Business Modeling to Health and Wellbeing Platforms in Living Lab Settings

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by

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Chapter 1: Introduction

In this chapter, it is explained the contextualization of the problem from different perspective views. Initially, it explains the existing problems that occur in the health and wellbeing sector. Subsequently, the research problem is described in order to reach a business model to platforms in this sector. Then, how the design of technologies and organizational arrangements occur within living lab settings. Once this contextualization finishes, the research problem is explained, as well as the research objective and research questions. Afterwards, it is described the research approach, and lastly the scientific and practical contribution of the project.

1.1. Context and Background

In this section, it is explained the trends of the healthcare and wellbeing to the elderly people. Similarly, the problems that exist to reach solutions with ICT in the healthcare sector are described, and also the main situations, which are visible nowadays to take care elderly people. Subsequently, it is presented a description of policies in order to incentivize the use of innovations, and the problems to design business models based on the existing literature review. Lastly, it is exposed the main conceptualizations of living labs, and the description of the context of one existing living lab in Netherlands to build and use the prototype of a platform service.

1.1.1. Healthcare and Wellbeing Context

The healthcare industry is becoming into one of the most demanding markets, specifically for elderly people (WHO, 2014). An aging society will lead to increase the demands of services for healthcare, and this will generate social and financial pressures to the healthcare systems (OECD, 2014). On the one hand, the medical expenditures on elderly people will increase (Arnrich et al, 2010). On the other hand, the younger people with older relatives will have to take care of their families and the elderly people (Geoghegan-Quinn, 2014).

According to the European Commission (2015), around 25% of the Europeans will be above 65 by 2030, and its trend is to increase sharply. An aging population can result in an increase longevity that will reduce the growth of the economy, and impact on the economy of the nations (Feldstein, 2006). This change in demography can become into a problem to the nation from the fiscal policy perspective given this population will require greater healthcare expenditures (OECD, 2014).

In addition, Goeghegan-Quinn (2014) adds the importance of having more support to provide better care from the society and the innovations in healthcare. The sandwich generation concept is described as people who take care of their parents and their children (Goeghegan-Quinn, 2014). This means the caring activities is becoming into a problem not only for the government but also to the population and healthcare institutions (European Commission, 2015). From this viewpoint, the need to have supporting tools, and improve the communication across al institutions in this industry is more and more necessary.

1.1.2. Platforms as ways to bring providers and users

Recently, the European commission enacted its eHealth plan in order to address and remove the barriers associated with the healthcare system ((European Comission, 2014)). According to the eHealth plan, the elements that mainly hamper the adoption of eHealth are the lack of awareness in Healthcare solutions among citizens with ICTs (European Commission, 2014). Thus, The eHealth plan seeks to support the innovation and diffusion of technologies to support or provide healthcare and wellbeing services to the elderly people (European Commision, 2014).

Currently, the predominant focus is on technology to deliver services and products with technologies in the healthcare sector (Van Geenhuizen, 2015). Yet, it is necessary to take into account the user perspective in order understand the end users needs, and preferences that they have (Lapointe & Guimont, 2015). Yet, some scholars argue the focus should be based on the user perspective. Keijzer-Broers et al (2015) argue that the development of eHealth solutions should be mainly based from the end-user side, and developed within living lab settings. Hence, a possible and interesting path to develop IT solutions in healthcare should involve the elderly people and experts in the user sides (Keijzer-Broers et al, 2014).

A multi-sided platform service can serve to link between users and service providers (Tiwana, 2014). This property aims to bring two markets (sided groups) throughout a platform (Tiwana, 2014). This type of platform services can help to join the organizations in the context health and wellbeing to provide the services in collaboration with one unified platform (Keijzer-Broers et al, 2013). Yet, the development of such innovations requires multiple parties that go beyond the healthcare industry and include other fields (Van Limburg et al, 2011). Hence, it is necessary collaborate with several stakeholders in other domains, and reach the cooperation.

Unfortunately, the design of these platforms to match the end users and the providers is not fully addressed in the literature. The platform theory mainly provides conceptualization on established platforms (Nikayin et al, 2012). And, similarly this occurs in the design of business models (van Limburg et al, 2015). Hence, the platform is able to provide the match between the two groups, yet the exploration of a business model requires further research given the platform is placed in initial stages.

1.1.3. Context of Living Labs

The development of platforms at initial stages can occur in a multi-organizational setting. Hence, it is necessary to understand the main concepts that are behind the living lab settings in order to contextualize and ground the problem. This aims to understand the new trends in design of innovations, and understand complexities at organizational level (García-Guzmán, et al, 2013). Living labs are open innovation systems that involve multiple organizations from the public and private sector with researchers and users (Balloon, 2005).

From the living lab perspective, the platform aims to define the living lab to coordinate multiple stakeholders. Katzy (2012) describes the *living lab* as a *platform to be the intermediary between multiple stakeholders, so that the platform can coordinate the actors in an open innovation system*. Hence, the living lab and its description as platform can aim to explain the complications that emerge at organizational level in the design of technology innovations such as platform in health and wellbeing to do the matchmaking between providers and users.

Living Labs consists of four streams: industry, researchers, public institutions and the users (Eriksson et al, 2005; Pallot & Pawar, 2012). Ballon et al. (2015) argue the living lab setting is mainly characterized by having five components: (1) the user involvement, (2) the real-life setting, (3) the multi-actor setting, (4) the ADR approach, and (5) the co-creation. *The user involvement* refers to empowering the end users so that they can influence on the innovation process (Følstad, 2008). The *real life setting* reflects the importance to text and experience with new technologies in real environments (Schuurman et al,2012). The *multi-stakeholders* environment exposes the participation of public institutions, private companies, technology providers, communities of users, and research institutions (Ballon et al, 2015). The *ADR approach* that takes into account the users, and the actions as part of the research and learning iteratively (Sein et al, 2011). Lastly, *the co-creation* refers to design research cycles that involve a set of stakeholders and the end-users in order to develop, and shape new technologies (Følstad, 2008).

From sections 1.1.2-1.1.3, the literature living lab is mainly focused on the understanding of the main characteristics, and conceptualizations about sustainable living labs (Ballon et al, 2015; Bergvall-Kåreborn & Eriksson, 2009; Eriksson et al., 2005). Platform theory is mainly focused on the analysis of established platforms (Cusumano et al, 2012; Gawer, 2009; Tiwana, 2014). Nevertheless, the design of the business model to platforms in living lab settings has not been addressed. Hence, it is necessary to explore the business model design on digital platforms, and within living labs. The existing research is focused on the analysis of problems that living labs with the use of business model frameworks (Lapointe et al, 2015; Masteli et al, 2015) without looking at the design process itself. Yet, this research seeks to explore the design process of the business model when the technology platform is being designed and built.

1.1.4. Multisided Platform in the Netherlands in health and wellbeing

As we stated earlier, the multisided platforms seeks to join, and match two or more different markets, normally providers and users (customers). From this view, the healthcare and wellbeing providers can be matched along with the elderly people in order to provide and deliver their services throughout digital platforms. Currently, the increasing elderly population is growing more and more. This can become into a problem to the national Dutch government, and increase the medical expenditure in healthcare (referred to WMO Act). This is in line with the problems described in section 1.1.1. According to the WMO Act, the responsibility to provide caring services is moving from the national level to the municipality level. The reason behind this is to have a better allocation of the medical and care expenditures, according to the VWS (referred to WMO Act). Yet, the municipality is able to administer, and define the policies to these caring services (referred to WMO Act).

As a way to solve the management and coordination that exist between providers and elderly users, platform services can be developed (Keijzer-Broers et al, 2014). The platform can respond to the needs of citizens in a municipality to find the providers, and the providers to deliver their services and increase their visibility. Based on this, the platform would be able to bring both parties into a platform service, so that this coordinates and manages the activities between providers and users.

However, the platform is reaching the stage of the prototype, and requires the design of the business model. The business model would aim to understand the vision of the platform services, and the main parties. This could explore the possible revenues and organizational issues behind the platform. Based on the business model, the living lab partners and/or other investors could provide findings to the implementation of the basic platform in the municipality.

The project is placed in a living lab setting given the users, organizations (private and public), and researchers participate together in the development of the business model, and technology innovations. The actors involved come from the IT industry, healthcare industry, consultancy firms in IT and healthcare, experts in the user side, and users. Similarly, the involvement of the users is part of the co-creation process along with the organizations in the Netherlands. And, its focus seeks to solve and aim partly the problems that the municipality has to communicate and advise their citizens in the healthcare industry, as well as have possibilities to grow and integrate other type of services.

1.2. Problem Statement

The design of business model in early stages of a platform is difficult to reach given the multi-actor setting, and the stage of development of the platform without the prototype version. On the one hand, there are companies and organizations that represent different

industrial sectors, and have different interests and roles (Keijzer-Broers et al, 2015). On the other side, the innovations across the industries have to face difficulties and iterations before reaching the commercialization phase (Bergvall-Kåreborn et al, 2009). Thus, the business modeling in platforms should include the multi-actor setting and the iterations in technology.

This conceptualization includes iterative and parallel trajectories between the design of the business and the design of the platform. This makes more complex the problem to build the business model, because there are iterations during the design process. These iterations lead to realize about new concepts that emerge during the process to the platform services, planning of the platform, and organization. However, this could be helpful in order to involve the stakeholders, and have different views about the design of the business model or the platform services in similar platforms or innovation process.

Form the academic perspective, the exploration of business model design to platforms in early stages is not fully explored. The existing research lies on the analysis of the business models rather than the business model design, specifically in healthcare industry (Mastelic et al, 2015). The previous research about business model on digital platforms is low, yet the increasing importance to the business model on technology services is increasing, and associated with disruptive technologies (Chesbrough, 2010). And, the platform theory is mainly focused on established platforms rather than initial platforms (Tiwana, 2014). Hence, the problem lies on the design of business models to platforms, when these are within conceptualization stages in order to reach the prototype version.

From a practical perspective, the problem lies on the necessity to build a business model for a platform that is at initial stage. Yet, the design of the business model will have to take into account the iterations, and multi-actor setting in the innovation process. Moreover, the business model must respond to the user needs, and the interests of organizations. And, lastly this must deal with the new regulations that have moved the caring services from national to local level. Hence, the design of the business model is complex given the interests and variability of roles in early stages of the platform.

1.3. Research Objective

As it was explained in Section 1.2, the design of business models to platforms has to deal with organizational arrangements, and iterations in its platform design. Yet, the design of platforms can aim to bring the providers and users in healthcare industry. In order to ensure the platform development under a collaborative setting, the business model is required. So, the investigation has as research objective:

“To design viable business model to platforms in health and wellbeing services within a living lab setting along with its business model road mapping”

1.4. Research Questions

Given the background explained in previous sections, the *main research question* to be addressed throughout this research is:

How can a viable business model to a digital platform in health and wellbeing be designed within a living lab setting?

The research questions addresses two aspects: (1) the business model design for platforms within living lab settings so that this can be viable under different case scenarios and (2) the roadmap to implement the business model so that the management board of the living lab can have a guideline to guarantee the roll-out of the platform services, and organizational arrangements at financial, and technological level. In order to answer the main research question, several sub-questions are explored, as it follows.

- RQ1. Which could be the service design to be provided within the business model?

In order to build the business model, it is important to describe the customer needs, user needs, and how the service model can fill out these needs. The platform service should be described from this starting point of view (Bouwman et al., 2008; Osterwalder & Pigneur, 2010). Based on the service model, the business model will be able to be analyzed from the rest of perspectives such as customer retention, branding, key partnerships, technology infrastructure, resources, and financial structure. In other words, the service design should be seen as a central point of the business model design.

- RQ2. Who are the main stakeholders involved in the delivery of services, design, maintenance of a digital platform in health and wellbeing?

In order to design the business model, it is necessary to make an actor analysis, and define the strategic stakeholders, operational (Solaimani et al, 2012; Limburg et al., 2015; Bouwman et al., 2010). This research sub-question seeks to be answered on the analysis in the business model design stage with all stakeholders (organizations, users and customers). Additionally, the logic of the business model with the exchange of services, values, and money flows should be part of the stakeholder analysis (Allee, 2008). Hence, the actor analysis and the business logic will be achieved based on the results of the business model design. In order to answer this question we suggest to look at the following literature (Bouwman et al., 2010; Allee, 2008; Soilamani et al., 2012).

- RQ3. What is the financial structure to ensure the implementation of the business model?

Despite the service and business logic behind the service is important into the description of the business model, the division of costs, investments and profits has to be described

(Osterwalder & Pigneur, 2010; Al-Debei et al., 2008). The profits could be less than the costs and investments in the initial stage, but these profits have to be higher in the long run to make the business model sustainable. Hence, we have to describe to where it can be possible the main cost sources, revenue models, and estimations of this costs based on the technology and infrastructure required. Financial analysis can be required based on competition, costs estimations, and investments, yet the sources of these money flows have to be identified, and then explore the estimations based on money flows, adoption of the platform service, and customer preferences (Bouwman et al., 2010).

- RQ4. What is the roadmap to this business model in order to ensure the alignment between the components of the business model and activities?

Lastly, the research will provide a roadmap in order to ensure the implementation of the business model to the platform. Applying roadmapping help to look at the time transitions, management practices, and the key players involved in the delivery of services (Gerdsi, 2007; Groenveld, 2007). De Reuver et al. (2013) argue that developing a business model roadmapping aims to describe the intermediary steps to achieve the modifications of the business model over time. Thus, the roadmapping approach has to look at modifications within the business model, and associate these changes with business activities (de Reuver et al., 2013).

- RQ5. What is the institutional view about regulations and legislations to support technology development and/or new changes into the healthcare industry?

Regulations are the primary focus of innovations and business models, especially in commercialization phase (Bouwman et al, 2008). Yet, the healthcare industry requires addressing different institutions (insurances, local and national governments) with different interests in the healthcare sector (Janssen et al., 2014). This research question seeks to know the existing regulations in healthcare, and how these could influence positively or negatively the business model. The legislations and public institutions could aim to incentive the adoption and commercialization of digital platforms in the long-run, but we have to identify their interests, the existing legislations, and possible policies that could impact on business model to be implemented in the municipality, other municipalities, or other nations. In order to answer this question we suggest to review the literature from (Janssen et al., 2014; WMO ACT referred; OECD 2015 documentation in Netherlands)

1.5. Design Research with observation method to collect data

In order to define the research approach to this thesis, it is necessary to ask beforehand what is research? What is a design? And, what research design approach can be appropriated to answer the research question? In general, *research* is defined as an activity that seeks to contribute to understand a phenomenon (Kuhn, 1997). *Design* means creating new artifacts

that do not exist, and solve specific problems (Winter, 2008). Several scholars have started extensively the design science research in fields such as education, healthcare, information systems, and engineering (Vaishnavi & Kuechler, 2013). In this sense, the development of technology platform to matchmaking the end users and service providers in health and wellbeing requires of a kernel theory to make iterations over the process, learn in each stage, and generate outputs in each stage of development (Keijzer-Broers et al, 2014).

Now the question lies on whether the design research can provide a guidance to design a research cycle in order to answer the research question. In this case Peffers et al. (2007) incorporates the iterations and knowledge contribution from the design research regarding to artifacts. In this investigation, the business model seeks to be implemented in order to commercialize a digital platform, yet the digital platform may have iterations and feedback loops during the business model design.

Despite there are other design research methods it is explained by Vaushnavi & Kuechler (2013), the Design Science Research Methodology (DSRM) is chosen given this enables the iterations, and knowledge contribution to the research problem in each design stage, and a variety of contexts. Hence, these two features of the DSRM make it suitable given the observations and iterations will be essential in order to reflect on the business idea, and design the business model. This DSRM is described briefly as it follows:

- The DSRM is composed of six sequent steps: identification of the problem, goal definition, design stage, demonstration, evaluation and communication. Peffers et al. (2008) argue that researchers can start in different stages based on prior research.
- From the definition of the objectives to the evaluation, the researcher can generate contribution to the knowledge and the field of study.
- Normally, the design research is accompanied by iterations. Hence, it is normal to have feedback loops in the evaluation and communication stages to the objective and design stages.

However, it is important to mention its limitations beforehand. Firstly, the design research methodologies are focused on the development of IS and technological artifacts, yet this investigation is more focused on design research on business models. And, the business models are composed of socio elements that include stakeholders and technology elements. And, secondly there is slight separation between evaluation and design, which makes the DSRM an open-gate model. Hence, it is advisedly to the investigation to consider these downsides, and follow-up the research with the iterations and reflections in each design stage.

1.6. Research Approach

1.6.1. Zo-Dichtbij

Zo-Dichtbij is composed of researchers, elderly associations as users, one municipality (public institution), and private companies (SMEs, and multinationals), just as living lab settings are composed. Zo-Dichtbij is an interesting unit of analysis to understand, and do research in depth to explore the design process of business models to platforms in health and wellbeing services. Based on this, we will be able to understand the main aspects to take into account in the business model design for digital platforms in early stages and later on.

1.6.2. Approach

In order to design and study the process of development of business model within living lab settings, the project Zo-Dichtbij can be chosen as a frame of reference to platforms at early stages. Moreover, the foundation Zo-Dichtbij seeks to develop a technology platform to matchmaking service providers in health and wellbeing services, and end users (Keijzer-Broers et al, 2013). Yet, the foundation requires the development of the BM in order to launch the prototype version of the project.

The research approach is described as it follows (See Figure 1.1). The first part mainly focuses on the problem formulation stage. This seeks to define the research problem, and justify the value of the solution (Chapter 1). Based on this research problem, we introduce the theoretical background to this investigation (Chapter 2). Our research question can be broken down in three different parts to the research domain: (1) Living labs, (2) business model theory, and (3) platform theory. This is mainly the literature review to ground the context of research, and start to make the design of the BM along with the users, and then with the organizations of the project.

The second stage comprises the definition of the objective and research questions. This stage should be updated based on the knowledge gained from coming stages as design and evaluation, but with focus on the research problem. In order to design and evaluate the BM, it will be necessary the interactions between the participants of the project, and partly between the researcher and the participants. Hence, the involvement of stakeholders and users of the digital platform is essential in the business model design, as well as within its evaluation.

The question that appears here is which research methodology to collect data is most suitable considering the chosen design research methodology. The research position will be an observer more than an active participant on the design process. Although the researcher will make the business model based on its observations and analysis, the participation to contribute to the business model will be low. Based on this, the design workshops enable to conduct the design process within a participatory environment to the users and stakeholders. These workshops will be part of the design stage to the business model. The workshops

design allows discussing the problems, and designing the solutions in cooperation (Bouwman et al, 2010). Thus, design workshop can explore, and reach different purposes that involve not only the creation of the service, but also the analysis of the service in other domains along with the representatives from each stakeholder (Steen et al, 2010).

Given that it is required to the involvement of users, two workshops will be done in parallel in such a way both complement each other to obtain one BM design. Therefore, the design stage will have the opportunity to bring all stakeholders, and involve the users to reach one version of the BM design. On the one hand, the investigation will obtain the viewpoint of users and customer needs. On the other hand, the involvement of stakeholders from the organizational side will enable to complement the view to build the business model from the strategic part, resources, and business logic. Hence, the users and organization views will be together within the business model design.

It is work of the researcher to make the business model after the design stage is done. The demonstration about the business model will be more an explanation of the business model achieved along with key stakeholders. Once the BM initial version is obtained, we can proceed to evaluate iteratively along with the participants of the project. However, it is necessary to ask which methodology can be used to evaluate, and refine iteratively the BM between the researchers and the participants.

In order to reach this evaluation and one final BM design, the researcher requires to conduct an investigation in a relatively depth conversation regarding complex topics. These topics should try to fill out gaps in the business model, as well as points that were not taken into account. Moreover, it is necessary to ensure a free setting to ensure the opinions from different perspectives of the stakeholders. Hence, the interviews can be the most appropriated methods to collect this information, and evaluate the BM by listening to each stakeholder. The interviewees will represent the main parties that are representative to the BM.

The iterations and reconstruction of business model components will be important in the business model. This includes not only the search and analysis of new inputs to the business model, but also the self-questions and critiques from the research side to find gaps. These iterations and reconstruction of the business model will enable to contribute to the design itself, and more importantly the understating of the field of study. Hence, these feedbacks and reflections about the problem should be taken into account as lessons or new knowledge that can emerge from the discussion between the participants, and/or refinement stages in the evaluation.

Lastly, the communication refers more to the conclusions, and recommendations to be taken into account by the practitioners and researchers. In figure 1.1. it is explained the the DSRM graphically along with the methods and literature chosen to this investigation.

