and research - Need for data for personalized health services - Individuals as touchpoints to their own personal data	- The technology is mature now - Data collected in the internet of things - Technology as an enabler for data interoperability and use - The Internet of Things -Data analytics	- Need for opening data silos - Data democratization and ownership need to change - Need for sharing data with privacy	-Individuals in control of their data - Companies are looking for new data-driven business models and opportunities - Companies are creating individual-centric digital services that require data access - Need for a new model where data is not collected in the shadows - Ownership of data - Attractive for businesses not to have the "Silicon Valley business model"	- Questioning the value of data itself - Value logic is changing - There is no value in just holding the data - Need for someone else to take care of the data in compliant and individual-centric manner - Companies want to do greater good	-Transparency over data use and trust - Need for a neutral and transparent marketplace - Individual is properly informed - Bringing trust into data ecosystem - No transparency over data use and value of own data	- Need for empowering people - Involve individuals as active actors - Enable individuals to build their own health services - Changing role of individuals in the data ecosystem - Shift towards patient-centered approach

Example quotations from Firm A	**Need for data compliance and data protection** "A lot of companies are not really allowed to have sensitive data. Especially pharmaceutical companies are not allowed to have insight into the patients. And there is pretty much a grey zone right now." "...we can actually solve GDPR problems or compliance problems, if this pharma company would host their services on [the platform] for example, and if this pharma company would agree to give full ownership and control of such data to the patient.	**Need for better data access for the individuals, services and for research** "So we actually solve the healthcare provider's data protection problem, because we actually give those data to the user and enable the user to have full control over this data."	**The maturity level and development of the new technologies** "The Internet of things which is a very big buzzword right now, this has indeed enabled [the firm] to become, hopefully to become a very important player in the market." "So, such automatic, [health] devices that are talking to each other under the internet of things approach or, industry 4.0 approach [...], this actually has enabled that we can integrate data sources automatically and, it also highlights the necessity of having control over such data."	**Data silos** "Reason for developing the platform: One is [...] data silos. As of now, we have all those different health data sources, and they all keep their data for themselves. So what we want to do is, to enable better medicine and better treatment, to break those silos up, and to aggregate all those data and put them all together, to get a better picture of the user or of the patient, to enable this better treatment." "So what we wanna do is to enable better medicine and better treatment, to break those silos up"	**Need for an external personal data storage** "We believe this only works if we really, and for a hundred per cent give the ownership and control of such health data to the user. Because, we've seen in the past [an example organisation] has, taken some user data, health data, which is considered as sensitive data, and has just monetised it. They have just sold patients' data without the patients' consent, which we don't really like." "The easiest answer is ownership of data." "A lot of companies, they just don't want anything to do with that (data). So, I want to build state-of-the-art devices, but I don't care about the data. (Give it to the user), let them have it."	**Need for an external personal data storage** "So we provide basically a data management for the b-to-b customers, which has two different main advantages. First of all, the, healthcare provider doesn't need to deal with the health data which very often is very sensitive data." "I don't want to deal with the [...] data. So, I want to build state-of-the-art devices, but I don't care about the data. (Give it to the) user, let them have it."	**Lacking individual empowerment** "We want to provide a neutral marketplace, independent marketplace, to our health data" "We are solving, hopefully, solving the data privacy and trust dilemma, that's in the market." "The user should actually at least be informed, and not be informed by the small print in the terms and conditions that he's signing when opening the profile, but that he actually has to give his consent very specifically to certain data dealers."	**Lacking individual empowerment** "We want to enable the user to build individual solutions for themselves. So for example if, someone wants to have a diary from all the different health data that he thinks is relevant to him, and put it all together, in an own diary, that he can then share with a doctor, then we want to enable him to do that." "If we enable the user to build own services [...] or own product out of their health data [...]. It sounds a little bit intangible right now, but we believe that it's actually a bit more for future."

Example quotations from Firm B	**Need for data compliance and data protection** "So regulation is tremendously helpful in the visibility and in the awareness. We think people would've moved our way without regulation, because it's better, for everybody, but regulation certainly helps with the awareness, and driving, it faster."	**Need for better data access for the individuals, services and for research** "People get re-X-rayed, redone, re-blood tested. This harms people, because people don't have the data when they're having a medical intervention." "Major drug company, has estimated that being able to source the data from an individual with consent through [the platform], will save them..."	**The maturity level and development of the new technologies** "So we've had to push technology's boundary to do this." "And we are using the very latest technologies to have achieved that. So in many ways it couldn't have been done before today. [...] So the early use of personal data was, not very good, but now [...] we can do more things. But we needed technology to be where it is today."	**Data silos** "That's the bedrock. If we move to sharing and privacy, then we can open up the siloes of data that are not used today. All our health data, wearables, genomics, all our finance data, everything I see, watch, do. And if we can open up all the data, can we do it in such a way that anybody can innovate (on) the data, not just the tech giants?"	**Need for an external personal data storage** "This is about providing more value to everybody, individuals, businesses, governments, society as a whole, by enabling more data to be shared. [...] So we solve the problems of the past, but we're not just solving the problems of the past / but what it's really doing is enabling us to share more data. And that's the business model." "What's wrong with it, is because they track everything else you do (on the web) and do all sorts of other things." "I like being told about things that are my interests, but only when I have chosen to give you the data to allow you to do it."	**Need for an external personal data storage** "So it's already, the future has already come towards us faster than you would think. Businesses recognize that there's a value in not holding data. So we've got some businesses, that are now going to be one hundred per cent using [the platform]. So what they'll do is they'll ask for data, they'll process the results, and they'll push the results into [platform] which (they'll use next time)."	**Lacking individual empowerment** "You make the choice, but you have all the protections that you need. [...] You can decide who can see what data [...]

Example quotations from Firm C	**Need for data compliance and data protection** "What has helped us as much is of course the GDPR, and, the more detailed discussion in the public about, what do we do. We give all the data away, so this is I think something that has, is slowly changing the mindset of people." "Now I think that GDPR has given us a big boost that we want to tell our European partners that this is the way we can finally do something that is different from the American Silicon Valley model." "And so our focus from day one has been, how do we build a technology that satisfies the regulatory drivers but enables individuals to actually participate in the value chain by being part of, the.. collection, consent or delegation, and access to information"	**Need for better data access for the individuals, services and for research** "So from doctors that say, hey, wouldn't it be nice if I knew what my patients do after the operation when they leave the hospital? Wouldn't it be nice if they had a dedicated smartphone app, that, basically, records steps, well-being, whatever then is, data that is relevant for this operation. And so that's how we started. We built the platform, we built the governance, we did the security audits on the platform, and then we said, OK, now we start with use cases."	**The maturity level and development of the new technologies** "Certainly we use state-of-the-art technology for the platform. I mean, I think the progress in cloud computing and machine learning and all this has been tremendous in the last eight years, which are starting to utilize that. Because we're still in this sort of very initial stage of being able to securely store the data."	**Data silos** "And individuals, not only talk but they're the ultimate aggregators of personal data. Because you can combine your genome data with your shopping data, with your fitness data that you record on a smartphone, and your medical data. Google and Facebook know a lot about you, I'm sure, but they never will be able to do that."	**Need for an external personal data storage** "These entirely new business models that are possible, with the data portability. So that's why I think it's the most innovative thing." "With this data portability can actually, finally, provide alternatives to the winner-takes-it-all, Google, Facebook, Amazon, China, lock-in models for artificial intelligence. Because, with data portability, and we are in control of the copies of our data, we can combine Google's artificial intelligence with our human intelligence. And if we do that in a fair way, we come to the governments, then, we generate a democratic, new data economy."	**Need for an external personal data storage** "Rather than owning data, it may be beneficial for companies that individuals are the data points" "So the fact that data can be copied and everybody has the same amount, and we are the ultimate aggregators of the data, and that's, in the aggregation is where the value lies. It gives individuals, citizens all around the world an entirely new power in controlling what happens to this data."	**Lacking individual empowerment** "We can be active participants in managing our personal data, or copies of that data. [...] Now the data economy works because data is controlled [...] behind our back, and that has been an extremely profitable business for the last ten years, because you feel you get the valuation of these big companies. You see the value of that. But, being able to copy that data and aggregate it in my own account, I'm becoming a very attractive player, in a new data economy."