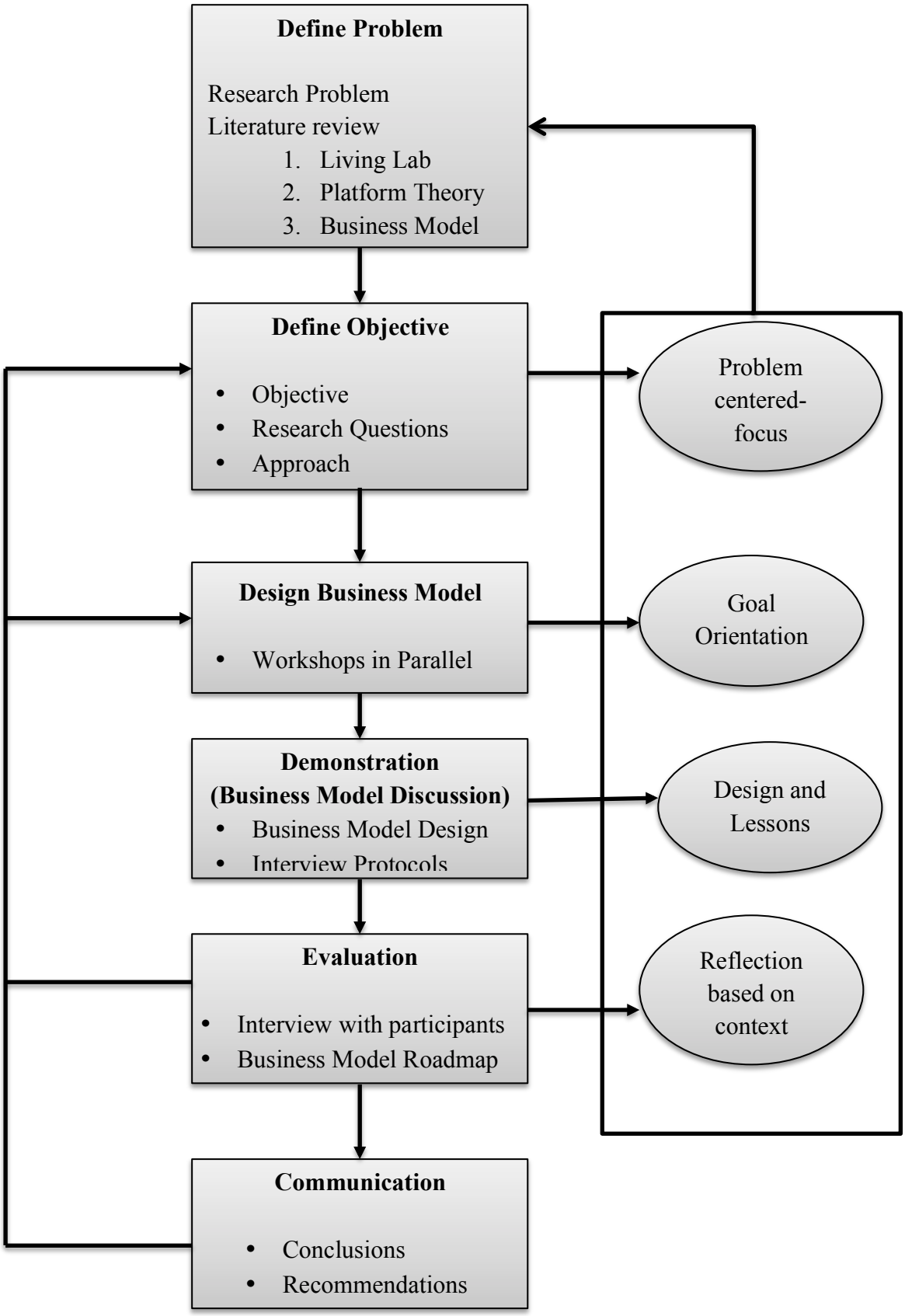

Figure 1. 1 Design Research Methodology to design the business model with participant observation

1.7. Scientific Relevance

This research is scientifically relevant in the following manner. This investigation will help to close the gap about design of business models to platforms at early stages. The current approach in the literature review addresses the problem by considering one business model framework to design the business model for an innovation. In this thesis, the researcher argues that it is necessary to take into account certain aspects in the development stages by linking the users, technology and the business model in an iterative way in each stage. Based on this, the investigations aims to understand why the design process of a business model is complex, specifically when the platform service is reaching its pilot phase to build the prototype in a collaborative setting.

1.8. Thesis Structure

The expected outcome of this studied is divided in six chapters. The chapter 1 outlines the thesis with its main research question, the research sub-questions, and the approach. This also provides a small overview of the main literature review to use in the research. Subsequently, Chapter 2 explains the theoretical background that is necessary to this research. This includes the three domains that are necessary: (1) Living Labs, (2) Business Model (BM), and (3) Platform Theory.

Subsequently, Chapter 3 explains the methodology to collect and analyze data iteratively, an also the initial BM that was obtained from the workshops. Hence, this second part will be focused on the design process of the BM. Afterwards; Chapter 4 goes in depth the evaluation and refinements to the BM, by taking into account the inputs from the interviews to each stakeholder.

In the third part, the focus is the roadmap to the BM, and recommendations that must be taken into account throughout the platform development, and search of potential partners. Lastly, the four part, the reflection and recommendations, Chapter 6 takes into account the findings of earlier chapters, and main issues to explore the road mapping, and ensure the implementation of the BM. Finally, the investigation addresses the conclusions and limitations in the last part of this thesis.

Chapter 2: Theoretical Background

In order to design the business model to the platform, it is necessary to bring some literature review to answer our main research question. This chapter reviews the living lab domain, the business model framework, and the platform theory. This research contextualizes the investigation, and grounds the research throughout these three lenses.

This chapter is described as it follows. In section 2.1, there is a review of the living lab domain. Firstly, we explain the definition of living labs in order to contextualize the reader within the living lab setting (Section 2.1.1). Subsequently, we explained the importance of the iterations and implications on innovation systems, as well as the values for users and companies involved within living lab settings.

In section 2.2, there is a brief review of platform theories. Firstly, it is exposed the definition of platform (Section 2.2.1). Afterwards, the main properties of platforms are briefly explained: multisidedness, network effects, and some platform startup principles. Afterwards, he focus is on the main issues to take into account in the platform development, and decisions to make in organization, technology and pricing decisions.

In section 2.3, there is an extensive explanation of business model frameworks that are being used by practitioners, designers, managers and researchers to build business models. Initially we briefly describe the concept of the business model (Section 2.3.1). Then, we proceed to compare four business model frameworks: CANVAS, C-SOFT, STOF, and VISOR (Section 2.3.2). Subsequently, we choose one framework based on the analysis described in previous sections (section 2.3.3).

2.1. Living Lab Domain

This section begins with the definition of a living lab, and its discussion in the literature. Subsequently, it is explained the different stages of development that a living lab has from its planning stage to its commercialization. Lastly, we sum up the main factors to take into account in the design of business models in living lab settings.

2.1.1. Living Lab Definition

In the literature, several scholars have discussed the definition of living lab extensively. Living labs typically refers to the co-creation, co-design of innovation between the users, researchers, and business stakeholders (Eriksson et al, 2005; Ballon et al, 2015). Later on, Bergvall-Kareborn et al. (2009) defines the living lab as an innovation system where firms and users interact within real settings. From the open innovation perspective, Mulder et al

(2008) argue living labs are open innovation systems that seeks to integrate multiple organizations from different fields and users to accelerate the development of new technologies.

Recently, Van Geenhuizen et al. (2012) described two conceptualizations about living labs. One the one hand, the living lab is defined as an open innovation platform or network with co-creation, emphasizing on the role of intermediary, so that this platform coordinates the network of actors in open innovation systems (Katzy, 2012). On the other side, living labs can be delimited in real-life environments that include an actor network with user involvement (Van Geenhuizen et al., 2012). Lastly, some scholars added the view of quadruple helix within the open innovation systems, and living lab definition (Folstad, 2008; Pallot & Pawar, 2012; Balloon et al, 2015).

Given the research is placed within the living lab setting, and seeks to design a BM to a platform, this thesis will use throughout this research the conceptualization from Katzy (2012). In other words, we use *living labs* as *platforms to an open innovation platform or network with strong user involvement, so that the platform coordinates and manages the actors* (Katzy, 2012).

2.1.2. Iterations in Living Labs to develop technologies and business models.

The development of innovations requires the cooperation between the main stakeholders involved. Ballon et al (2015) argues the characteristics the components within living labs described in section 1.1.3. On of it components, the ADR approach imposes the need to have user involvement, and make iterations from the user side, and organizations involved (Sein et al. 2011). And, although these iterations can aim to develop technologies faster, these can lead to create conflicts at organizational or technology level.

Stahlbrost and Holst et al. (2012) describe the commercialization of innovations have to overcome four stages: the planning, the conceptual design, the innovation design, and the commercialization of the innovations. Among each cycle, the technology and organizations have to overcome the use, the appreciation of opportunities, the design, and evaluation at the end of each stage. Hence, the iterative design can have effects in the design of the technology.

Due to technologies requires integration and management; these modifications can lead to re-design the technology or the business model itself (Garcia-Guzman et al. 2013). Based on this, the iterations should be incorporated as a component of the business model framework in its design and evaluation.

2.1.3. Values for users and companies to ensure the commercialization of the technology

In addition to the iterations across the business model and platform development, It is important to highlight that the values and interests for the stakeholders and users. The collaboration is essential, but the search of values to incorporate in the innovation system is key to make it sustainable. Mulder et al (2008) argues that values can incorporate resources, capabilities, governance issues within the innovation system, and intangible elements that are reasons to participate in these projects.

On the other hand, the users require seeing the values, or exploring new opportunities to evaluate the technology, and participate in its development (Stahlbrost and Holst, 2012). Yet, Garcia-Guzman et al (2014) argue that these values can change during the innovation development not only from the user side, but also from the organization side. Due to its importance in the business model to describe the value creation and value capture (See Section 2.3.1.), this element is included in our analysis to reflect on the selection of the business model framework. This means that this has to have a description of values to parties involved and customers, rather than only customers as typical.

2.2. Platform Theory

Along this section, it is explained the concept of platform, and the properties that platforms experience from the Information and System (IS), and management fields. Subsequently, it is discussed the strategies and organization to open or close the platforms along with their relationships with the governance. Lastly, a short sum is presented in order to link this theory with the design of the business model.

2.2.1. Platform Definition

The concept of platform has been extensively discussed in the literature on management fields, and information systems. There are different definitions based on the perspective of the authors, and the field where scholars do research.

From the management perspective, Gawer and Cusumano (2012) define industry platforms as a set of products, services, and technologies that provide the basis to develop complementary products, new services, and new technologies. However, Cusumano (2010) argue that there are two conditions to build the platform: (1) the design and building of the technology architecture as a whole system must have easy integration (Cusumano & Gawer, 2012; Eisenman et al., 2008), and (2) the increasing value users can give and received is dependent of having more services (complementarities) (Katz & Shapiro, 1994). For instance, LinkedIn can be seen as platform, because this has easy integration and organization of job positions, and the users give more value for having more and more job recruiters.

From the IS perspective, Tiwana et al. (2010) introduced two concepts: software platform, and platform architecture. Software platform is basically "an extended software and hardware system that offer a core functionality, and can interoperate with other modules (Tiwana, 2010). Similarly, the use of these software platforms can lead to have benefits to other users, and the software platform itself (Tiwana, 2014). And, platform architecture is a blueprint that describes how the ecosystem is broken down into relative stable platforms along with their complementarities (modules) (Tiwana, 2014).

The definition of platforms from these two perspectives has in common two concepts. Firstly, the core function of a platform is to offer a core functionality to develop and coordinate activities that can lead to develop more and more services (modules). And secondly, the integration of services and adoption of users can lead to network effects (Katz and Shapiro, 1994). In this thesis, we use the term 'service platform' to refer to any IT architecture that require the integration of several modules, as well as the coordination of users and organizations (Nikayin et al., 2014)

2.2.2. Platform Properties

Once we have described the definitions of platforms, we proceed to explain the main notions and properties that exist in platforms. This will aim to understand the important concepts, and complexities that exist to make decisions to design or build the technology, or to organize the platform architecture. Lastly, based on the properties mentioned it will be possible to describe the main platform start up principles that normally emerges in initial stages.

- **Multi-sidedness**: One of the essential properties refers to its possibility of bringing two or more groups to interact each other. (Tiwana, 2014).

- **Network Effects**: refers to the increasing value due to one additional user (Katz & Shapiro, 1994). The more users, the more valuable the platform is.

- **Multi-homing**: refers to providers (applications, services) are able to participate in more than one platform ecosystem (Tiwana, 2014). For instance, services can be delivered in IOS or Android even these are competitors.

- **Tipping**: refers to the point where network effects are noticeable, and have self-reinforcing mechanisms to take off the platform (Tiwana, 2014).

- **Lock-in**: is described as its impossibility or difficulty to switch to competitor platforms (Schilling, 2004). This applies to both sides: providers and users.

- **Competitive durability**: The solution is so competitive and innovative so that the user continues using it after its adoption (Tiwana et al, 2010).

- **Envelopment**: Platforms are able to offer services from adjacent markets, by adding the services (products, applications) to the bundle of services from the service platform.

- **Architecture**: This is typically the conceptual design and structure of the technology solution in order to deliver the platform service.

- **Governance**: in general, this term refers to who governs the platform, makes decisions, and orchestrate the development of the platform service (Tiwana, 2010).

2.2.3. Platforms at initial Stages

There are several principles that are important into the development of platforms (Tiwana, 2010). These are associated to the stage of development that the platform service has (Tiwana, 2014). In this sub-section, it is explained briefly four principles, yet if the reader wants to go deeper, this can refer to Tiwana (2014).

According to Tiwana (2014), there are four guiding principles that are related to the emergence of platforms at initial stages: (1) the *Red Queen Effect* that refers to the velocity of the platform ecosystem to evolve, and survive. (2) The *Chicken-and-egg-problem* that is the most difficult to achieve given this seeks to attract, and join both sides within the platform. (3) The *penguin problem* that refers to the uncertainty of users and providers to join to the platform in the initial stages. And lastly, (4) The *emergence*, which is the degree of flexibility and autonomy to grow spontaneously without taking into account the rest of actors involved.

In general, two problems have to deal the platforms in initial stages. On the on side, the attraction of both sides is complex given the experience users and providers have to join to these platforms (Eisenman et al, 2008). On the other side, the emergence must be spontaneous, so that the autonomy and flexibility to grow does not require the cooperation of all parties involved (Tiwana et al., 2010). These two problems are complex and difficult to be solved between all actors that are involved.

2.2.4. Platform Openness and Governance

Currently, there is a discussion in academia about the strategies that platforms could use. There are two extreme examples in the industry between Apple and Google Android. By one side, Apple has a closed platform with boundaries to entry for both sides application provides and users. By other side, Android evolves with an open strategy, so that there is a free entrance to providers and users. This has created debates and discussions about the platform strategies that should be used, and its degree of openness (Chesbrough, 2006; Gawer, 2009; Tiwana, 2014).

Despite, the literature has discussed the definitions of open and closed platforms, it is difficult to determine a consensus about these definitions. From an organizational perspective, Tiwana (2014) argues that this openness relates to the *platform governance,* degree of autonomy, rules, and metrics that exist between the platform and the providers (complementors). And, Eisenmann et al. (2008) relates this openness to the platform strategy in order to manage interoperability and absorption of complements (providers). From these two discussions, both highlight the importance to the governance and autonomy as key component of the openness in platforms. And, Eisenmann et al (2008) points out its importance at strategic level to manage key assets such as licenses, intellectual property, and shared services.

Lastly, governance is seen as a gear to the architecture, and the changes at organizational level must be translated into the architecture (Tiwana, 2014). Based on this the platform would be able to guarantee its evolution, and grow fast rather than looking at the organization and technology as two components disconnected.

2.2.5. Pricing Decision

The pricing decisions are essential elements to create incentives in order to reach adopters from both sides to the platform (Eisenman, 2008). There are five pricing strategies, yet this must be in line with the platform development, the lifecycle of the platform (service), and the business model (Tiwana, 2010). Hence, this decision must be systematically analyzed from these three views. Subsequently, the five decisions are described as it follows:

a. **Symmetric Fees:** The first pricing strategy can be to ensure both sides have a fee to be introduced within the platform (Eisenman et al, 2008).

b. **Subsidy Side:** This pricing strategy mainly consists of subsidizing one side while the other side is charged from the platform (Osterwalder and Pigneur, 2010).

c. **Access and Usage fees:** sometimes called access per usage, but this has to take into account the lifecycle of the platform, the platform development and the parties to be charged (Tiwana, 2014).

d. **Sliding Scale:** This is established between the service providers and the platform in order to have royalties over the size of sales that service providers have (Gawer and Cusumano, 2009). For instance the 70-30% between Apple and app providers.

e. **App pricing model:** In this case, there is a perpetual subscription or license to the provider to be part of the platform. Yet, this mainly depends on the development stage of the platform architecture.

2.3. Business Model Framework

The research question is related to the design of a viable business model (BM) to platforms in health and wellbeing. Yet, it is important to know beforehand What is a business model? and what is viability of a business model? Moreover, there are multiple business model frameworks, and it is necessary to know what is the most appropriated business model framework given the factors that can influence the business model in living labs (section 2.1.4), and the characteristics described in platforms (Section 2.2). Subsequently, we will proceed to begin the design of the BM.

2.3.1. Business Model Definition

Defining the business model concept has been extensively discussed in the literature, and its conceptualization is still being built (Fielt, 2011). Most of business model definitions refer to value creation, and capturing value from organizations to customers (Chesbrough, 2006; Osterwalder & Pigneur, 2010; Teece, 2010). Chesbrough et al. (2002) define that *business model as the way organizations intend to create and capture value from technology innovations*. Amit & Zott (2001) argue that business model is a template to define the structure, content and governance between the focal firm and customers (Amit & Zott, 2001). Similarly, Osterwalder et al. (2002) argue a *business model is a description of the value is offered from a company to their customers, and describes the firm's architecture and partnerships to create, deliver and capture this value in order to generate revenues streams*.

Nowadays, companies have moved to create and capture value not only to customers but also to a network of companies, so that these deliver their value propositions to users and organizations (Allee, 2008; Teece, 2010). In this thesis, the definition of business model is described as Shafer et al (2005) reflects on it, taking into account the discussion described earlier. *"**Business model is the core logic and strategic choices of a firm in creating and capturing value within a value network**"* (Shafer et al., 2005 p. 204).

From this definition, it is necessary to explore three additional concepts: the strategic choices, the value creation (capture), and the value network. The *strategic choices* are composed by several components the customer segment, and value propositions, revenues, resources and competencies and others (Shafers et al, 2005). The *Value Creation* is mainly composed by the strategic resources, and operating activities from actors in order to deliver the value propositions (Shafer et al, 2005; Solaimani et al., 2013). The *value network* is a term that mainly describes the roles and interactions existing across a social system that include multiple stakeholders (Allee, 2008; Peppard & Rylander, 2006). Lastly, the *value capture* can be reached by revenues model, and cost structures (Shafer et al, 2005). Yet, Allee (2008) argue the value capture can come from intangible assets, and can be dynamic as the roles performed by actors or the actors themselves.

2.3.2. Business Model Ontologies

The business model ontologies define the elements and relationships that exist between these elements to build desired business models. The term ontology denotes a philosophical discipline that deals with the nature and organization of the reality (Guarino & Giaretta, 1995). In this thesis, the *ontology* is defined based on the Gruber's (1993) definition as "*an specification of a conceptualization".* And, *conceptualization* refers to *a semantic intentional structure that encodes the implicit rules constraining the structure of a piece of reality* (Guarino & Giaretta, 1995). Thus, the business model ontology is "*a conceptual tool that contains a set of elements and relationships, which allow illustrating the logic of a firm"* (Petrovic et al, 2001). The literature provides a set of business model ontologies such as the CANVAS (Osterwalder & Pigneur, 2010), the STOF model (Bouwman et al., 2008), VISOR (El Sawy & Pereira, 2013), CSOFT (Heikkilä et al., 2008), and so on.

CANVAS

The CANVAS is the most commonly used BM framework by start-ups, and even large companies use this framework (Osterwalder & Pigneur, 2010). The CANVAS is based on the four initial pillars (Product Innovation, Customer Relationship, Infrastructure Management, and Financial Structure), and breakdown into 9 building blocks (Osterwalder, 2004). Although CANVAS is not specific for technology innovations, the majority of entrepreneurs use this as an starting point (Bouwman et al, 2008). The business model CANVAS provides a powerful tool to visualize the business model, making it a design-innovation focus (Fielt, 2011). However, the CANVAS cannot provide overviews about the initial design in order to design the operating activities (Bouwman et al, 2008). And lastly, De Reuver et al. (2013) argue this business model framework does not take into account the value networks that exist within innovation systems.

STOF model

The STOF model has as starting point the customer value of the product or service to build the business model (Fielt, 2011). Bouwman et al (2008) describe the four domains SERVICE, TECHNOLOGY, ORGANIZATION and FINANCIAL domains, looking at the concepts and their relationships so that the framework can illustrate a complete explanation of the business model. The domains are briefly explained as it follows:

- **Service Domain:** a description of the service design, the value propositions (intended value, delivered value, expected value, and perceived value), the customer segment, the context where the service is used, and offerings (Bouwman et al., 2008).

- **Technology domain:** a description of the technical architecture and functionalities that are required to deliver the services. (Bouwman et al., 2008).

- **Organization domain:** a description of the multi-actor setting, which analyzes the resources and capabilities, interactions, roles, value activities that generate inputs on technology, delivered value, technology or costs (Bouwman et al., 2008).

- **Financial Domain:** a description of how the value network generates revenues and costs from particular services to other actors. In addition, the financial domain assesses the risks associated to investments, and how these can be mitigated with pricing structures, and revenues model to make viable business models (Bouwman et al., 2008).

VISOR model

The VISOR model seeks to integrate the different the components of business models into five categories, categorized as the VALUE PROPOSITION, INTERFACE, SERVICE PLATFORM, ORGANIZATION model, and REVENUE model (El Sawy & Pereira, 2013). The components of the VISOR model can be seen in Figure are described as follows.

1) **Value Proposition**: The Value proposition consists mainly of the customer segment, the customer value, the customer relationships, and customer understanding (El Sawy & Pereira, 2013).

2) **Interface**: The customer interface is described based on its ease of use, simplicity, convenience, wow experience or positive energy (El Sawy & Pereira, 2013).

3) **Service Platform**: The Service platform describes the technology architecture, the key resources, and activities have to be delivered to build technology innovations (El Sawy & Pereira, 2013).

4) **Organizing model**: this seeks to describe how the value network will deliver their activities, and the existing service flows across this (El Sawy & Pereira, 2013).

5) **Revenue Model**: this is the financial aspects including the investments, revenues streams, financial model, and financial flows along the value network.

C-SOFT model

The CSOFT is a business model framework, which seeks to translate the strategy into value propositions, customer relations, organizational arrangements and financial aspects, and provide a conceptualization for the business processes (Heikkila et al, 2008). The CSOFT is

based on the STOF model, but this adds an element that exists by nature in business models, the customer relationship (Heikkila et al., 2008). They argue that the customers are related to the service design, financial domain, technology and organizational arrangements. The description of each component is described as it follows:

I. **Customer**: This component seeks to describe the customer segment that is targeted by the business model (Heikkila et al, 2008).

II. **Service**: this enables to illustrate the intended value of the services and goods, and how this is created, delivered, as well as how this creates value (Heikkila et al, 2008).

III. **Organization**: This component describes the roles and participants, and activities that are performed within the value network (Heikkila et al, 2008)

IV. **Finance**: The finance component is focused on the costs and revenues across the value network (Heikkila et al, 2008).

V. **Technology**: The technology to provide services is an important factor to provide, and deliver services to the customers (firms). (Heikkila et al, 2008).

2.3.3. What Business Model Framework to digital platforms within living labs?

In order to answer the research question, it is necessary to make a reflection at this point to choose a business model, and answer which business model could be appropriated to analyze the problem, and design our business model.

In section 2.1, we discussed the importance to look at the iterations and the description of the values to the customers and companies involved within the business model framework. From the platform theory, we have to look at two aspects to address the organization and the technology. The organization of platforms is essential define the platform governance, strategy, and alignment with technology as discussed in sections 2.2.3-2.2.4. And, secondly the discussion of the technology as gear to grow the platform with the governance should be included. Now from our viewpoint, we analyze the four frameworks along with the factors described above, and measure its level of description in one or several components of their framework.

CANVAS is mainly focused on the value creation and value capture for the customers rather than value to organizations (Osterwalder & Pigneur, 2010). This has a focus on description of services and products for business to customers. In this same reasoning line, the iterations are not part of the business model design, yet Osterwalder & Pigneur (2010) discuss the importance to make assessment over time and/or create scenarios to test and re-design the business model if required. Moreover, the organizational structure is mainly based on the

description of the infrastructure management pillar. And lastly, the technology has no definition on the framework.

The STOF model is mainly based on innovation services within collaborative settings (Bouwman & Reuver, 2010). Contrary to CANVAS, the STOF model seeks to identify the value for users, customers, and organizations across the value network (Bouwman et al, 2008). This implies the STOF method assumes all stakeholders can actively participate within the design of innovations. Bouwman et al (2008) argues extensively the organizational arrangements to have network openness, and network governance as critical design factors of the value network. In addition, the STOF is based on a dynamic multi-actor setting for technology innovations, and divided in three development phases: the technology R&D; roll-out, and market phase (Bouwman et al, 2008). And lastly, this model accepts the iterations as part of the design of the business model.

The VISOR focuses on the development of virtual services within a networked environment (El Sawy & Pereira, 2013). VISOR describes the technology and organizational infrastructure in their components, as well as seeks to comprehend issues related to governance, openness given its focus on platforms. The value elements are important for both customers and companies involved (El Sawy & Pereira, 2013). The iterations are not well-described, as well as there is no visible tool to design the business model as STOF.

Lastly, the C-SOFT is mainly focused on B2C relationships, and has a customer-center focus (Heikkila et al, 2008). Yet, This gives importance to the organization and technology alignments, but this occurs under a networked environment with a customer centered position form all stakeholders (Heikkila et al., 2008). Finally, the development of scenarios with market conditions, technology changes can be evaluated to make refinements in the business model.

From this view, we make a comparison of the four business models is shown along with the main features described earlier in Table 2.1. Based on this analysis, we can see that the STOF method could be the more suitable to design the business model to digital platform within living lab settings.

	CANVAS	STOF	VISOR	C-SOFT
Innovation Setting				
Value User and firms	Customer Focus	**Customer and network value**	Customer and network value	Customer Focus
Iterations	Scenarios	**Iterations in design and evaluation of domains**	Scenarios (not described)	Scenarios (not described)
Platform				
Organizational structure	Overview of Key resources and partnerships	**Value network and actor analysis**	Value network and actor analysis	Value network and actor analysis
Technological Innovations	No Technology description	**Technology architecture**	Interface and digital services	Technology architecture

Table 2. 1 Comparison of BM frameworks

2.3.4. Viability of a Business Model

Viability is defined as the quality of being able to have a reasonable chance of success. Viability comes from the latin root *vita* (life) so this means the ability to keep alive, and grow over time as it is intended from the beginning (vocabulary.com; Cambridge Dictionary). Similarly, a viable business model can be defined as a business model that is able to evolve, grow, and keep alive, as it is intended once the design of the business model has finished. To this thesis, we take the concept of viable business model as the ability to create value for customers and the value network (Bouwman et al, 2010).

As it was mentioned, the STOF model has a tool to design, and support the design stages of the business models in a step-by-step approach (Bouwman et al, 2010). The STOF method has the critical success factors (CSFs) to make a viable and sustainable business model (Bouwman et al, 2010). And similarly, the CSFs are associated with critical design factors (CDFs) in order to make the refinements over the evaluation and design process of the business model (Bouwman et al, 2010). The CSFs and CSDs are re-assessed and re-designed until the business model creates value to customers and firms in a balanced way between all domains (Bouwman et al., 2010).

2.3.5. Business Model Road-mapping

As part of the main research question, the investigation has to look at a roadmap to implement the business model for the platform in health and wellbeing services. The business model road-mapping aims to the planning to make transitions from the business model into business activities (de Reuver et al., 2013). The business model road-mapping is worked out by two analysis in parallel: the business model domains, and the activities to enable the progresses over the time, and across the roll-out of the business model (De Reuver et al, 2013). The first layer has to take into account the four domains of the STOF model. Based on these streams over the time, it is possible to see the impacts of a modification into the rest of domains of the business model (De Reuver et al, 2013). Four steps are described in this process, and these are exposed as it follows.

1. Identification of the changes in the business models.
2. The analysis of the impact in the rest of domains.
3. The translation of the changes across the business model domain into business activities.
4. The mapping of actions with an ideal transition of activities over the time.

2.3.6. Business Model Stress testing

In addition to the CSFs and CSDs, the business model could be evaluated based on scenarios analysis to measure its impact on the business model. Normally, these scenario evaluation aims to validate the robustness of the business model (Bouwman et al., 2010). Robustness should be understood as the property of being able to withstand adverse conditions (Oxford Dictionary). Janssen et al. (2012) propose the BM stress testing in order to validate the strong and weak points of the business model under scenarios and uncertainties. The process to make the business model stress testing is broken down into six stages: (1) the description of the business model (2) selection of uncertainties (3) mapping the uncertainties (4) define the heat signature to each uncertainty (both extremes) (5) Analysis, and (6) Conclusions (Janssen et al., 2012). Janssen et al. (2012) suggest the business model stress test should be applied at initial stages of the business model generation, because there are more uncertainties and scenarios to study.

2.3.7. Business Models with Iterations on Technology and User acceptance

Normally, the practitioner would think the development of the business model after the technology is created. However, more and more innovation services will be able to be developed, and the business model as strategic element is becoming more important (Casadesus-Masanell et al., 2010). Teece (2010) argue the importance to meet the business model with certain aspects of the customers and organization, and raise the attention to the business model given moving the attention to the technology. Hence, Bouwman (2010) suggests the business model design at early stages in order to aim the technology development, and the design of strategy.

From section 2.3.3, the discussion addressed the importance to include the iterations that exist in the technology, and the values to users and companies involved. In this line of reasoning Heikkila et al. (2015) suggest the importance to develop the technology iteratively validating this technology with the users, and building the business model. This is an alternative to build the business model in parallel with the technology, or before its development and customer validation, or after its development (Heikkila et al. 2015). Based on this, the business model can act as boundary object between stakeholders, users and technology developers, and intermediate with the market forces (Heikkila, 2010; Heikkila et al., 2015).

2.4. Discussion and Conclusion

In this chapter, we discussed three theoretical streams: STOF method, platform theory, and living lab settings. The living lab setting allows to understanding the complexities of open innovation systems based on the iterations an implications at organization and technology, and the importance of value creation for users and companies. The platform theory provides

us the main problems to ensure the alignment of organization and technology architecture, and the complications to grow these platform services at early stages. And, lastly the STOF method was described and compared to other business model frameworks, and how this was chosen based on the characteristics described in platforms and living lab settings (Section 2.3.3).

In order to design the business model to platforms in healthcare and wellbeing, this investigation will use the STOF method. The business modeling will involve participants that represent different stakeholders to the design and rollout of the platform idea. And, the business model design will have iterations in order to look alignments between organization and technology, as well as the guarantee to address the value creation to firms and users. The STOF method seeks to provide the main elements of each domain: Service, Technology, Organization, and Finance in an iterative way (Bouwman et al., 2008).

Finally, the reflection and analysis of the collected elements to build the BM should take into account the problems to design business models, and link this to the platform and design stages as described (Tiwana, 2014; Stahlbrost and Holst et al. 2012). The main points to be taken into account are represented in the critical factors to make it viable of the business model (Bouwman et al., 2008). Yet, it is important to add the business model stages, and its view to make iterations over the technology, along with the users and the business model (Heikkila et al. 2015). And, the construction of scenarios and analysis of these into the business model could aim to define the robustness of the business model. Hence, the business model design will have to take as starting point the STOF method, but reflect on the platform development stages, iterations on technology, and involvement of users.

Chapter 3: Business Model Design

In this chapter, we proceed to do the BM design using the STOF method. We initially describe the project Zo-Dichtbij, and the main stakeholders that are involved within the living lab in Section 3.1. Subsequently, it is explained the methodology to design the business model as well as the way we collected data from the design stages in Section 3.2. Then, the description of the main events and agreements between the stakeholders are described in Section 3.3. Finally, we conclude the BM design by making a comparison of the results, and building the BM in Sections 3.4 and 3.5.

3.1. Zo-Dichtbij

Zo-dichtbij is placed in a living lab setting in order to design, and build a platform in healthcare and wellbeing within the municipality of Rotterdam. This platform mainly seeks to do the matchmaking between the service providers, and users to provide services in healthcare, wellbeing and domestic help (Keijzer-Broers et al, 2013). Currently, several parties that come from the academy, industry, public sector, and users compose the living lab. Scholars and students represent the research group; there are two large organizations and two SMEs from the IT industry, and innovations in healthcare industry. Moreover, one partnership has been established throughout one foundation in order to build the platform and the BM in such a way, the business idea can be exposed to the municipality.

Currently, the platform is conceptualizing the matchmaking between the end users and providers in order to deliver services to the elderly people. The platform seeks to be implemented in the municipality to initially launch the prototype. A basic prototype with basic features has been tested, but it is time to develop further. The municipality and WMO helpdesk will be able to use the platform as a tool to support and advise their citizens in the healthcare system.

Zo-Dichtbij is an interesting project to our research in order to understand the complexities in the design of BM, as well as evaluate and take part of the design process of the BM in a real setting. My role will be an observer of this setting, and contribute to the design of the business model based on the abstraction of data from workshops, and later from interviews.

3.2. Methodology

In the research methodology, we explained the importance of interactions between researchers, designers, managers, and users in order to design the business model. This enables the participation in design stages, so that the business model can be developed, taking into account the views from each stakeholder. From a workshop design, the researcher can explore the different alternatives, and collect information to make the business model more

balanced in all domains. Hence, the emphases in these two sessions were mainly the design of the business model using the quick scan.

The quick scan seeks to define the business model with the STOF method. Its main idea lies on the construction of the service domain from the customer value to the rest of domains (Fielt, 2011). Bouwman et al (2008) argue that the business model can be built from the service domain to the rest of domain aspects. Hence, the design workshops will give inputs to build the business model. (Bouwman et al, 2010).

The workshops were mainly to have brainstorming sessions about how the business model could be designed between the researchers, and the participants. The workshop agendas can be seen in the Appendix A.1. These workshops were in parallel in order to compare results about how the business model could be designed, and see the complications of problems in the business model of the session. On the one side, the involvement of the users and experts from the demand side (elderly users) will aim to build and identify the needs from the user side. On the other side, the involvement of companies helps to identify their interests and main roles in the business model. Moreover, both workshops will have a business model stress testing to evaluate the business model under scenarios or uncertainties as described in section 2.3.4.

Yet, it was difficult to address the technology domain due to the participants had a strong focus on the service, organization and finance domain. The participants in the first session did not have expertise in technology, and a few remarks could be obtained from the technology domain in the second workshop. So, the focus is on the other three domains, and brief description is given in Technology. Additionally, both workshops sessions were leaded by the same facilitator in order to guarantee the interaction of the participants. The facilitator had to have the abilities to allow the communication process in the design, and cooperate with the participants to take the key points in the BM design.

In order to ensure an active interaction, the workshops used the Dutch language. The use of native language enables participants to communicate and debate in the brainstorming session. Indeed, the participants could easily communicate. All participants of the board were Dutch native speakers, except me as a researcher. However, the Video recording were analyzed and translated along with Dutch native speakers, yet the refinements to the business model in Section 4.2 can validate the understanding from my side about the business model design.

In table 3.1, it is explained the overview of the participants involved in the design, and evaluation part of the BM along with the codes to refer in the rest of document. Due to confidentiality and privacy, we are not able to publicize the names. Lastly for both workshops, we considered the following conditions to select the participants in both workshops: (1) the experience and involvement within the project, (2) the knowledge in and experience in business domains, and (3) the moderator should have experience in dealing with a big number of participants in workshop designs.

Code	Participant Workshop	Organization	Job Position
VC	Session 1	Voluntary Caretaker	Manager
DI	Session 1	DareToDifr	User expert
FO	Session 1	Foundation Zo-Dichtbij	Chair
ZI	Session 2	Ziggo	Sales Manager
NE	Session 2	Neobis	CEO
MV	Session 2	MedVision360	CEO
IC	Session 2	ICTU	IT Architect
IV	Session 1 & 2	Innovalor	Consultant
R1	Session 1 & 2	TU Delft	PhD Student
R2	Session 2	HBO	Researcher in Security

Table 3. 1 List of Participants in the sessions to the BM design

Once the description of the main reasoning and events were described. Then, we proceed to abstract the information that was important to the design of the BM. This includes the description in the four domains, and the main points that were analyze in the business model stress testing. Subsequently, the comparison of the two workshops was more focused on how some ideas could complement each other, and the similarities that were found in the process. Lastly, we validated and supported these results with the main participants of the session in order to evaluate and listen to them their arguments in favor (against) the findings throughout the interviews (see chapter 4).

3.3. Workshops

This section describes the main reasoning, and debates that emerged in the workshop design sessions in order to build the BM. Similarly, it is possible to see the value networks that were built during the session with the main actors to build the prototype version of the platform. Based on the discussions, and the analysis of this data, we will proceed to analyze the information, compare, and design the business model incoming sections.

3.3.1. Workshop 1

The first workshop was mainly addressed from the user side. In this Section 3.3.1, it is exposed the main outputs to the business model based on the arguments and debates that occurred in each domain.

3.3.1.1. Service Domain

The workshop began by describing the overview of users of the platform, and making a difference between near relatives and elderly people. Afterwards, a brief description of the platform services was obtained based on the portal, and basic functionalities of the platform. Four target groups were identified: the elderly people, near relatives (voluntary caretakers), providers and the municipality. In this section, we describe each target group, along with the value elements that could be delivered to each target group.

The voluntary caretakers have a dual role as customers and users of the platform, because they are sometimes responsible of their parents, and can be users in the platform [VC]. On the one side, the voluntary caretaker could access to the platform, and support the elderly people or themselves, to receive help form experts in care, wellness, or information about regulations [DI, R1]. On the other side, they could buy services or products for the elderly in health and wellbeing if required [R1].

As debate, the role of volunteers and voluntary organizations was discussed given they could help the elderly people, but they want to obtain better coordination and management to reach these people. These organizations want greater visibility, reduce management tasks, and they are focused on supporting elderly people [VC, DI]. However, [R1] argued that voluntary organization will receive the support with information and guidance to its target group as suggested to the voluntary caretaker. By now, the value elements could be the unburdening of healthcare load, support, guidance, and security (privacy) [VC, DI, R1].

The elderly person is clearly seen as a person who has some mental and physical disabilities, and requires help and support from someone else [DI, R1]. Moreover, they have limited budget to finance services, and want to be more involved in local activities [DI, FO, VC, R1]. Hence, the main value elements that can be delivered to the elderly people are: Support, and stay at home independently [DI, FO, R1]. Yet, [DI] emphasized the preferences in two points: (1) social contact with people, and (2) information to find caring solutions or advises.

The third group is the providers who can deliver services or products in health and wellbeing to elderly people. The providers can be from commercial partners, voluntary organizations, and professionals to providers of healthcare services with technology [VC, R1]. The main need to the provider is they want to reach more customers in the market [R1, FO]. The bundling of services was suggested by [R1], because these services can be domestic help, installments, health, wellness, medical professional help, and advisory services in the healthcare system.

As debate, it was suggested to make distinction between service providers and product providers [R1]. However, the users would not care this difference since when they receive their products and services [DI, VC]. This was a reason to make a suggestion to bundling services as described earlier.

The municipality is seen as an intermediary to reach the citizens (adopters of the platform) in the prototype version [FO, VC, DI, R1]. The idea of launching the platform there lies on the WMO Act that moves the expenditures and policies at local level. They want to communicate more efficiently, and help their citizens to advise them, and communicate with them when it is required [R1, FO]. Moreover, the municipality could guide their citizens with supporting tools in their business operations [R1]. Based on this, the municipality would be able to receive a good quality of service [VC, DI], and better communication and supporting tools to their citizens [R1].

A debate was the responsibility about information and privacy. On the one hand, the municipality may require information yet this is located in the platform [FO]. The municipality could improve their policies and caring services based on this information. However, the users and voluntary caretakers would be against this idea due to privacy issues, and also this applies to providers [DI, VC]. It was suggested to process information from the platform, and deliver statistical information if so [DI].

Lastly the platform services were explored based on existing concepts and platform ideas. Five features were identified: the diary, the agenda, contacts, local activities, and marketplace. The diary and the agenda compose the profile [R1, DI]. Yet, there is combination of activities online and offline between near relatives and elderly people [DI]. The diary seeks to show the events, local activities where the elderly user and/or near relative participated [R1, D1]. The local activities are events about healthcare, medical professional events, social events nearby the user [VC, R1]. And, the marketplace is the platform service to find providers and adopt their services [R1, FO].

3.3.1.2. Organizational Domain

In the organizational domain, the initial step was to analyze the actors that could be involved within the business model. Then value network was described based on the discussion of the service and the organization domain. In this section, it is described the value network obtained along with the actor analysis described in the session. In Figure 3.1, it is described the final value network that include the four target groups mentioned earlier, and the ICT firms. However, some additional parties were studied as insurances, Ministry of Health, Association of Municipalities and regulators, and how these could impact on the business model.

The central actor in the value network is the platform owner and, is responsible of the governance [VC, DI, R1]. [DI] added that this governance should include the service providers, and adoption of the users, but [FO, VC] remarked that providers must be reliable parties with credibility from the users. [FO, DI] suggested to start from the municipality, and try to reach the district neighborhoods to make more efficient the coordination between the providers and the elderly users.

The municipality is interested to help and guide better their citizens with efficient tools. [VC, FO] added the municipality could provide information to the platform about the healthcare system, or advisory services that citizens can be interested. In exchange, they would have the platform service. Their interests lie on helping their citizens to guide them throughout the system, and increase their corporate social responsibility to support the elderly population [FO, DI].

The IT partners are connected to the platform owner (Foundation), because these can provide the service supply the technology and infrastructure [R1, FO]. However, there should be a strong relationship to ensure the coordination activities in the platform [FO, VC]. These

management activities should be based on the improvement of services, and alignment of the platform architecture, and IT architecture. According to [R1], these activities should be moved to the foundation rather than the municipality.

The providers are able to give information to the platform within the marketplace that the platform has within the portal features [R2]. They are interested to have greater visibility and promote their products [DI, FO, R2, VC]. Moreover, [DI] remarked the preferences to not to have management tasks, and the platform along with the public sector (district nurses and municipality) should guarantee these responsibilities. The moderator suggests providing the access to the platform, and the providers would be able to provide information in the profile and promotions of their services in exchange.

They consider the foundation can offer to these elderly people and near relatives the matchmaking between the providers and end users [DI, R2]. Yet, it is still on the foundation board, the features that will have free access, and premium features [DI]. The services can be multiple from information services in healthcare, wellbeing, local activities, to the profile of the elderly user with the agenda, and the diary to make reviews from medical professional help or providers [R2, DI, FO]. In Figure 3.1. It can be seen the value network.

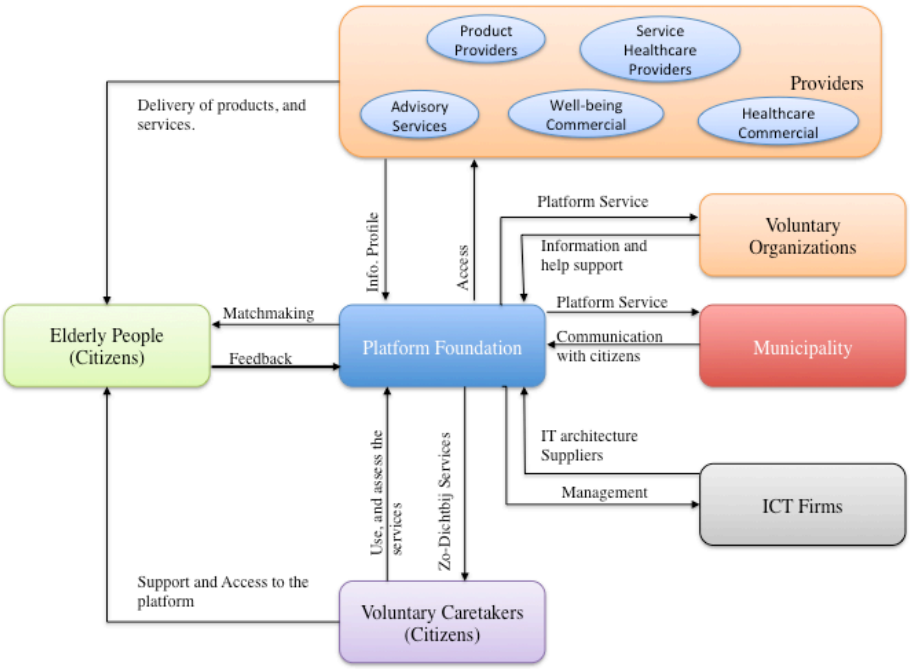

Figure 3. 1 Value Network obtained in the workshop 1

In addition to this value network, additional actors were mentioned in the actor analysis. The regulators can be broken down into three parts (1) the Ministry of Health (2) Association of Municipalities and (3) The Municipality [FO, R1]. The three institutions want to incorporate better quality of care to increase their corporate social responsibility with their citizens [FO]. Yet, it is necessary to reach the municipality at first glance to reach the other two layers [R1, FO]. By now, these parties can influence externally but not directly on the value network with legislations [VC].