Example quotations from Firm D	**Need for data compliance and data protection** "GDPR and open banking and changing regulation and e-privacy, what we've seen is an acceleration obviously in Europe to companies to look at how they manage privacy and data, but more importantly progressive organisations are looking to see whether or not this is an opportunity to actually alter business models." "Data management, data privacy, blockchain and distributed ledger, [...] which is now enabling enterprises and governments, fueled or pushed by regulation to start looking at this either as a compliance requirement, an innovation requirement or an opportunity to.. actually evolve their business model"	**Need for better data access for the individuals, services and for research** "Issues that are constantly coming up in the European Union around data access and the rights of the customer, and so there is already tension building to say that there needs to be another model" "So we need to rethink completely how the business model operates and therefore, the value we generate is in enabling this as opposed to the data itself."	**The maturity level and development of the new technologies** "The platform businesses have been the super businesses for the last two decades. Facebook, Google, LinkedIn, Amazon, these abilities to build the core infrastructure and then by owning the infrastructure really own, the value chain. And we've seen this unfortunately, with Facebook, in particular. "The technology moved faster than the ability for commercial models to adapt. And so what we had, we'd built this asymmetry very quickly so we built power in these platforms and at the same time we disenfranchised the value chain."	**Data silos** "Convenient way for people to integrate horizontally the different parts of their life, rather than a silo solution and so one of the problems with apps right now."	**Need for an external personal data storage** "What we are trying to see is how that [regulation] is now going to drive commercial models and those commercial models are likely to require real time authentication and consent, and therefore that gives us a clue to what the technology needs to do." "Platform businesses promise, hey it's free, and then we will monetize and create value for shareholders in the background in exchange for giving you something for free, which is not sustainable in the long term."	**Need for an external personal data storage** "Countries or companies have actually ended up developing their services for the greater good, to protect the society. We've seen this with tobacco, we've seen this with automotive and I believed the same thing would happen with data, so to be honest with you it was a huge relief that, GDPR came along."	**Lacking individual empowerment** "The shift to a person-centred approach was a trend we spotted well in advance of the market and have taken a leadership position in this area both in terms of concept and in having a live certified platform able to make the individual the point of integration."

Example quotations from Firm E	**Need for data compliance and data protection** "In our case GDPR and PSD2 have provided a framework of obligations that has nudged organisations along the path to supporting a person centred approach which is more logical, more flexible and more secure but is counter intuitive to the organisation centric model predicated on control of personal data, lock in of customers and a distrust of empowering individual's to control their own data and interactions with the world around them. In simple terms regulation is driving innovation. "Regulation has reinforced our mission and purpose and opened up readiness for considering GDPR compliance solutions such as our consent management as a service capability."	**Need for better data access for the individuals, services and for research** "We offer three things they need. One of them is a simple and efficient means to deliver data portability."	**The maturity level and development of the new technologies** "We're going to experiment, we're going to make sure the architecture's right, the security's right, the legal structure's right, and just keep moving forward slowly so that we are there. And we are one of the organisations that will ensure that trust happens and, person-centeredness approaches."	**Need for an external personal data storage** "This whole idea that data is the new (asset pass), data is the new oil, it's all just, sort of, venally self-interested money people looking at the world and thinking how do I make more money out of people/ hat kind of, juvenile mental model of data is just so outdated. If you look at any, ecosystem or any infrastructure that has been created, there's always the period where somebody's trying to be the only one or trying to close the market down or control it or intermediate it. But it never succeeds."	**Lacking individual empowerment** "But there's no transparency about how they use that data subsequently. There's no consent process except it's buried in the terms and conditions." "What we're all about is improving the efficiency of the digital economy." "Not so much new but obvious need to reduce cost, friction and effort whilst increasing trust, inclusion and access to digital services."	**Lacking individual empowerment** "Individuals do not have the tools needed to be an active participant in their daily lives and how their data is managed and used. We saw the need for them to be able to manage their own data, their identity and control the flow of it between organisations and themselves."

Biographies

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