All participants [R1, FO, DI, VC] consider the insurance companies as potential partners. As suggestion from the user side, elderly people and associations could advise the insurances to adopt the platform services [FO, DI]. Yet, [VC] debated the importance to launch the platform to achieve this goal beforehand. In the long-run, insurances could be potential customers with a license fee to adopt the platform service due to their interests on cost reduction and better healthcare quality [FO].

3.3.1.3. Financial Domain

To the financial domain, several revenues model were named and analyzed by the participants. However, no decision was made in order to define which revenue model should be chosen to each target group. The costs mainly come from the IT partners in order to develop the technology, and these costs are responsibility of the foundation.

Initially, [VC, R1] suggested services with a basic subscription to obtain basic services, and a monthly fee with premium services. [DI] advised the subscription with low fees given the budget limitation. However, [R1] suggested that the freemium model can be an interesting offer given the elderly people will have access to basic services for free, and they will pay for extra functionalities. Its weakness lies on the adoption of the free services, and marketing to adopt the premium services along with the usability of the extra functionalities [VC].

Lastly, the participants analyzed the advertisement model. The providers would be willing to have an advertisement model to promote their products, and this could be an attractive value element to the providers [FO, DI]. Yet, the advertisement model requires having a large number of users, so that this can be attractive to the providers at local level [VC]. The advertisements can lead to promote the services as the providers want, and the foundation receive revenues from the providers [FO, DI].

3.3.1.4. Business Model Stress Testing Workshop 1

This section describes the main points and discussions in the BMST session. The methodology and the main notes of the workshop are described in section A.3. and A.4.1. The main focus was the points to take greater attention based on the BMST.

In the Business Model Stress Testing session, the participants selected four uncertainties: (1) Digital skills; (2) competition; (3) WMO Regulation changes; (4) Aging population. And, the analyzed components of the business model were the target group, the value propositions, the technology, the actor analysis and the revenue models. The moderator suggested to breakdown the digital skills in two extremes (High vs Low); the competition (Slow vs Quick); and leave without changes the regulations and the aging population due to time period.

In the workshop there was a debate about the digital skills of elderly people, and this could be an uncertainty [VC, R1]. The competition was recommended by [FO, R1] in order to analyze

the existing of future competitors. And, the regulations were suggested from the user side by [VC, DI]. In the end, [FO] added the aging population to evaluate whether the target group (elderly people) was the real target group.

The digital skills of users could have two different results in each case. A positive result, if the older people have good digital skills in the future, voluntary caretakers and elderly people will be users [VC, FO]. But, the platform could face difficulties of adoption if the voluntary caretaker had low technology skills to manage the services [FO, DI]. Similarly, this was related to more revenues if everyone access to the platform, and less revenues if only voluntary caretakers can access [R1, FO].

From the organizational domain, the digital skills of users can impact on the business model in both extremes. On the one hand, more organizations and partnerships can build strategies and platform solutions to access to elderly people under high involvement of digital skills [FO, R1]. On the other hand, the elderly people and the platform owner could face problems to evolve the platform services due to low technology skills [DI, R1]. From this view, the technology skills of elderly people are crucial to develop the business model, and increase the opportunities to make it sustainable.

The analysis of the uncertainty of competition can be broken down from two different sides. On the one side, the slow competition can bring benefits to the platform with (1) creation of monopoly [FO, VC, DI] (2) Time to change or develop more the value propositions [VC, DI]; and (3) Timing of entry to build the platform ecosystem [FO, R1]. On the other side the quick competition can bring complications that deserve attention on (1) Focus on niche players (municipalities) [R1]; (2) More differentiation in the value propositions regarding to competitors [VC, FO]; and (3) Smaller estimation of profits due to competitors [VC, FO].

Lastly, the regulations in the WMO or policies national level may have negative impacts on the strategy and the role of the actors, specifically the VNG or the municipality. Other actors can play a role instead of the municipality as it currently happens [FO, VC, DI]. And, medical professional staff nearby to the elderly people could be affected by budget limitations from the municipality and/or policies at national level [DI]. In the end, the participants agreed to have the focus on the elderly people and the near relatives as the target group.

In general, the participants considered the business model design and the BMST sessions were really helpful. From their view, the activity helped to build the strategy in the future [FO]. The target groups, the value network and the analysis of uncertainties helped to analyze more the target groups, and understand external aspects of the business model [R1, VC, DI]. However, two remarks were added in the end (1) the business model will be more compelling in a future, but this business model could have adaptations in a future. And, (2) the competition is really low from this view. Thus, it is advisedly to make more compelling the business model, and balanced between the domains.

3.3.2. Workshop 2

As it was stated in the agenda (Appendix), the session initiated with a brief explanation of the STOF method, so that the participants could understand the STOF methodology to address domain by domain. Subsequently, the introduction of the personas was exposed, and the session started. Throughout this section 3.3.2, it is exposed the results of the brainstorming session along with the main debates that emerged in each domain.

3.3.2.1. Service Domain

The session started with the discussion about who is the end user? And who should the customer be? In order to make a difference, the participants analyzed the needs, preferences, and the context to come up with value elements.

Initially, the elderly person was being seen as a user by [ZI, NE, MV]. Yet, the elderly person is seen as an indirect user who needs the support from one voluntary caretaker [R1, R2]. The reason behind lies on the difficulties to access to technologies, and disabilities that elderly people have at these ages due to mental or physical problems [R1]. Afterwards, [IC, NE] argued that the providers deliver services and products to the elderly people, and this make them users. However, it is difficult to one elderly person who has disabilities or does not have technology skills to access to the platform as a young elderly person has.

Two different groups were mentioned in the session the elderly people who are people very old, more than 75 years old, and the young elderly people, between 55 and 75 years old [R1]. The younger group could be the voluntary caretaker whereas the older group is the elderly people who want support, and stay at home [R1]. However, this idea was argued given more and more elderly people are technology users [ZI]. This could be a trend in the future given that the adult people will have experienced in their life with technology.

From the provider side, [IC] said that the provider had a dual role as user, and customer. The provider can use the platform to have visibility in the market, reach more sales, and do marketing to the voluntary caretakers or elderly ones [IC]. And, this could be a customer given they can buy for services to promote their products (services) in the platform [R1, R2, NE, MV, IC]. Thus, the provider could offer some information about their services to the platform, and buy some services from the platform.

Afterwards, [MV] introduced the importance of having the municipality as potential target group, because the platform will support the helpdesk, specifically the advisors with information services within the platform. In general, IT providers [NE, IC, MV] consider the municipality should launch the platform, and the municipality should pay for the WMO helpdesk services that are provided from the platform to the citizens. However, it is important to understand the reasons why the municipality should buy this service [MV]. According to [R1, R2], the platform will reduce costs for the municipality. The reduction of costs and

improvements of efficiency comes from the information services, the participation of users (advisors, elderly people, voluntary caretakers), and less and less people will go the WMO helpdesk [R1].

Conversely, the description of the service domain in this workshop was difficult to be reached. At the end, the group mentioned value elements such as transparency, reliability to the system were related to the municipality. The value element to stay at home as long as possible was related to the elderly people. Now, the unburdening of healthcare load and support were the main value elements to the voluntary caretaker, because they will find the products and service in the platform and make it easier the caring responsibility [R1, R2, ZI].

During the discussions, the participants addressed possible ideas to connect platform services with each target group. The marketplace is related to the providers' interest to promote their services and products [ZI, NE, MV, R1, R2]. Advertisement services were partly explored by [R2], yet these could be bounded given the user base is low [ZI]. In order to deliver platform services to the municipality, these would mainly lie on the information services, and possibilities to advise their citizens with the platform more efficiently [R1, MV, R2]. And, the elderly users and near relatives will have the profile as their main platform service [R1, MV, IC].

3.3.2.2. Technology Domain

In the second workshop, there were some participants from the ICT domain. I leaded this session along with [MV, IC, NE]. Initially, the moderator exposed the idea to address the technology domain by looking at the applications, access logic, and infrastructure required to deploy the platform services.

Subsequently, the participants said that the platform would be built over a cloud service, and the users would be able access by mobile devices, and personal computers [MV, IC, NE]. However, the main complication lies on the construction of the interface to the users of the platform [MV]. And, the architecture consists of one database, one integrator, and a system to aggregate the information to build the interface of the user. Hence, the participants considered that it was difficult to reach one possible IT architecture [MV].

In the end, the moderator ask two questions about the interests of the IT firms, and resources that they contribute or could earn. Currently, the ICT firms have interest to increase their sales, and gain experience in platforms to the healthcare and wellbeing to the elderly users [MV,NE]. They currently see the need of the municipality as the potential and initial customer [MV, NE, IC]. They would be willing to provide their resources and capabilities to develop the platform, and do the maintenance activities to ensure the evolution of the platform from the technology level [NE,MV,R1,ZI]. Hence, the IT firms recognizes its role at operational level, but they consider the importance to bring the technology interface.

In general, this session had difficulties to explore a possible IT architecture due to lack of the user interface. In order to design an IT architecture, four points were given: (1) the cloud service to roll-out the platform [MV, NE] (2) the platform features to deliver information services to the citizens in healthcare, the profiles, the contacts, the social and local activities, and the marketplace to do the matchmaking [R1, R2] (3) the security would be across the IT architecture, and lastly (4) the access to the platform will be mainly accessible by mobile devices and laptops with online connectivity [MV, NE, R1, IC].

3.3.2.3. Organizational Domain

Based on the service domain, there were three actors besides of the foundation. [ZI, R2] added that the elderly user would receive the support from the near relatives based on the service design. Yet, there should be an interaction between the providers and the elderly users in order to deliver services and products [R1]. In other words, the platform is the medium to communicate both parties so that the provider can deliver the services to the elderly people.

In Figure 3.2. It can be seen the value network obtained to the business model. In section 3.3.2.2, the description of activities and roles in the IT firms were described. And, this was in line with the findings in the workshop session from the organization domain. [R2] added that the information and the processing (storage, sharing, content delivery) that the platform does to this is key to provide new services, or ensure the transparency across all actors. Hence the platform should use existing technologies, but the innovations should come from the service or interface [R2].

Similarly, the end users, informal caregivers, formal caregiver would receive the platform service from the foundation, as described in section 3.3.2.1. In exchange, they could provide some feedback to the platform services. Conversely, the participants in this session had common agreements about this. The differences are mainly on their roles they should have as discussed in section 3.3.2.1 given elderly people (end users) could be user and customers. And, near relatives make the support part due to lack of technology skills or disabilities.

From the provider perspective, the researcher expressed that providers can be really broad in how these can provide services or products to the elderly users [R1]. These could go from pharmacies, product providers, and medical professional to large organizations that can offer caring services [R2]. However, these parties required supervision not only in the selection process, but also in the delivery of services to the elderly users [ZI]. For instance, the elderly user may or may not require medical professional help, and they have to filter the cases that deserve professional attention from general practitioners [ZI].

The providers' interest seeks to have more visibility in the market, increase their sales, and deliver information to the user profiles, or marketplace. Additionally, providers want to experience, and learn from this sort of platforms, or become into strong parties to these

platform services [ZI]. From the value network (Figure 3.2), they promote their services throughout the marketplace, and can use a ranking from the platform service [R1, ZI]. Moreover, they deliver the services and products to the elderly people. In the end, [ZI] added that they do not have interests on the profits of the platform but in the access to promote their services.

However, the debates to have the providers are focused on two points: (1) the selections of these parties, and (2) the revenue models to this party. Some people believe that strong parties should join to the platform in order to ensure the growth of the platform, and the adoption from the users [NE, MV, IC]. However, [R1, R2, ZI] argued that the selection should look at resources, capabilities or properties that can make easier the delivery of services to the elderly people. And, the revenue models to these stakeholders lie on whether they pay a fee to the entrance of the digital platform.

The third stakeholder discussed was the municipality. To the project, it is advisedly the municipality does the investment to have the platform service [ZI, R1]. Despite risks to have looses are possible, the learning and lessons to obtain a digital platform in health will be obtained by direct experiences [R1]. In addition to it, [R2] mentioned that if the platform has problems within the municipality, the foundation must be ready to respond to these requests. Based on this [ZI] claimed that the municipality is an important actor, but the foundation has to deliver effective communication to the platform and their citizens.

The activities that the municipality can be responsible are the provision of information to the platform. They could provide information to advise, and do marketing to their citizens about the platform service [DI,VC,R2]. Yet, the supervision and management between providers and elderly people should be under the responsibility of the foundation, as well as the platform management [R1,R2,ZI]. The municipality would be responsible of special cases when the elderly person requires financial aids, or expensive medical services [FO,R1,VC].

Subsequently, the participants proceeded to make a picture of the value network. In general, the foundation is the central actor given that this seeks to ensure the matchmaking to the elderly user. The foundation will have a multi-sided platform to align three sides, so that the elderly users have their support from the voluntary caretakers, and the services from the providers. Hence, they have a central position to align both sides, and guarantee the services to each sided group. See Figure 3.2

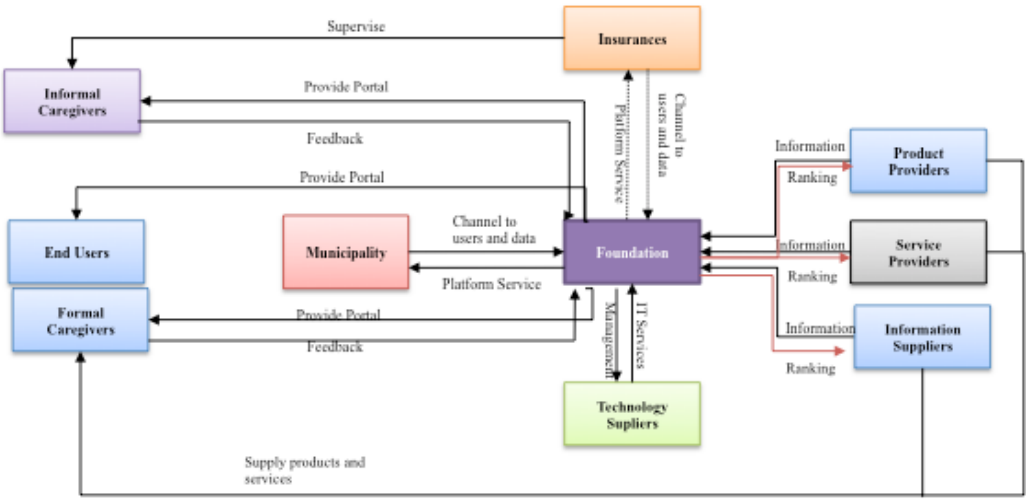

Figure 3. 2 Value network obtained in the second workshop

Similarly as it occurred in the first workshop, the regulators are the VWS, the association of municipalities (VNG) and the municipality, yet the municipality can lead to reach the VNG, and deliver customized solutions in other municipalities [R1, ZI]. Based on the promotion and success of the platform services, the innovation will have more and more supporters from the public sector such as the patient associations, and advisors of insurances and the ministry of health [R1]. Lastly, the insurances could adopt the platform services, and help to grow the user base due to their subscribers.

3.3.2.4. Finance Domain

The finance domain started with the description of the main goal to describe the investments, the costs, the possible revenues, and risks associated with the financial domain. Subsequently, the participants discussed and interacted to come up with possible revenues model that could be explored to the platform.

From the user perspective, [MV] mentioned that voluntary caretaker might have a subscription model to reach a membership in the platform. [R2] considered that the foundation can reduce risks if the revenues sources are constant from the all parties, especially from the voluntary caretaker. Hence, he considered that there should be premium services, and free services [R2]. [R2, MV] agreed with subscription with premium services at low costs given this amount times the number of potential users can represent a large revenue stream.

However, [MV] argued that it is necessary to launch the platform in the WMO, and then find out the money flows that will exist from the rest of parties. Subsequently, [R1, R2, ZI] discussed that the municipality should pay, and this can aim to reduce the risks to the rest of stakeholders given that if private firms invest it will be more difficult. Based on this, the WMO helpdesk should be the main source of revenues to the platform, and this must pay for information if they require [MV]. The WMO would be able to have partly free services given

this is a collaborator that can provide information, and this can aim to launch the platform in the municipality.

Then, the discussion moves to the healthcare plan that insurance companies should have to provide these services. However, there is no insurance that can think about on this service because this does not exist. [IC, MV] agreed with this statement, but [MV] argued even more that delivering services and products in healthcare and wellbeing must be paid anyway even if there are subscriptions to the platform for these services. The insurances would be able to have customized solutions to their own platforms, and may pay a fee to have the platform services within their insurance plans to the subscribers [VC,FO,DI,R1]. However, the foundation should start to negotiate this, once the platform starts to be launched in order to ensure the provision of caring and wellness services to their insured elderly subscribers [ZI]. Hence, [ZI] suggested working initially together with the Municipality, and trying to bring the providers later on along with a negotiation with the insurances in the long run.

Lastly, [ZI] considered that freemium model can be possible to the voluntary caretakers in the prototype version. But firstly, the foundation has to ensure how users will keep using the services as much as possible [ZI]. And, [ZI, IC] argued that the subscription and healthcare plan is not a problem, it is something that the foundation can start to discuss with insurances, patient organizations, and advisors of insurance companies. Lastly, [ZI] did not agree with charging the providers, because they do not want to be charged over delivery of their own services and products throughout the platform.

3.3.2.5. Business Model Stress Testing Workshop 2

In the session, three uncertainties were suggested in the session (1) Competition (Slow and fast) [R1, R2]; (2) Dominance of Insurances in the healthcare system (Rival vs Partnership) [MV, ZI]; (3) Privacy (Open vs Closed) [IC, R2]. And, the three uncertainties were evaluated based on the target groups, the value proposition, the value network, and the revenue models, as components of the business model. The focus of this section is on the main points to more attention on the business model; the rest of discussion can be seen in section A.4.2.

From the competition view, the greatest point of attention should be in the value network when the competition is fast. Under this scenario, the partners and IT firms could leave the platform, and join to other digital platforms [NE]. Similarly, it is recommended to make quick decisions to the revenue model and the services in the market under fast competition [NE, ZI]. So, the adaptation is essential under sharp and accelerated trends in the market competition.

In the dominance of insurances, the main complication lies on the impact on the value network no matters the insurances are rivals or partners. As rivals, the insurances may not need service platforms, and follow the policies in the healthcare industry [MV, R1]. Whereas the insurances as partners is risky because they may develop the platform services, and take a stronger position [MV]. This dominance is associated to the direct communication with policy

advisors, user bases, and possibilities to develop the platform with a direct experience, and own finance [R1]. Moreover, the inclusion of the insurances leads to have a revenue model, which is not described yet [MV].

From the analysis of privacy and security, It is advisedly to have an open system rather than closed system. The closed system could have impacts on three components: the target group, the value proposition, and the value network. The service design would require authentications, and the value proposition would have to be more limited given the entrance is limited [IC, R2]. And, the involvement of more stakeholders could become into a problem no matters if these are IT firms or providers [IC, R2].

In the end, a short evaluation was given from the participants. The business model is not fully described yet [MV, NE, ZI, IC]. The estimations in numbers about costs and profits would have been better to be reached, but the search is part of the process [MV, NE]. New insights were obtained from the business model [ZI]. Regarding to the methodology and organization, the feedback was good in general.

3.4. Comparison Workshops and building the Business Model

3.4.1. Service Domain

Conversely, the service design has four additional actors and the foundation as the platform owner. The elderly people who are the oldest group, and require support to manage and use the platform. The voluntary caretakers, particularly the young elderly people, who are in majority between 55 and 75 years old, and are willing to help their parents or near relatives along with a supporting tool to manage the caring activities, and access the platform. The municipality is being seen as the potential customer, and initial location to launch the platform in order to reach more and more adopters. And lastly, the providers are able to provide products and services in healthcare, wellbeing, and domestic help.

Based on the STOF method, we summarize the key points based on the needs, preferences, context, and value elements to include in each target group. In Table 3.2. the comparison of both workshops is presented regarding to the needs, preferences, context and value elements in each target group. Conversely, there are more similarities than differences in the service domain. The four target groups were described, yet the debate about the voluntary caretaker and the elderly people was clearly seen in both workshops. The slight differences are described as it follows:

- The preferences of the elderly people should be social contact and low costs while the companies involved inclined to the information services from the municipality.
- The debate about the differences between the elderly people and the voluntary caretaker was more visible in workshop 2 than workshop 1.

- The preferences on the municipality are to help and guide citizens in the workshop 1 while the focus on the second workshop was cost reduction and efficiency in workshop 2.

Now the question is how we can relate these value elements to the platform services that will be offered throughout the profile and access to the platform Zo-Dichtbij? The near relative will be able to access to portal, and have a profile to manage the profile of the elderly person. From this profile, the user will have access to five different features: (1) Agenda of the user; (2) the diary to keep a record of events; (3) Insurance and Medical Information; (4) Main services Zo-Dichtbij (Marketplace, social contact, information services, local activities), and (5) The reviews of products and services that will be acquired by the user (Keijzer-Broers et al, 2015).

- The agenda helps to coordinate activities between medical and healthcare professionals with the near relatives and the elderly people.
- The diary can help to support and guide the near relative (voluntary caretaker) to take care their relatives, because they will be able to observe and have a record of events related to the healthcare and wellbeing.
- The medical and insurance information, but this feature would be locked-in or, would partly provide information given the insurances are still parties to join to the platform.
- The marketplace can be broken down into to products and services in healthcare, wellbeing, and domestic help. The near relatives and voluntary caretakers will be able to search and find the services (products), as well as the providers will promote and reach new customers throughout this feature at local level.
- Information about aging-in-in-place in order to guide the citizens and help the municipality to have better communication, and be more efficient.
- Social contacts and local activities will let users know about events and friends in neighborhoods regarding to advisors, events in healthcare and wellness.

Target Group	Workshop 1	Workshop 2
Elderly person	**Needs**: support from someone else, and stay at home. **Preferences**: Social Contact, and low costs to solutions. **Context**: Mental problems, disabilities, and more involvement with ICT. **Value Elements**: Support, stay at home independently.	**Needs**: Support from young elderly people (near relative) **Preferences**: product, services, information in healthcare. **Context**: Mental problems, more involvement with ICTs. **Value Elements**: support, living independently, matchmaking
Voluntary Caretaker (near relative)	**Needs**: unburdening the healthcare load **Preferences**: guidance to find the right providers and entities. **Context**: take care parents, families **Value Elements**: Support, guidance, unburdening the healthcare load, security and privacy.	**Needs**: They want a supporting tool, unburdening the healthcare load. **Preferences**: features and interface **Context**: take care of parents and sons **Value Elements**: unburdening the healthcare load, usability and quality of service.

Municipality	**Needs**: They want to reduce costs, and have better services with their citizens. **Preferences**: They want to increase their corporate social responsibility. **Context**: The movement of caring to the local level (WMO Act). **Value Elements**: Low costs, quality of service, more communication with their citizens, more organization.	**Needs**: more efficient, better communication, support to inform citizens. **Preferences**: better communication, **Context**: WMO Act, and employees in the helpdesk WMO. **Value elements**: support, better communication, effective communication, low cost, reliability.
Providers	**Needs**: Increase visibility in the market. **Preferences**: Avoid management tasks, easy ways to reach more customers. **Context**: Fragmented market with many products and services. **Value Elements**: Promotion, visibility, access to customers	**Needs**: More visibility, they want more marketing, and increase the sales. **Preferences**: Promotion of their products. **Context**: Fragmented market **Value elements**: More visibility, more access to promote their products and services.

Table 3. 2 Comparisson workshops Service Domain

In table 3.3, It is summarized the compelling value propositions, and the services that could be provided to each side of the platform.

Group Sided	Compelling Value Proposition	Services and products
Elderly People	Live as long as possible independently with support and at low cost	Contacts, social activities, local activities, information aging in place.
Near Relatives (voluntary caretakers)	Unburdening the healthcare load along with support and guidelines	Contacts, social activities, access to marketplace, information and advisory services from professionals and the municipality, agenda, diary, reviews of products and services, local activities.
Municipality	Support and secure instrument to guide and communicate effectively with citizens at low cost	Information and Communication throughout the platform (information aging in place)
Providers	Access to customers, and promotion of the services in a marketplace	Marketplace, customer retention and promotion of services in the marketplace, and agenda (profile user)

Table 3. 3 Compelling Value propositions and Platform Services

3.4.2. Organization Domain

The organization domain in both workshops reached almost a similar outcome. The focus is on the municipality to launch the platform. In both workshops, they found difficulties to start the evolution of the digital platform without the municipality because they would lack of the user base, and the investments are difficult to find from the private sector. The Table 3.4 shows the slight differences between both workshops based on the actors, roles, interests, and value network.

	Workshop 1	Workshop 2
Actors	Voluntary caretakers and elderly people were clustered within a similar group. Yet, the distinction between the groups is clear.	Similarities in the regulators, main target groups (voluntary caretakers, elderly people, providers, municipality).
Roles	No IT domain given expertise in IT. Insurance can aim to bring the platform services within their subscriptions at first glance.	Technology domain described but broad Insurance and Telecom (Mobile) operators can be an intermediary to reach more users. Municipalities should be the main clients to be recognized in the market.
Interests	One of the main interests of providers, municipality, foundation, IT firms is their corporate social responsibility in healthcare.	Interests lie on reduction of costs, business opportunities, more access to healthcare, access to users and customers in healthcare.
Value Network	The providers were service providers, living commercials, volunteering organizations, domestic help, pharmacies, nursing solutions, medical professionals. The money flows were not included given the analysis of revenue models	The providers were classified in three large groups: service providers, product providers, and information providers. The money flows were not included given the analysis of revenue models.

Table 3. 4. Main differences in the organizational domain of the workshops

The actor analysis was extensively discussed in sections 3.3.2.3., and sections 3.3.1.2. However, if there is a table in the appendix section A.3, where the actor analysis is extensively described to digital platforms in healthcare and wellbeing. In general, the organizations involved are interested on four things (1) Visibility in the market and more sales; (2) More ways to reach, and communicate with customers (citizens); (3) Improve the quality of care; (4) Cost reduction and more efficiency. Lastly, the experience and willingness to learn is visible in the main actors described in the value networks.

3.4.3. Financial Domain

In general, the financial structure was difficult to be reached given the stage of the platform development. The main cost sources currently come from the development of the platform and the IT infrastructure at hardware and software level in both workshops. Moreover, there is a strong relationship between the foundation to the management and the ICT firms briefly described in points: (1) Platform development (2) Management from the foundation to ICT firms; and (3) Integration of systems based on existing technology. Hence, the main investments and operating costs come from these IT firms.

The revenues model were difficult to be reached given in both workshops were mentioned and analyzed a possible list of revenue models. The comparison and results can be seen in Table 3.6. of the possible revenue models. Despite several revenue models were briefly analyzed, not all can be implemented because these have to look at the technology

architecture possibilities, organizational domain and platform openness, and timing. Hence we will focus on six specific revenue models.

Revenue Model	Workshop 1	Workshop 2
Subscription Model	Subscriptions should be at low costs, or financed by the PGB [DI, VC]. From the provider side, it can be possible to pay for an spot [R1].	[MV] the subscribers to the healthcare plan in the platform must pay. Yet negotiations with insurances should start [ZI]. The providers can pay to have a spot [MV, R2]. This can create limitations to have free access, and open platform [ZI].
License Model	Municipality could pay a fee for the platform service	Municipality would reduce costs, be more efficient to the license (annual fee) [MV, NE, IC]
Freemium Service	The free services should be at low cost or for free [R1, DI, FO]. Premium features are possible but adoption is required.	It is possible to have this revenue model, yet they must ensure the adoption of the services [ZI]
Advertisements	Large user base is required [FO, VC].	Ranking and ads to the providers
Usage and Access Fee	Mentioned, but it is complex to implement.	Not mentioned
Transactions Fee	Providers can work by demand, and the foundation can receive income based on transaction costs [VC]	The providers can be charged [R2], but, increases in prices to the customers [ZI].

Table 3. 5. Analysis of Revenue Models in the workshops

Now the question is which revenue model can contribute to the development of the platform in the prototype phase? Any workshop could address the answer to the business model. However, we could consider the comparison in Table 3.6, and analysis in both workshops to complete to add to the value network the money flows.

Three revenues model could be visible: the freemium model, the advertisements, and the license. In Figure 3.3. can be seen the value network with the financial flows. The foundation will provide the platform service to the municipality whereas the municipality can be the channel to reach the user base, and pay an annual fee to the foundation. The providers would have an advertisement fee in exchange they would have the marketplace, and the promotion services from the foundation. And, the near relatives could have a freemium model with a platform service that has free services, and premium services with a monthly fee. In addition to it, the providers and users can provide feedback, and information to complement the platform service. The elderly people would receive the services and products from the providers, the matchmaking element from the platform, and support from the voluntary caretaker.

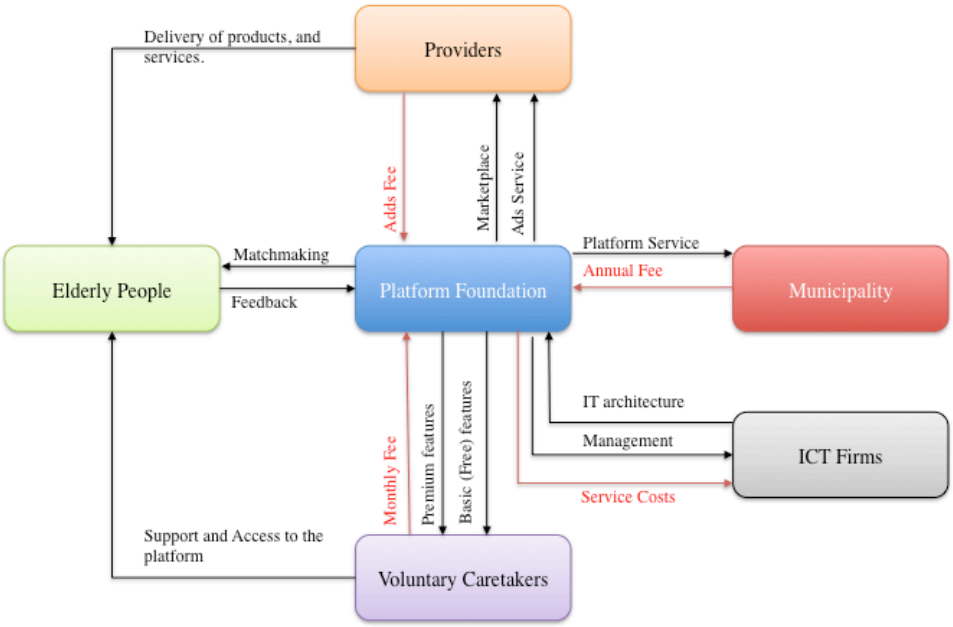

Figure 3. 3 Value Network after the BM design

3.4.4. Technology Domain

The service will be mainly online to the providers, voluntary caretakers, and municipality. However, the elderly users will not be able to manage their profiles unless they make a request. The main functionalities to the platform are: the profile, the marketplace, the information aging-in-place, the local activities, and social contacts. According to them, the security will be across the technology architecture. And, lastly the users will be able to access to the platform by mobile devices or computers.

In general, the platform services would be placed in a cloud service. The cloud service would be responsible of the intelligence of the system in order to integrate the web services, APIs, and databases that are required. The security should include the authentication and security systems to access to the platform, make requests to establish procedures, or access to the information and infrastructure in IT. Based on this, we proceed to describe a possible IT architecture to the prototype version that includes the main roles from the IT perspective, as it can be seen in Figure 3.4.

Telecom or mobile network operators could be the access layer to the users. And, then the updates or content would be processed and distributed. Although this was not described, the main needs to the platform services are: (1) add services (service aggregator), (2) the advertiser, (3) the billing and (4) the content aggregation from users. Lastly, security should be responsibility of all IT firms and the foundation. These four IT services should be integrated with the platform features and the cloud services as it can be seen in Figure 3.4.

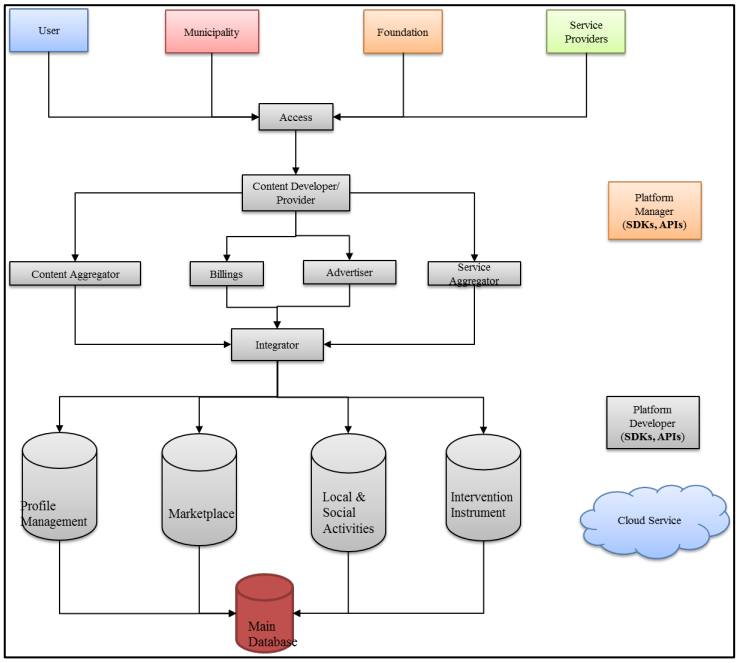

Figure 3. 4 Roles and Technology Architecture at basic level

The cloud service implies the functionalities and features will be processed and store in a cloud. The IT provider of the cloud would have dominance in the privacy and security of the platform and data integration. Hence, the foundation should be aware of these downsides from the IT management view. And, the management of the platform in IT should be responsibility of the platform owner rather than providers or the municipality.

3.4.5. BMST Comparison

The main differences in the workshops were the uncertainties chosen to evaluate the business model in two different scenarios. In the workshop 1, the uncertainties were the digital skills, competition, regulations and aging population, whereas the workshop 2 chose the competition, the dominance of insurances, and privacy. Contrary to the similarities in the business model design, the scenarios and uncertainties are seen different from the user and organizational sides.

The components to analyze the business model were almost the same. This implies the users and stakeholders have been involved before in the project, are figuring out the business model to the digital platform. Moreover, it is also clear for them the description about the target group, value elements, value network and the revenue models. The unique difference is in the analysis of the technology, but this had a focus on the user side rather than on features.

The heat map for competition with fast reaction was similar in both. They are aware that competitors can appear, and the business model and technology will have to react to this change. However, the differences were in the value network. The users read the problem from the winners of the market, while organizations focused on changes to the business model, and problems to keep partnerships given interests to grow with platform rivals, if so.

3.5. From Building to Reflection

After having described the business model in section 3.4 based on the inputs from both workshops, we proceed to reflect and make initial contributions based on the design stage, as we stated in our research approach. Initially, we took a position about the business model design and the importance to design the business model on platforms with all stakeholders from the STOF method as starting point. And subsequently, we explore new topics, questions that appear based on the literature and experiences in the business model design stage.

3.5.1. Business Model Design on The Digital Platforms in health and wellbeing

The approach to involve the users, develop the technology, and build the business model was considered in the living lab approach. Just as, Heikkila et al. (2015) argue the business model should be developed in parallel with the technology, and the customers should validate the technology iteratively till the three elements reach the market introduction. We consider the importance of building the business model along with the technology (digital platform).

Initially, the involvement of the user is central not only to the design of the technology, but also the business model. The involvement of the users can lead to identify faster the needs, preferences, context of use, and even value elements to the service design. Moreover, they can make contributions to the technology design given they can accept technology services, and adopt more nowadays. The digital skills as real skills in elderly people could contribute to bring more benefits than cons. This literacy trend in IT can bring more possibilities to build the platform, and better reading about value propositions or target groups.

Although the technology domain was briefly described in the technology domain, the portal features and platform services are being achieved in parallel with the business model. In fact, the platform services described in both workshops and the comparison demonstrates advancements from this view, and user acceptance. And, tangible element can be seen in the portal features described in the appendix Figure A.5, interface that is being tested and designed iteratively.

The design of the business model is a third component to be introduced besides the user acceptance, and the technology development. In both workshops, the business model could reach important insights in all domains, but still this lacks of elements that were not described in full. These mainly refer to the financial numbers, investments, costs that are also associated with the development stage of the digital platform. Hence, the business model will require to make refinements based on certain topics, and ensure the value propositions, platform services, value network described in section 3.4 can reach a more compelling business model than the achieved business model.

3.5.2. Reflection based on STOF Method to make evaluation and refinements

Although a business model was reached till now with gaps, it is necessary to look at the CSFs of the STOF method (Bouwman et al., 2008). The reflection on the elements achieved, and the uncertainties found in the BMST can be complementary.

The customer value is evaluated based on four factors: the target group, the value propositions, the quality of service, and the customer retention. Now, the business model reached can describe the *target groups* to the digital platform. The elderly people, the near relatives, the providers, and the municipality represent the target groups. The *value propositions* were evaluated in both workshops, but the feedback was to describe the compelling value propositions instead of elements. From this view, the value propositions will be evaluated in the refinements and evaluation stage. The *quality of service* and the *customer retention* were points that still deserve more attention on the business model. Hence, the evaluation should look at these issues, and their design factors to where it can be possible.

On the other side, the network value takes into account: the network strategy, the division of roles, the acceptability of profits, and the acceptability of risks. In the existing business model, the *division of roles* seems to be clear since the value network had the strategic stakeholders as target group, and the IT firms as operational stakeholders to develop the platform. Moreover, the institutional parties are described from the national level to the municipality level, yet the focus should be on the municipality given the WMO Act. The insurances are an uncertainty, but they could have a dominance position in the value network, and take actions to build digital platforms by their own, becoming into rivals.

The *network strategy* seems to have a clear strategy from the participants since the feedback was positive about this point. Yet, some points should be addressed based on the uncertainty in privacy in workshop 2 to define the views from the user side and organizational side about platform governance, and platform openness. The weaknesses are the *acceptability of profits,* and the *acceptability of risks,* these two factors are related to division of investments, financial arrangements, and financial numbers in costs and profits. The revenue models and the cost sources are part of the description about the acceptability of profits, yet numbers cannot be reached given the platform development stage. Hence, it is advisedly to review topics of the organization domain based on governance and openness, and the financial structure based on revenues models decisions.

Based on this, the business model is still in progress to make improvements. The customer value requires more analysis to look at the customer retention and the quality of services regarding to the municipality, providers, and users of the digital platform in healthcare and wellbeing. Moreover, the network value should have a better description in the division of roles and the strategy. Currently, it is difficult to define the business model, and make a description with numbers based on profits (revenues and costs), and investments. Hence, the refinements should be focused on the design issues to close these gaps as much as possible.

And, lastly the BMST could provide important insights to the main points to take into account under specific uncertainties. The major problems lie on the rapid growth of competitors and implications on the value for both customers and firms. The fast growth of competitors can lead to create problems to reach the target group, and the business model should focus niche markets. From the organizational part, the growth of competitors can lead to have more resources and capabilities to build the project, yet the IT developers could prefer to leave the platform development, and join to rival platforms.

Given the BMST seeks to measure the robustness and the evaluation of the CSFs seeks to measure the internal validity and viability of the business model. Both tools are complementary and can be used to make the design (refinements) to the business model, and evaluate the business model regarding to uncertainties or gaps in the BM. Based on this, it is possible to make anticipations to the changes faster. Although different results were obtained in both workshops in the BMST, the business model is still in the direction to address the elderly people, and reach the municipality.

3.5.3. Financing Digital Platforms in Health and Wellbeing Domain

From my initial position, I said that the development of digital platforms in health and wellbeing should come from public-private-partnerships in early stages. The division of investments in the platform development to have the platform basis should be responsible of the municipality, Zo-Dichtbij, and providers from IT and healthcare industries. Its main reason lies on the earnings in finance, resources and capabilities that businesses will obtain from this experience in this industry sector. However, the researcher position changed over the time to place the investments on the municipality rather than the private sector.

Nowadays, the municipality is responsible of the promulgation of policies at local level and funding on innovation and healthcare. Moreover, they have an interest on cost reduction, and better communication with their citizens to improve the health and wellbeing of their citizens. In addition, the innovation policies and budget to allocate the innovations in the healthcare industry should be part of this responsibility (referred to WMO social act; OECD, 2014). Their interests and institutional power to finance the project from the public sector would bring the stakeholders to collaborate and cooperate on the project. The downsides would lie on the interests of the rest of firms to extend the project even more. The IT firms are mainly focused on boosting the sales, and learn from these experiences in the healthcare industry. However, the sustainability of the project could be affected once the IT firms developed their solutions, or firms in healthcare develop new platform solutions. Therefore, the governance should guarantee these risks, but it is likely the investments should come from mainly the public sector rather than private sector in the context of the Netherlands.

Chapter 4: Business Model Evaluation

After using the quick scan methodology, and building the initial business model, we proceed to make the business model evaluation throughout iterations till reaching a final business model that could create value to the elderly people and the actors. In this chapter, we explain the methodology and the final business model. The final business model is explained based on the discussions between the stakeholders in order to refine, and reach a balanced business model between its domains.

4.1. Methodology

The methodology used to make the refinements and evaluate the business model was throughout interviews. The interviews can aim to identify the advantages or disadvantages of the existing business model, as well as the analysis of gaps or possible recommendations to the business model design. This will help to evaluate the service concept, and decisions made from the organizational and financial perspective by involving all stakeholders. The main advantage of these interviews lies on the focus on the evaluation, and the advantage to gain insights in specific topics from the stakeholder perspective, and speak freely. A set of questions was designed to have the interview (Sextion A.2), and the researcher will be able to provide new insights or ask new questions depending on the answers.

The interviews had three stages: (1) the explanation of the business model design briefly, (2) the discussion or remarks from the interviewee to the interviewer, and (3) the interview questionnaire in order to assess and make refinement of the business model. As it was stated in section 3.1, the involvement of stakeholders is one of the keys in the design of the business model. Thus, we choose representatives from the user side (voluntary caretakers), the municipality, the foundation, and the providers.

Code	Organization	Job Position
VC	Voluntary Caretaker	Manager
MU	Municipality	Healthcare Advisor
ZI	Ziggo	Sales Manager
FO	Foundation Zo-Dichtbij	Chair

Table 4. 1. Particpants in the interviews to the BM evaluation

4.2. Business Model Refinements

Contrary to the initial design stage of the business model, the participants will have a starting point. The refinements will be done in parallel to the evaluation depending on the domain. If

the refinements are required, it is necessary to see the impact on the rest of domains in order to reach the balance (Bouwman et al, 2010). In this section, we explain the refinements that were necessary to the business model design in order to close some gaps, and improve the business model a bit more.

4.2.1. Service Domain

In the service domain, the value propositions were assessed one by one to each target group. In general, there is an agreement about the value elements to elderly people of "living as long as possible independently", and the "support" [FO, VC, MU]. Yet, they recommend that rather than low costs, the value element to introduce should be associated with efficiency and organization of the information in one place [VC, FO]. Secondly, the quality of the service is difficult to describe due to they have not had direct experiences with the platform [MU, VC]. And, lastly the municipality added the conditional of support and guidance when this is required.

The value proposition to the voluntary caretakers was discussed from the unburdening element. The unburdening can be mitigated with volunteers, and organizations that can offer some domestic help [MU]. But, this unburdening element only remarks the negative sensation of the target group rather than the elements that could offer the platform [ZI]. This unburdening should be decreased by another element, or aggregation of other value elements [ZI]. Moreover, the importance to find the information in one place is not sufficiently visible in the value proposition despite the guidance [VC]. Hence, the value proposition should be reconsidered to "Unburdening the healthcare load with support, quality, and guidelines to be informed in one place".

The value proposition to the providers is the most clear regarding to the rest of target groups, according to [VC, MU, FO]. However, [ZI] added the importance to have a partner and be trustable to their platform services. The establishment of a partnership with Zo-Dichtbij is a value element that could be important to this value proposition. Yet, the retention of the providers depends on reaching more customers once the platform begins to work [ZI]. Therefore, we suggest the "Access to customers, and coordination to promote and deliver services with Zo-Dichtbij".

Yet, the value proposition to the municipality finds difficulties in three points (1) the implementation of customized solutions with other municipalities [VC, MU], (2) the visibility of costs and efficiencies [MU, FO], and (3) the benefits that municipality could receive from the platform to their citizens [MU]. The implementation with other municipalities can be a problem in coming stages, but the platform should ensure the integration of these solutions [MU]. Hence, the platform as support element must reflect the benefits to the municipality and their citizens at the same time in order to have value elements to pay for it. Based on this, the value proposition was changed to "Support your organization and citizens with quality, comfort to guide, advise and communicate more effectively, and get contact with us at home".

And, lastly the retention and the quality of services are the main complications in the platform services. In order to ensure the customer retention, the profile is seen as driver and enabler to use the platform, and promote brands (companies) or personal care [VC, ZI]. Moreover, the providers will be able to have their channel to promote their services with growing user base [VC, ZI]. And the customization to the municipality and their citizens can be a good way to have the municipality within the platform [FO, MU, ZI]. Yet, these two elements require more description and visibility with a direct experience of the technology/

The customer retention will be possible to see based on the usability of the platform features, and its adoption. The customers will move, and keep the premium account, once they recognize the facilities of the platform services [VC, FO, ZI]. The digital platform needs to find the platform services to ensure the adoption and use of the services [ZI]. Additionally, the adoption can be a driver to have more and more users, and help to describe more the customer retention elements [VC, ZI]. Currently, the description cannot go beyond the profile and customization services keep using the platform with high quality.

4.2.2. Organization Domain

In general, the actors agree that the platform should be open not only to have more IT partner but also more commercial and market partners from the healthcare, wellbeing, entertainment and municipalities [VC, FO, MU, ZI]. There are several advantages of an open platform: (1) the opportunity to bring more competition between the providers [VC, ZI]; (2) the voluntary caretakers will have better services, and better customer relationship in the platform [VC, FO, ZI]; (3) Municipality will be able to offer more and more advisory services if the citizen needs about care or wellbeing [MU]. Hence, the openness can be beneficial not only to the platform developers but also the commercial partners and users.

The freemium model is an important input to the business model given this is related to the openness of the ecosystem [VC, MU]. Similarly, the advertisement fee is in line with the interests of the providers, and ads do not introduce barriers from the financial perspective to them [VC, MU, ZI]. Yet, the excess of advertisements can be harmful to the adoption, as well as the preferences to specific providers [MU]. Moreover, the platform Zo-Dichtbij has to guarantee the competition between small players, and large partners [ZI]. For instance, providers in the neighborhoods can be more reliable and reachable than others in specific regions. Hence, the preferences to select providers should come from the branding and user preferences that elderly people and voluntary caretaker have in the market [VC, ZI].

The municipality wants the foundation will be responsible of the supervision and management activities [MU]. The municipality would not like to handle with rules and governance with citizens and now providers. Moreover, the foundation should design the service level agreements to the providers in order to guarantee the delivery of services or

products to the elderly people [MU, VC, ZI]. And, the providers should be certified (in capabilities and resources), especially in healthcare and information services, in order to deliver the quality and reliability to the citizens and the municipality [FO, MU]. All these rules, criteria to select partner should take into account the dynamic environment to let entry or leave the users or firms from the digital platform.

4.2.3. Financial Domain

The three revenue models were studied in detail, as well as the inconveniences to the municipality or the private firms to invest on the project. In general, the participants accept the advertisement model, yet the main recommendation was to ensure an attractive user base to the providers in the first stage [VC]. Moreover, some parties would be willing to join, but they would like to receive in exchange something given they can add more value to the platform such as information and statistics [MU, ZI]. As a remark, the advertisements should not be excessive given this can spoil the interface and perception of the users about the platform. In table 4.2. it can seen the advantages and downsides of each revenue model.

Revenue Model	Strengths	Weaknesses
Freemium Model To elderly people and/or voluntary caretaker	Free services enable and drive to more adoption. Premium services can become into potential revenue to the platform.	The success depends on the information and platform features (diary, agenda, and information services) to provide.
Advertisements to providers	The firms understand the revenue model, and ads are aligned with promotion elements.	Location of ads can be disgusting. User base growth
Annual Fee to municipality	Revenue stream to foundation.	Highly dependent on the municipality.

Table 4. 2. Table Revenues Model

The freemium model would depend on the services and the usability of services that are for free in order to ensure the move to the premium service [VC, FO, ZI]. Based on the portal reached in previous stages, participants were asked about free and premium services. The free services would be the social contacts, the access to a light version of a profile [VC, FO, MU], the access to information services about caring, wellbeing and advisory services in the healthcare system [MU, VC]. By other side, the premium services would be the unlocked features of the profile to incorporate the providers within the agenda and the diary, as well as the full access to the information services and the marketplace [VC, FO]. Hence, the usability of these services and the increasing user base can lead to the monthly fee, or as minimum they are willing to pay [VC, FO, ZI].

Lastly, the revenue model to the municipality was debated by [MU, FO]. The main revenue source in earlier stages will be the municipality [FO]. Hence, the elements and the service should be clearly stated [MU, FO], as well as the focus on the customization of solution to the municipality in the first stage as a gain to benefit the municipality and the citizens [MU]. This

means that the annual fee could be possible once these value elements are stated and clear from the technology side, and financial estimations.

Therefore, the foundation has to ensure the coordination and management of the platform to the municipality. The foundation will support the WMO help-desk with the platform to coordinate the activities between the citizens and the advisors. Similarly, the platform will enable to improve the communication process between the citizens and the municipality, so that the citizens will be able to access to the platform at home (independently) to be guided, and advised to some extend. Once these elements are achieved, the municipality can pay the platform services annually. In other words, the technology and the business model requires an step further in order to reach the platform development stage, and re-design the business model based on the results achieve in platform management, and platform services (communication to the municipality and guidance to citizens).

However, the investments are still at stake in order to develop the platform foundations, and the roll-out of the platform within the municipality. The municipality would be willing to have the annual fee, and include the customized solution and the necessary support to implement the platform [VC, FO, ZI]. Yet, the solution should be tested to some extend beforehand in order to see the quality and services that could offer to the municipality [MU].

Now, this solution could be reached from the private sector with a basic service. However, the assessment should be based on the services that can deliver in information to the municipality and their citizens [ZI, MU]. Although the portal demo was developed and tested with 30 users, the municipality is not interested in the investment yet. As it was mentioned in section 3.5.3, the municipality is seen as the investor to develop the digital platform to their citizens, and more development from the foundation and IT firms is more difficult given the financial budget.

4.3. Discussion

Once the domains were assessed with the participants, we proceed to briefly explain the final results in each business model domain. The final service design explains the value propositions, and the platform features. The organizational domain is mainly focused on the partner selection and points to be taken into account in the governance model. And lastly the financial domain explains the relationships between value elements and the financial flows between the actors.

4.3.1. Final Service Domain

In table 4.1, it is explained the value elements that were added and modified to the value propositions of each target group. Similarly, the platform features are related to the each

target group in order to clarify the platform services to each sided group. The platform service to the municipality has to provide information and advisory services to support and guide the advisors in the WMO help-desk, and the citizens. The citizens will have the freemium service in order to ensure the adoption and test of the platform services, as well as guarantee to guarantee the access to the marketplace features. And, the providers will have the access to the customers, and deliver their services and products to the elderly people.

Sided Group	Value Proposition	Platform services
Elderly People	Stay and Live at home independently as much as possible with support and better communication.	Light Version: Social contacts, Agenda, diary and profile information with local activities and lock-in features, feedback reviews. Premium Service: Robust version to interact with providers and full access to information advisory services, and marketplace.
Voluntary Caretakers (near relatives)	Unburdening the healthcare load with support, quality, and guidelines to be informed in one place at home.	
Municipality	Support your organization and citizens to guide, advise with comfort and quality to communicate more effectively, and get contact with us at home.	Information and Advisory services to communicate with their citizens. Profiles to advisors, and direct involvement with their citizens by their profiles.
Providers	Access to customers, and coordination to promote and deliver services in a marketplace.	Marketplace, advertisement, and interactions with their customers by the profile agenda, and/or diaries.

Table 4. 3 Value Proposition and Platform features after BM evaluation

4.3.2. Final Organization Domain

The business model design stage was focused on the analysis of the main stakeholders. Yet, the BM evaluation was mainly focused on important issues such as the selection of partners (providers group, IT partners, potential customers), governance issues, and the complexities that could appear at organizational level. In table 4.3, it is summarized the organizational design issues, and the measurements to take into account.

In general, the organizational domain takes into account the delivery of services and value propositions. There is a clear vision of the services that should be implemented; yet the roadmap is necessary in order to ensure the customization of services to the municipality, and the attraction of providers to have a large user base. Finally, the SLAs should ensure the transitions to ensure the transparency and delivery of services to customers, and the activities to have before the parties join, and during their participation in the platform development.

Design Issue	How to address at organizational level?
Partner Selection	IT Partners • They must have the resources and capabilities to play the IT roles. Initially, the roles are content developer, content aggregator, advertiser, integrator, service aggregator, platform developer, cloud owner, and security architect. Providers • They must have branding or reputation at local level with elderly and caretakers. • The healthcare and wellbeing providers should have certifications to provide their services and products. Municipality • Municipalities with large populations, and they should be willing to learn in the platform development.
Openness network	• Participants should be willing to share knowledge, and learn during the prototype. • The platform should be open not only to providers, but also IT providers. • The openness should have restrictions to ensure transparency and delivery of services to customers. • The reviews and feedback should be part of the improvement to the services.
Governance Model	1. Foundation will supervise and manage the platform in the initial stage. 2. Foundation will ensure the coordination and management to providers and volunteering organizations. 3. The providers will have to ensure the usability of the platform with the elderly people and voluntary caretakers in the profile, diary and agenda. 4. Certified providers can deliver services with their own branding to the elderly people and/or voluntary caretakers 5. Foundation should manage the platform development, and IT providers align technology activities. 6. Customized solution to the municipality and their citizens. 7. Foundation will design the SLAs to the providers. These must include certifications, management activities, and usability of the platform, marketplace access.
Network Complexities	• Retention of the living lab partners throughout the SLAs to use the platform, promote their services, advise and communicate with their citizens. • Retention of the voluntary caretakers and elderly people with the profile, and the quality of platform services. • Transitions to ensure the modification of roles, or dynamics of the actors.

Table 4. 4. Organizational Domain with Refinements

4.3.3. Final Financial Domain

In figure 4.1, It is included the value elements that are tangible and intangible across the value network. There is a general agreement about the roles between the ICT firms, and the service design to deliver services and products from the provider side to the elderly people, as well as the importance of support from the voluntary caretaker to the elderly people when this is required due to mental (physical, technology) disabilities. Based on the figure, the municipality will have to do the marketing with their citizens and provide information to the platform in the initial stage from the WMO desk to the platform. Yet, the main values that

municipality receives from the platform are: (1) the support and customized solution to the WMO helpdesk, (2) The tool to communicate with better quality to their citizens, (3) the coordination and supervision of platform activities to operate the platform, and (4) An organized way to search information and guide their citizens (elderly people and near relatives) about healthcare, wellbeing, local activities, information of the system. In exchange, the municipality pays an annual fee to the delivery of these platform services to their citizens, and the WMO help-desk. Additionally, the voluntary caretakers and/or some elderly people will have free services in their profiles as well as information about social contacts, some local activities, and feedback about the platform features. This is in line with the needs of the municipality, yet they would be able to have premium services with a monthly fee in order to receive more and more services from other partners in healthcare, wellbeing, entertainment, and advisory services. And lastly, the providers will receive the management and coordination activities from the platform, as well as the market place to promote their services and reach the customers. They would deliver in exchange and adds fee to promote their services, and use the platform with their customers in their user profiles.

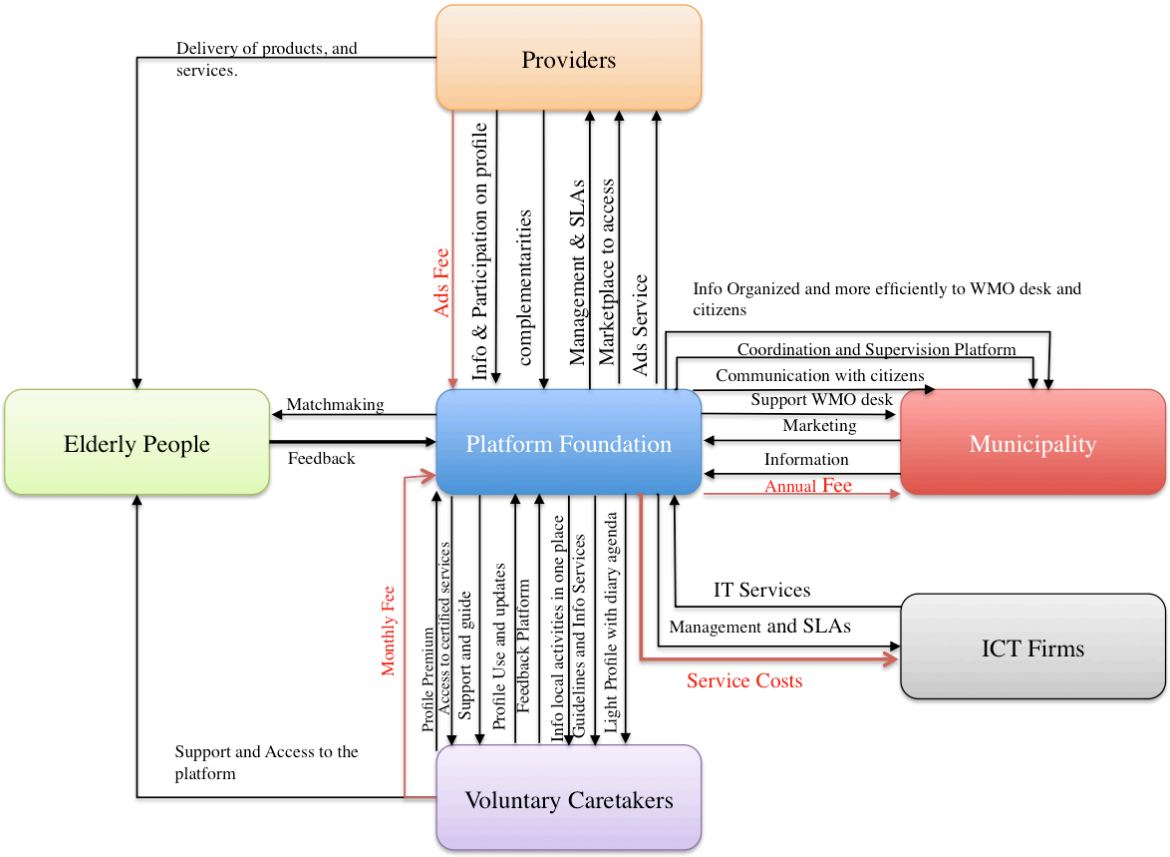

Figure 4. 1. Value Network to the business model in the prototype version of the platform.

4.4. Lessons on the business model design and evaluation

After the workshops, three points were briefly described in order to make the business model design of platforms (See section 3.7). In this section, we extend these to have four more additional lessons, and describe a methodology that should be applied in the business model design and evaluation stages to platforms in health and wellbeing. Initially, we had for lessons described as it follows:

1. Involvement of participants from the user side helps to describe and validate the service design, and accelerate the platform development.
2. The design of the digital platform should be done in parallel to the business model.
3. The business model can be described along with the platform development, but the gaps and its re-design should be a continuous process.
4. The iterations and adaptations should be part of the development of the business model across the platform development stage, and platform conceptualization.

The iterations are important not only in the business model design, but also in the platform development. In the STOF method, it is stated the importance of refinements of the business model with iterations. Yet, we can argue that these iterations are required in both the business model and the technology. This means the platform services should run at the same speed, and aligned to the business model. Hence, the iterations and assessments have to evaluate whether the digital platform requires changes from the business model, or the business model has to enrich its vision to make adjustments due to changes in the digital platform.

For instance, the evaluation of the value propositions from the different viewpoints can enrich the service design. Some value elements can be introduced with new platform services, or simply the changes to different target groups can lead to make re-design in both components. However, these modifications to the business model and the technology have to be analyzed and validates with the users. The involvement of users can aim to identify faster the needs, market trends, and adapt faster the business model and the technology.

The reasons to have the customer acceptance, the business model design, and the platform development are (1) Possibilities to adapt fast the business model to the market needs (2) Rapid development of the technology based on the user needs; and (3) Fast growth in the platform development with a business model. The adaptations to the business model within innovation systems are part of the business modeling design. The possibilities to make changes from one business model component can lead to make changes in other domains. Due to the innovation system and market needs, the business model should have possibilities to make changes in the service, technology, organization or finance domain.

According to Tiwana (2014), the platform development can grow faster with the adoption of more users. Yet, the adoption can also aim to evolve the platform faster by helping to reach improvements on the existing service design. User preferences can change due to new

technologies or competitors. And direct experiences with them can aim to understand, and make modifications on the business model and the technology. Hence, the business model can define boundaries on what can be reachable in the short-run, and aim to define the strategy for the platform.

In this case the business model aimed to describe in each domain. The service was described based on the target groups, the value propositions, and possible services to each target group. The discussion of the organization was focused on the division of roles, governance, and platform openness. And, the technology sought to describe the main overview about the digital platform. Although the financial structure still needs to be more complete, some advancement were made in the description of revenue models and main cost sources.

Now the question is whether these iterations and involvement of users, business model design, and technology development should apply for all type of innovations. In this project, the digital platform is based on existing technologies for the interface and the infrastructure systems. Yet, the digital platform has its focus on health and wellbeing services, and makes it attractive given the aging population, and growing literacy in IT of elderly people. The business model to the digital platform seems to fit more with an innovation in an existing market.

Heikkila et al. (2015) argue the difference between low-end market disruptions and new-market disruptions. Based on this, the platform service seeks to exploit the existing technologies, and address the elderly people along with a party, which has a user base as the municipality. From this view, the business model to this digital platform is a low-end market disruption, because the business model searches the unbundling of services to their customers at affordable price and with existing technologies. In addition to it, the alternative to develop the technology and the business model with the user acceptance can be seen in this project based on the experiences and outcomes achieved in the business model design, and evaluation stage. Thus, the business model for innovations in this project has as starting point the low-end market disruption, yet the pilot phase to launch the development in the municipality is required.

4.4.1. Evaluation and Refinements on digital platform in health and wellbeing

Conversely, the refinements were focused on (1) The evaluation of the value propositions and target groups; (2) the gaps in the governance, openness, and partner selection in the organization domain; (3) The evaluation of the revenue models chosen. The refinements and evaluation stage was iterative in the business model evaluation stage, and looked at the implications at service, technology and financial domain.

At this point it is important to ask which could be the main factors that lead to have a clear customer value. Based on STOF, these are the target group, the value propositions, customer

retention, and quality of service (Bouwman et al., 2008). Currently, we have a digital platform that is being conceptualized, this means the quality of service and the customer retention are difficult to be measurable. Although we took into account some platform features (the profile user, participation of providers in the user profile and marketplace), we still face the evaluation of the quality of service. This factor is more related to the platform features and the user interface, in other words the technology domain.

From the discussion of the service domain and the finance domain, we concluded that the target groups are clear as well as their value propositions could be related to each target group. Yet, more work is required in order to define more clearly the value elements in the target groups. From the user side, the direct experience with the technology could lead to define the customer retention and evaluate the quality of service. The premium or fees regarding the services will not be a problem if the platform service can deliver the value elements in the business model. Thus, the *target groups* and the *compelling value propositions* are still the main description achieved from the customer value.

The *customer retention* and the *quality of service* were debated extensively in relation to the revenue models and impacts on the organization domain. However, these two elements did find complications to be described more detailed. Although the *customer retention* currently lies on the user profile and customization of services to the municipality, this factor still requires more evaluation from the user side, and the technology view. The existing development is still low, and requires more progress in order to validate the adoption and usability of the platform service.

And, similarly this occurs in the quality of service, especially from the municipality side. The quality of service is difficult to be measured, and could be difficult even during the platform development. The *quality of service* is currently associated with integration, more security and information in one place. Yet, these elements will be able to be seen when the municipality and elderly people can have direct experience on these two issues the unobtrusive customer retention and the quality of service.

Based on this the customer value is described by the value propositions and target groups. And, some insights were given in the customer retention and quality of service to each target group. Based on this, the business model should have its focus on the municipality and citizens (elderly people) in order to deliver information and advisory services. The pilot phase could start from this starting point with the existing demo, and then the platform can be developed to match these two groups.

On the other hand, we evaluated the organizational domain by addressing the network strategy, division of roles, profits (revenue models and costs), and risks associated (investments). In section 4.3.2, we discussed extensively the governance and criteria to select the partners from the IT and organizational perspective. Moreover, the strategy to open the platform to other organizations and users is acceptable under restrictions to providers and

technology providers to deliver the services in health and wellbeing. Hence, the *division of roles* and *network strategy* were refined and improved in order to ensure the value to the organizations.

We found three advantages (reasons) to choose an open platform: (1) more competition; (2) better and more services; and (3) local advantages to municipality (business customer) to integrate the platform with their activities due to its modular characteristics and adaptability to changes. However, governance models, and partner selection should limit this openness. These two elements will bring the trust across the value network and the platform organization itself.

The partner selection should be focused on the criteria to select the parties. And, its governance model should focus on the contingency measurements in transitions between new services, new roles at organizational level, and entrance (exit) of actors into (outside) the platform. Unfortunately, the development of digital platforms has to overcome these inconvenient needs to achieve its first success business case with a proof of concept. Yet, the governance and openness as strategy and management model from the platform owner (Zo-Dichtbij) can aim to translate the technology and business ideas into the platform demonstration. Thus, the discussion of these three elements openness, partner selection and governance can lead to make refinements from the organizational side, and re-assess the rest of domains around this domain.

In general, the *division of roles* in the platform development at organizational and technology sides requires to take into account the transitions and dynamic environment to innovate, and breakdown of actors into strategic and operational. The transitions within the dynamic environment are important points due to the stakeholder from the strategic or operational sides can leave or entry into the platform. The suggestion is mainly focused on the description of the strategic stakeholders based on the target groups and institutional parties, and the description of the operational stakeholders to build, and develop the platform from the technology. In addition to it, this division of roles should take into account criteria to select partners, and manage the activities between them to ensure the platform development and delivery of services. This *division of roles* was accepted and evaluated by the participants, yet the experiences and the development can lead to bring more parties or the dominance of others as the insurance case analyzed in section 3.4.5.

The participants, and more developed with the discussion of governance, partner selection, and platform openness accepted the *network strategy*. Moreover, the description of the target groups to the digital platform and the search of value elements could aim to have a better focus to organizations. Based on this, the digital platform and its foundation would be able to move resources to integrate this with the service that is being built, and evaluate again with the customers. As it mentioned in section 3.6, the iterations will be a continuous activity to make improvements in both technology and business model with the acceptance of users. In

other words, the business model can aim to define the boundaries to make a continuous improvement on the platform development, and even after its market introduction.

However, the development of business models to digital platforms has greater difficulties in the *acceptability of risks*, and *acceptability of profits*. Based on the actor analysis, IT firms and providers desire to increase their user bases to their services, and the municipality reach to increase their business efficiency with better communication to their citizens. However, the municipality finds difficulties to funding the project from the beginning. The main risks are the sustainability to develop the platform between Zo-Dichtbij, the municipality and the IT firms at first stage. And then, the risks are associated with the governance and profits when the platform can move from the municipality to reach more providers, or even other municipalities due to investments and resources acquired over this time.

From the discussion of the refinements, we found that the municipality could introduce this digital platform easier with a platform basis. However, the basis to build the digital platform still requires of investments. Hence, it is necessary for the IT firms and the foundation Zo-Dichtbij to take an action in order to build a prototype with more features than platform features reached. This can aim to demonstrate the business idea from the municipality to the elderly people and near relatives at first stage. The investment should be sufficiently low, and integrated with a basic technology infrastructure. Once this can be reached, the municipality will be able to determine its viability to finance the platform development along with the integration of the rest of services. From this view, Zo-Dichtbij would obtain the way to reach a large user base, the IT firms would guarantee the increase in sales and development of the platform, and the negotiations with providers in health and wellbeing can start. And, even if the project still fails, the learning experiences are the "earnings" to the investors.

The creation of value to the network in the healthcare industry is the most complex task in the development of the business model. This should take into account the interests from the strategic partners, and involve the IT firms. Indeed, the agreements to invest and accept the division of investments make harder the creation of a value network. The financial structure seems to have more costs and investment roles at first stage in the IT firms and the platform owner at first stage. And later the municipality would have the greatest responsibility to invest with the added problems to involve more partners of healthcare and technology industries.

Despite the actors in healthcare industry recognizes the opportunities behind innovation and technology, they prefer to have tested solutions instead of developing solutions with collaborative partners. However, the innovations in the healthcare sector require the cooperation between the IT firms and companies in the healthcare industry. The collaboration can lead to adopt the resources faster, and speed up the development of digital platforms in this industry. The institutional parties can play a role to incentivize these collaborations to innovate the sector throughout these platforms, yet they must be aware of the financing budget to these projects in the long run.

In order to find balance on the investments and risks, two points have to be considered. On the one hand, it is advisable to develop the digital platforms with a strong focus on the support and advisory services in health and wellbeing to the municipality. Yet, this has to take into account the current budget of the municipality into the WMO office. Based on the estimation of costs in the platform, the current expenditure in the WMO office, and the earnings from the strategic view to the municipality in (more communication, support and better quality of care), the *acceptability of risks* should be possible. On the other hand, the revenues and costs should reflect the development of the digital platform, How? In this case we suggest ensuring the annual fees on the operational activities of the digital platform, and the development of new platform features with a customized solution. Coming back to the section 4.2.3., the investments and costs are more difficult to be obtained, the sustainability of the project depends on the funding from the municipality not only to operate but also to develop the platform.

Now the question that appears at this point refers to what kind of activities are required in order to guarantee these changes? This will be explored in chapter 5 with the roadmap to the business model. From the lessons learned in section 4.4. And 3.6, we have to add iterations and adaptations to the platform development based on new services, organization, or external market forces such as new competitors, or legislations. Hence, the adaptations should be part of our reflection and lesson to build the business model and its road-mapping.

In general, the evaluation about the business model was addressed from the customer value and the value network. However, the difficulties to make the digital platform in health and wellbeing sustainable were more visible in the organizational view than the value creation to the customer. The network value finds difficulties to accept the risks, and the profits. This unacceptability is related with the difficulty to make estimations about operating costs in the platform development stage, as well as investments required to build the digital platform in comparison with the existing operations in the WMO Office.

Chapter 5: Business Model Roadmap

In this chapter, it is exposed the way the BM should be implemented in the municipality in order to ensure the desired changes across the lifecycle of the platform. As it was stated in Section 2.3.4, the business model road-mapping involves two layers: the desired changes in the BM throughout the four layers, and the activities layer (De Reuver et al, 2013). Hence, this chapter explains in detail the business model changes in order to reach the vision of the business model. Once this analysis is exposed, we proceed to explain the transitions in the activities layer, and mapping of activities along with desired timeline to visualize the relationships between the BM changes, and activities to do in the platform.

5.1. Business Model Changes and Impacts in the rest of domains

Zo-Dichtbij started its platform design with conceptualizations from the user perspective to the platform features (Keijzer-Broers et al, 2014). Nowadays, the platform has a basic prototype with basic features, and tested with low number of users (30 in total). This means the project Zo-Dichtbij is moving from the design cycle to the prototype cycle of the platform. However, this transition is difficult, given this requires investments, and acceptance of risks from the municipality. And, the foundation and IT firms have to deal with modifications on the roles and activities during the platform development. Thus, the business model is subject to have modifications before the platform service achieves its commercialization with all stakeholders involved in the value network.

Despite the business model is at ideation stage, the foundation requires a basic prototype. This prototype can be reached by the alignment of activities between the technology and finance domain at first stage, as well as by the basic service features. Yet, we have to define beforehand which are the business model changes in order to reach the commercialization of the business model. Three stages could be seen clearly, yet the platform development could be divided in two stages. These can be briefly described as, it is described as it follows:

1. Development of the basic prototype (it already started)
2. Platform development stage from the municipality to the citizens.
3. Platform development-phase II: introduction of the providers
4. Commercialization: Search of Municipalities and Negotiations with insurances

In order to reach these stages before commercialization of the digital platform, some business model changes have to be achieved before. The investments in the private sector to build a basic platform basic to provide advisory services in health and wellbeing to elderly people can be brief demonstration to the municipality. This is currently being developed between the foundation and the IT firms.

The investments can create impacts on two points (1) the selection of IT firms from the organizational domain; and (2) the platform services focused on information and guidance to citizens and the municipality. In the organizational side, the foundation is being responsible of the criteria to select IT firms based on resources and capabilities of both parties. And, the foundation supervises and manages the platform development, as suggested in section 4.3.2.

In the service domain, the platform features to elderly people and the municipality should be described before to develop the platform features. During the project, the platform features were being developed in parallel, as well as the involvement and user interaction was part of the project. Thus, the investments should initially lead to have modifications in these two domains in the business model.

Once the basic platform has been designed and tested with users and participants of the municipality, the municipality will be able to implement the platform service as a proof of concept and at large scale. Due to the public funding of the municipality, three business model changes can be seen: (1) the municipality will have to be introducing in the organizational domain; (2) the alignment of activities between technology and the organization should start to be translated from this point; and (3) we have to include in the service domain the entire platform features to the elderly people, and the municipality.

The alignment of the technology and the organization should be a continuous process, and iterative process to ensure the integration and grow of the platform. Once the municipality makes the funding, the digital platform will have the first revenue stream. The annual fee to operate the platform, and make investment on the platform for the municipality will aim to make the project sustainable. Yet, the platform services to the municipality should be in line with the value propositions to this target group, and the elderly people. The acceptability of customers should be a component to accompany the required steps to reach the vision of the business model.

The third stage is the development of the digital platform in health and wellbeing. Although, the focus will be in advisory services to guide citizens in healthcare system from the municipality, the digital platform will have to include the providers in health and wellbeing. The introduction of providers will become this platform in a full digital platform in health and wellbeing. The introduction to the providers will lead to have three business model changes: (1) aggregation of the platform features to providers; (2) adjustments on the technology infrastructure to ensure the rollout of the platform services and coordination with Zo-Dichtbij. And (3) Revenue models from providers and the elderly people. However, the user involvement, and design in parallel of both the business model and the platform development should be elements across this development phase.

After the proof of concept and the platform evolve, other municipalities would be able to move their information services and advisory services to the digital platform. This would lead to include customization elements within the value propositions in the service domain. The

customization to the municipalities will have to be visible in the platform architecture. Hence, this customization of platform services, and the changes in the platform architecture will be the greatest impacts to the business model, if the digital platforms grows to other municipalities.

Moreover, the foundation will be able to prepare the analysis and evaluation of the innovation activities, and existing services to be broader in other industry market segments such as the telecom (Mobile) network operators or insurances, or creation of business services to healthcare providers. At this point, the service design will have to be ready to have versioning, and updates to their platform services, and full integration of their platform services to other businesses, and/or flexible integration of specific services to other digital platforms from competitors.

Although it is difficult to predict the business model changes at this point, the business model to the digital platform will change significantly compared to the initial one, just as Janssen et al. (2014) argue to move towards the insurance route. Additionally, we argue that the co-creation elements in digital platforms cane lead to speed up these changes. In fact, we consider the insurances can be reached directly by the experiences and adoption of the platform services. This means that the adoption of the users can aim to influence in the adoption of these digital platform in large businesses in the healthcare industry or parties with greater user bases as the MNOs. In table 5.1, it is exposed the BM changes that will have to be taken into account, as well as the impacts of each BM changes in other domain, depending on the platform development.

Business Model Change	Business Model Impacts
Financial Domain: • **Initial Funding (in progress)**	1. Organization: Selection of IT firms 2. Service: Description and establishment of basic platform services to municipality and users.
Financial Domain: • **Municipality Investment**	1. Organization: Involvement of municipality 2. Organization: Involvement of IT firms 3. Service: Platform features elderly people and municipality 4. Technology: Alignment IT with organization
Organizational Domain • **Introduction of Providers**	1. Service: Platform Features to providers 2. Technology: Infrastructure required to providers 3. Finance: Revenue Models to providers, elderly people
Organizational Domain • **Introduction of potential customers (B2B)**	1. Organization: More providers, municipalities and insurances 2. Technology: Infrastructure, alignment IT and organization 3. Service: Customization, Versioning, and bundling 4. Finance: New revenue model

Table 5. 1 Business Model Changes and Impacts to reach the business model before and after the pilot phase

5.2. Translation of BM changes into specific activities

In order to ensure the desired BM changes, some activities should be carried out to design, implement and evaluate the prototype and the BM over the time (de Reuver et al, 2013). We described the main BM changes in each domain in table 5.1. And, the description included the impacts on the rest of domains in the BM. Now, we proceed to translate these BM changes in

business activities that will be required before reaching the BM changes, during and after the BM changes have been achieved.

In order to reach the basic prototype with the basic features to the municipality and citizens, it is necessary to attract financial capital from public-private partnerships. These public-private partnerships can include the search of venture capitalists, angel investors, or simply investments from the living lab partners. Subsequently the outsourcing activities has to start in order to have platform IT developers, and integrators to the IT systems. Thus, there will be developments in the interface, and IT architecture to the platform. Thus, the prototype includes: (1) outsourcing IT developers, and (2) Platform development in its most basic version. It is important to highlight, the platform prototype is being developed, and has already started. In fact, IT developers have tested the basic solution with some users.

Currently, the vision is moving to the roll-out and innovations in the proof of concept. The proof of concept will be located in the municipality of Rotterdam. Yet, there will be coordination activities between the IT firms and the foundation to implement the platform in the municipality. The municipality will be responsible of the marketing to adopt the digital platform as way to be connected with their citizens. The IT firms and the foundation will have to understand the complexities to define and have clear roles and activities given the stage of the platform development. And, the formalization of roles and responsibilities will be able to become more and more visible. Hence, two activities are essential: (1) marketing between the municipality and the foundation, and (2) the implementation of the digital platform to the municipality.

Once the platform has been established in the municipality, the platform will start to increase more and more its user base. However, the growth of the platform will depend on the provider side and adoption of users to have network effect and cross positive network effects as mentioned in section 2.2.2. Having more providers will lead to have more and more services (complementarities) to the platform services.

Hence, the platform management (board of Foundation) will require three activities: (1) governance models in IT and providers; (2) Implementation Digital Platform with providers; and (3) Innovation Management for adaptations to the business model and search of potential customers. These three elements are essential in order to ensure the growth of the platform, and evolution to its market commercialization with large clients. In this stage the user interaction with providers and involvement of elderly people to accept the technology and business model should be taken into account as in previous stages.

The governance models will aim to ensure the delivery of services, partner selection, and contingency measurements to leave the platform. Moreover, the platform owner must start to think about the business model adaptations to change the services faster with users and clients, and search potential customers. In this case, innovation and knowledge management teams can deal with these negotiations, and transformation to the services. Therefore, the

implementation of the pilot phase will reach its end, and be able to develop business cases based on the innovation or bundling of service to new clients.

The last stage of development should be focused on the integration of platform services with online broadcast, volunteering organizations, digital media (TV, radio broadcast), etc. This development and integration is expensive, and require greater investments compared to the initial investments. Yet, the platform will have greater visibility and reliability from the partners to migrate these services when they start to have more municipalities. This can be reached throughout the promotion and marketing directly with municipalities, and the VNG (association of municipalities).

However, the search of municipalities will lead to have customized solutions at technology and organizational level in each case. The innovation management team will have to explore and demonstrate success cases to organizations that have direct customer relationship such as the Mobile (Telecom) network operators, or the insurances. Both parties will be willing to adopt the platform services, and include them within their subscription models when the platform demonstrates their previous business cases, and experience in the market. In table 5.2. it is exposed the business activities along with the business model changes that were broken down in section 5.1. The next step is to make the back casting to have the final roadmap (See Section 5.3).

BM Change	BM Impact	BM Activity
Financial Domain: Funding to basic platform	Organization: Selection of IT firms Service: Description and establishment of basic platform services to municipality and users.	• Prototype development with the user interface
Financial Domain: Municipality Investment	Organization: Involvement of municipality Organization: Involvement of IT firms Service: Platform features elderly people and municipality Technology: Alignment IT with organization	• Implementation Digital Platform at the municipality. • Marketing (municipality)
Organizational Domain Introduction of Providers	Service: Platform Features to providers Technology: Infrastructure required to providers Finance: Revenue Models to providers, elderly people	• Implementation Digital Platform with providers • Design governance model to providers (selection, metrics, contingency measurements) • Innovation Management to start negotiations with other municipalities and providers.
Organizational Domain Introduction of potential customers (B2B)	Organization: More providers, municipalities and insurances Technology: Infrastructure, alignment IT and organization Service: Versioning, and bundling Finance: New revenue model	• Modularization Digital Platform • Commercialization platform services and/or applications.

Table 5. 2 BM Changes and BM activities to the business model

Overcoming the stage of customized solutions with the municipalities will be difficult. At this point, it is difficult to make a forecast how the business model will be. From this view, it is necessary the modularization of the platform to have customized solutions, and the integration of services to other digital platforms from other parties in healthcare industry or other industries. At this point, several business model changes will have been done due to need fro reaching the vision or external changes from the market or regulations.

5.3. Back-casting of BM changes and actions in the roadmap

The roadmap must include the BM changes in each domain as well as the activities to be performed over the time, see Table 5.2. In general, four stages are identified: the design of the platform and its interface, the roll-out of the proof of concept, and the search of commercial partners, and potential adopters with established user bases. However, these stages can be achieved by the alignment and balance of changes between the domains of the BM as well as the rollout of activities.

In the design of the platform and the interface, it is necessary to implement the basic features of the service domain, start the technology development, and gather the necessary investments. The design of the platform service is being made up between the foundation and the IT partners that were already chosen. This stage is being finished, and is moving to the platform development with the municipality. The services were defined, and its main focus was on the user profile and information services for the elderly people, See Figure 5.1.

The roll-out of the proof concept is highly dependent on the coordination between the municipality and the foundation. Yet, it is necessary to have marketing before and during the implementation of the platform. This marketing should be responsibility of the municipality whereas the foundation will have to be focused on one single customized solution to the municipality. Thus, it is important to have a basic platform service to the municipality, the funding from this party in order to begin the implementation. In parallel to this activity, Zo-Dichtbij must ensure the alignment of activities in IT with the municipality and the service design See Figure 5.1. above the platform development stage.

The third stage is the adoption of commercial partners that include the service providers, product providers, and information providers. These providers will deliver their services and products to the elderly people in healthcare, wellbeing, and entertainment. Hence, the introduction of providers leads to change the services to the platform, so that these two BM changes and the technology infrastructure will be necessary to continue the platform development. At the same time, the governance model as we stated in section 4.3.2. must be developed along with the innovation team to deal with negotiations and adaptations to the business model. This back casting can be seen in Figure 5.1. above the second part of the platform development stage.

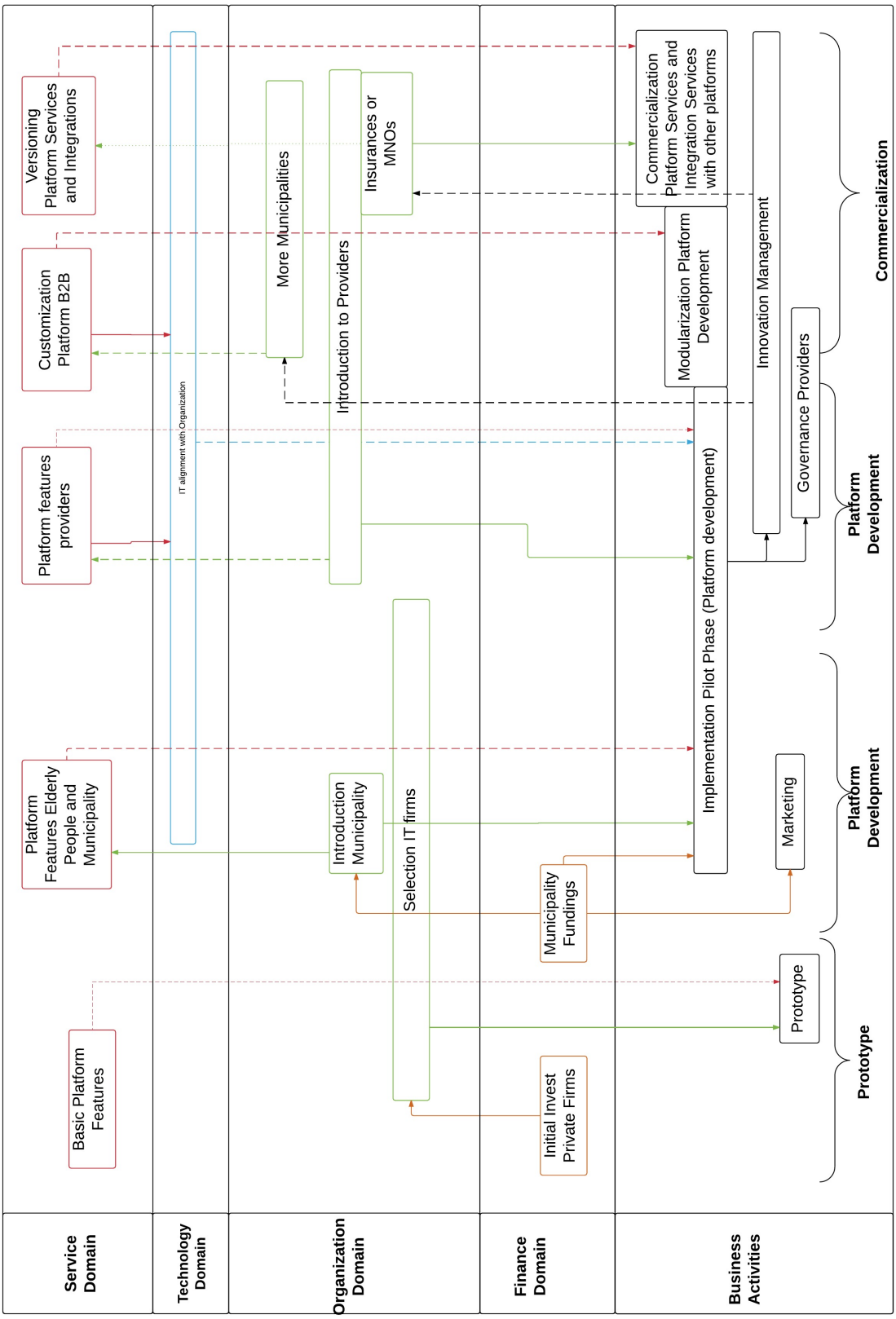

Figure 5. 1 Business Model Roadmap to project Zo-Dichtbij

The fourth stage is the search of potential partners to increase the user base of the platform. As we stated before in section 5.1, and 5.2, negotiations between the municipality and insurances must be established, so that the platform can be commercialized. Hence the involvement of insurances or MNOs will lead to change the four domains including new revenue models. Yet, the backcasting that was made at this stage began with the introduction of these parties, and then the impacts on the service, technology, (blank) finance domain, respectively.

5.4. Lessons Learned Roadmap and Business Modeling on digital platforms

Although the roadmap is based on the discussion, debates in previous chapters and the business model, we have a lesson to add as part of the business model design. In section 4.4, it was stated the importance to make adaptations to the business model. In this chapter, we remarked the importance of planning into the roadmap to anticipate the business model changes. The anticipation enable that business models on digital platforms can aim to evolve the platform, and become it more sustainable.

Moreover, this planning should be accompanied by the continuous evaluation of the business model given the dynamics that exist in the technology, organization domain, and market environment to attract more customers (businesses) to use the digital platform. From this view, the innovation and knowledge management should design the governance, and search for new business clients. This will guarantee the growth of the platform services, the business model, and the innovations across the digital platform. Hence, the iterations should be accompanied by adaptations based on learning experiences, and active actions to anticipate modification in the business model due to internal or external changes.

5.4.1. Roadmap of Digital Platforms in health and wellbeing

The business model road-mapping can aim to illustrate the changes to the business model with a layer of business activities (de Reuver et al., 2013). In this case, the changes to the business model are more intermediary steps to build the digital platform in health and wellbeing. Certainly, the road mapping is a helpful tool that aims to understand and make anticipations to the achievement of the vision that was built in the business model.

The road-mapping translated aims to translate the business model changes into specific list-to-do over the time across three different platform development stages. The beginning of the project remarks the importance of building the platform interface and its validation. Although the project has already started, the IT developers could reach result in the interface and minimum functionalities with a low investment. Thereby, the user acceptance from the municipality side is the goal in order to reach the pilot phase.

In the pilot phase, it is visible the complications to bring the municipality, and how the introduction of providers can influence on the platform development due to differences between the municipality, providers and the platform owner. The problems are mainly focused on the differences between the municipality and the foundation. On the one side, the municipality wants a customized service to communicate with their citizens, and support their activities in the WMO office. On the other side, the foundation seeks to provide more services to the elderly people, and expand their business opportunities. This difference could be difficult to be overcome, but the experiences and demonstrations in the planning can aim to open opportunities for bringing the providers.

In the commercialization stage, we can see the need of searching clients with insurances and the association of municipalities. The experiences of users and the proof of concept can lead to open a competition space. Based on the BMST explained in chapter 4, the business model could face complications if the competition grew fast. Hence, the business model and the platform service will have to make more differentiation on the service, and move to niche markets. Moreover, the insurances could create complications to the platform owner and stakeholders involved given they are more autonomous to adopt the platform or may have more dominance. And, this explains the needs of the innovation management teams in order to design more services due to introduction of providers, and business clients.

The planning on the roadmap and the business model design will be necessary during the platform development and commercialization. The planning and adaptations should have a focus on business model changes. During this stage the platform and the business model has a focus on the target groups and the value propositions from the user side, and the division of roles and network strategy from the value network. However, the platform development will decide the success with the adoption and improvements on the quality of service. Similarly, the investments and risks will be clearer and lower over the time, till the platform can make profits.

As recommendation, the business model and the platform should include the customers and users in order to make designs and evaluation on both elements. The experiences and understanding of the service with technology can speed up the development of the business model and the technology. Just as the alignment of the technology and the organization helps to grow the platform, the user involvement in these two elements help to understand the target groups, and make adaptations faster to develop the platform or have business model changes. Thus, the iterations to design the technology will be a consequence of this feedback from the users, but also these iterations will have more focus given the business model construction in each development stage.

Chapter 6: Conclusions, Recommendations, Limitations and Further Research

In this chapter is described the conclusions, and main findings based on this research. Similarly, it is exposed the future research that will be required in order to explore new research topics. As it was stated in the first chapter, we make a reflection and learning using our design approach, and taking into account the lessons learned during the investigation. These learning lessons are supported in the experiences of the project Zo-Dichtbij, and difficulties to reach decisions during the design and evaluation process of the BM.

The conclusions and recommendations are in line with our research question *How can a viable business model to a digital platform in health and wellbeing be designed within a living lab setting?* Hence, the research outcomes are broken down in two parts: (1) the description of main findings to the business model design and its evaluation using the BMST and CSFs, and (2) the conceptual model is extensively discussed in section 6.2.1-6.2.2 and (3) the recommendations that are mainly based on the outputs of the evaluation and the main points to take into account in the roadmap. Based on this, the research question is answered, and the research open new doors to explore topics in coming development stages of the platform.

6.1. Main Findings

6.1.1. Business Model on platforms in health and wellbeing

The main objective of this research was to design a viable business model for health and wellbeing platforms. In chapter 3 and 4, we explained the business model by using the STOF method. In general, the business model seeks to achieve the pilot phase to build the platform from the municipality to their citizens. In order to achieve the platform development, the business model must reflect the needs of the most likely coming stage, and provide the main value elements to each party. Hence, we can now answer the sub-questions described in the research approach.

RQ1: which could be the service elements to be provided within the business model?

The service domain reflects on the value propositions and target groups that the business model will have with the new service and/or product. Four target groups were identified in the business model: the elderly people, voluntary caretakers, the providers, and the municipality. The elderly people want to have a support and better communication to stay at home independently. The voluntary caretakers who take care of elderly people, will unburden the healthcare load with a support tool, and guidance to find the information in the platform. The providers will be able to access to the customers and promote their products and services in

the marketplace of the platform. And, lastly the municipality will be able to support citizens and advisors in the WMO office with comfort, and quality to communicate more effectively between the municipality and their citizens.

A couple of platform services have been designed, and validated with users. The elderly people will have a freemium service with social contacts, a user profile and feedback reviews to the platform in their free service whereas the premium services will be integration of services with providers, and full access to marketplace. The municipality will have features to advise citizens, communicate with them in topics related to healthcare system, wellbeing activities on the user profiles. And lastly the providers will have a ranking system to promote their services and the marketplace.

RQ2: who are the main stakeholders involved in the delivery of platform services on health and wellbeing?

The actor analysis was focused on the interests and roles that each stakeholder (public and private companies/institutions) could play in the business operations at internal or external level. Based on this, the view reached a better description of the network strategy and the division of roles during the platform development. And, we reached the value network by integrating the value elements from the service, and the activities related to management and supply of services to build the digital platform.

The value network with the value elements and activities can be seen in Figure 4.1. There are four strategic stakeholders represented by the target groups, and one operational stakeholder that can be broken down into several by the IT Firms. The providers will deliver services and products to the elderly people whereas the near relatives and near relatives will make requests to the foundation (platform owner) to have the premium services. The foundation will receive in exchange the monthly fee and the ads fee from the voluntary caretakers and the providers, respectively. Lastly, the municipality will have the platform service to reach a better communication and guide their citizens whereas they pay an annual fee to the foundation. The foundation will manage the platform and the IT firms the platform development.

The rest of stakeholders, public institutions and insurances, can play an important role in legislations and adoption of the platform stage once the platform service has been adopted by several people from different municipalities. Moreover, the platform owner (foundation) should start negotiations with insurances and public institutions to provide the platform service in other municipalities or within the healthcare plan of insurances. Yet, the service could be subject to changes given their interest lies on efficiency (cost reduction, better performance, greater information) and improvements to the quality care of citizens or their subscribers. Thus, the business model must be re-assessed continuously, and include the new elements to fill out the needs of potential customers as well as changes in technology.

RQ3: What is the financial structure to ensure the implementation of the business model?

Finally, the revenue models and the cost sources should be identified, and be aligned with the needs of customers and organization of the business model. The revenue models were the advertisement models to the providers, the freemium model to near relatives, and the annual fee to the municipality. On the other side, the costs sources come from the ICT firms due to they are responsible of the platform development. Lastly, the investments are in the integration of IT services with the cloud service, and the roll-out of the platform with its interface.

RQ4: What is the roadmap to the business model in order to ensure the implementation of the digital platform?

The roadmap was divided in three stages, and the mid stage was sub-divided into two small stages. These are (1) the platform development as its basic level; (2) the beginning of the platform development phase from the municipality; (3) the platform development with the providers, and (4) the market commercialization. The main business model changes are: the investments and development of the platform prototype (in progress), the introduction of the municipality, adoption of providers, and search for new clients. However, these business model changes will impact on other domains, and some activities will have to be done in parallel with the platform development and direct experiences with customers and users. The roadmap can be seen in section 5.3.

- RQ5. What is the institutional view about regulations and legislations to support technology development and/or new changes into the healthcare industry?

Currently, Municipalities in Rotterdam have the legislation power to define policies in healthcare, and improve the quality of care of their citizens based on WMO social act. As stated in the organization domain, the municipality would be responsible of the marketing, and adoption of platforms in health and wellbeing not only citizens but also employees (advisors and WMO office). In addition to it, the policies to innovate the industries from the national government accompany the design and implementation of new business models given the coming platform revolution across several industries. Thus, these two institutional instruments can aim to support the development of platforms in the healthcare industry, and expand the business services to organizations and customers.

6.1.2. Evaluation of the Business Model

The business model was evaluated based on the CSFs of the STOF method, and the BMST. On the one hand, the viability of the CSFs sought to find gaps in the existing business model, and reach its balance in the four domains. On the other hand, the BMST evaluated the

business model under the analysis of uncertainties that the business model had. The findings are broken down briefly in this section.

According to the STOF method, eight factors are important in the assessment of the business model; four are related to the customer whereas the rest are related to the organizations (Bouwman et al., 2008). From the customer value, we found that the *target groups* are clearly defined and described to the business model. The distinction between the elderly people and voluntary caretakers is the least visible, yet it is clear that elderly people will sometimes require the support from voluntary caretakers due to disabilities. The *value propositions* had some adaptations and changes but these respond to the needs of each target group. Although the *customer retention* was taken into account with the user profile, this will depend on the adoption and usability of the services in the pilot phase. And lastly, the *quality of service* depends on the platform architecture and user experience with a robust platform.

In order to assess the network value, we analyzed the acceptable risks, profitability, platform strategy and division of roles. In general, the *strategy* and the *division of roles* could be addressed from the governance and discussion about the openness of the platform. The platform strategy seeks to reach the municipality at first stage and the division of roles is described to each stakeholder. During the interviews and workshops, the stakeholders agree with the business model help to define the strategy and coordinate the activities to develop the platform and reach a better vision about the existing market.

The main weakness lies on the *acceptability of risks* and *profits* in the pilot phase. The investments can be associated with the risks to lose money during the platform development. The platform requires development and more innovations, and this could lead to more investors and parties involved in technology to build the platform. The profitability has an initial source from the municipality, yet the municipality desires to implement a tested solution rather than building the platform along with the foundation. Therefore, the investments and profitability require more attention to ensure the viability of the business model. Therefore, the network value is not totally described, and this makes difficult the platform development from the municipality.

Based on this, the business model could be viable under the assumption that the municipality will still be willing to invest on the digital platform, once the basic platform is required. Otherwise, the business model is not viable. The technology needs to have a basic demonstration with user's features to both sided groups municipality and elderly citizens to negotiate the investments at financial and technology level, as well as measure the quality of service. If so, the business model could be viable, and the platforms solution can be accepted in the municipality.

On the other side, the business model was analyzed and evaluated with the BMST. The BMST aims to evaluate the robustness of the business model under different uncertainties (Bouwman et al., 2008). So, it is possible to define whether the business model stand under

five different uncertainties: (1) the digital skills of elderly people in IT; (2) competition; (3) regulations (4) privacy; and (5) dominance of the insurances in the market. And, The main components analyzed of the business model were the target groups, the value propositions, the technology, the value network and division of roles, and the revenue models.

Based on the BMST, we found the growing trend in elderly people to understand and manage ICTs, and its positive influence to grow the platform. The rapid growth of competitors can lead to create problems in the organization and the movement to target groups. Organizations can move to rival platforms due to opportunities to develop faster their resources and capabilities. Similarly, the regulations could affect the value network, and bring more parties. The privacy and security suggests more complications under closed system given rules and governance will have to be strict from the beginning. And finally, the dominance of insurances can lead to become them into competitors with more resources (user base and financial capabilities). From this view, the business model cannot withstand under rapid changes on the competition or a dominant position of insurances in the market.

6.2. Academic Reflection

Based on the findings and results obtained in the design and evaluation of the business model, it is important to ask our research question *How can a viable business model to a digital platform in health and wellbeing be designed?* In order to answer this question, we suggest to design the business model according to its platform development and the involvement of users in order to make adaptations on both the platform and the business model.

From the living lab approach, the user involvement is essential for developing technology innovations. The involvement of users should participate not only in the design of digital platforms, but also the business model for two reasons. On the one side, the user involvement is possible due to the growing knowledge and direct experiences in ICTs from people. On the other side, the user involvement with platform development can aim to identify the needs, preferences, and context of use of these digital platforms.

As we could see in the BMST the digital skills and expertise in ICTs are growing, and bring opportunities to develop platforms to the elderly people. In fact, people can understand technology based on direct experiences of the industry, and find solutions that could be designed as digital platforms. The users can be seen as source of information to build business ideas into business models given its direct experience with the industry from an strategic viewpoint of organizations. Thus, the users can reflect on the needs, context of use and value elements of customers and organizations.

According to Tiwana (2014), platforms can evolve and grow when there is an alignment of the platform architecture (technology) and platform governance (organization). However, the platform development could come from the business model. The business model should be designed in parallel with the digital platform. As we could see in the business model roadmap,

the platform development will have different changes, and each one has impacts on the business model, and vice versa.

The business model will have changes over the platform development even after its commercialization. These business model changes have implications on one or more components of the business model. Similarly, the planning on the business model should take into account the changes in the platform development. Therefore, the platform development should grow at the same rate of the business model. In other words, the business model will define the boundaries till where the platform could be developed in coming stages.

In addition to these points, Heikkila et al. (2015) suggest the business model and the product development with iterations. Due to the active participation of users, they can make designs on the design of digital platforms. The knowledge in ICTs and the development of platforms based on existing technologies can aim to have active user involvement in the platform development. Moreover, they can help to anticipate market changes, and help to design the business model. At the end, the user involvement and customer acceptance help to make adaptations, and change the direction of the business model or the platform development.

Therefore, the business model should include these adaptations to the changes in the digital platform or technology. The model should be seen as a DNA model with two streams the technology and the business model, and the user involvement as linkage between the business model and the technology. On the one hand, the users experience the platform services, make reviews on the digital platform, and participate on the platform development. On the other hand, the customer and users can aim to anticipate the market needs, technology needs, or improve the service design on the business model. Hence, the iterations occur in both sides the platform and the business model.

The growth of the platform development should lead to make more visible the business model, and the acceptance of the customers. Similarly, when the business model is not fully valuable for organizations neither customers, the platform and the user acceptance could not be visible. And, when the user acceptance of the platform decreases, the business model and the platform development lose their vision till these involve the users and make adaptations on both areas in parallel. Hence, the business model and the technology could grow and evolve faster but with a strong focus on the market.

These adaptations should be seen as learning lessons for users and companies in the design of the technology and the business model. The iterations in the business model and the technology should be accepted by organizations as a methodology to improve their capabilities and resources on the innovation of the business model and the technology. Companies can target their resources and capabilities on the achievement of new goals given the business model changes or new market needs (competitors or users). Moreover, they can build a bundle of services to companies or customers given the experiences gained, or

introduction of new services. And, thereby companies should see these iterations as opportunity to change the business strategy.

During the BMST and the business modeling, the stakeholders could define more clearly the vision of the digital platform. But, they look at opportunities with niche markets, elderly people, and possible rival platforms that could appear. Similarly, users should understand the adaptations of the business model and iterative design of the technology. They should contribute on feedbacks in order to have active participation on the technology development, and even during the evaluation (before its implementation). Hence, the users should see these iterations as opportunities to improve the technology, and learn on experiences gained in the past.

Based on these three elements, the business model roadmap can be possible. The roadmap should have a focus on technology development and the business model changes. Although the user involvement is not clearly visible due to its focus, this can be visible on the strategic view and operational activities. From the strategic viewpoint the user involvement can speed up at the same rate the business model and the technology. And, the user involvement with the companies can aim to take actions for the creation of services, changes in technology, modifications to the value network, or introduction of new revenue models. In other words, the business model roadmap makes anticipations to possible changes that are required before reaching the (business) network strategy.

In sum, we explored the search of a viable business model on a platform in health and wellbeing to the foundation Zo-Dichtbij. And we found in this research that the user involvement, the construction of the business model and the platform, and the iterations on the business model and the technology development helps to solve the problem of looking for a viable business model on digital platforms. These three elements together should accelerate the platform development, and develop a viable business model, so that the platform can reach its commercialization.

6.3. Recommendation

Based on the findings and the knowledge obtained from the business modeling and evaluation on the platform Zo-Dichtbij, we suggest the following improvements using the STOF method in order to design business models on digital platforms in health and wellbeing.

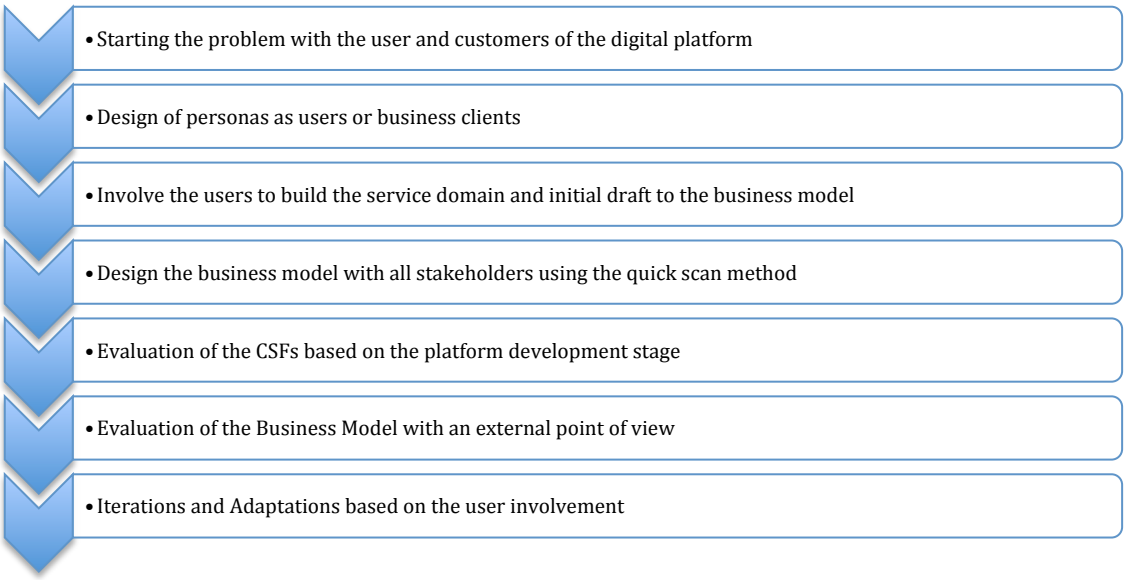

Figure 6. 1 Guideline to design a business model on digital platform in health and wellbeing

Starting the problem with the users and customers of digital platforms

As suggested in our findings, the user involvement is essential in order to identify the needs, preferences, and context of use of them. Based on this, it is possible to have inputs in order to change the business model and the digital platform. And, if there are market changes from the users and customers, the platform owner can identify this faster, and make adaptations.

Design of the personas as users and business clients

The design of persona has to be seen as organization rather than average user. Its importance lies on the understanding of the interests as organization, if so, from the strategic viewpoint and the operational viewpoint. So the personas who represent organizations should be seen as defined business clients. And its description is based on needs, preferences, and context of use.

Involve the users to build the service domain and initial draft to the business model

As we stated in the findings, users can identify market needs, and participate in the platform development. The involvement of users can aim to define or re-define the service design of the digital platform. Moreover, they can identify the organization in a broad view, and give some inputs to the finances, especially in revenues models using the quick scan methodology.

Design the business model with all stakeholders using the quick scan method

The design of the business model in the rest of domains can be reached in a workshop design session with all stakeholders involved. From this starting point, organizations can design the business model, or make adaptations on the entire business model including the service design. The participants should come from the management and operational level in IT in order to design the business model in all domains.

Evaluation of the CSFs based on the platform development stage

During the evaluation of the CSFs, the researcher faced complications to evaluate the business model, specifically in the quality of service, customer retention, acceptability of profits and acceptability of risks. In general, evaluation could not go beyond the value propositions and the target groups from customer value, the network strategy and division of roles from the network value.

Although the user profile was an element to have customer retention, both the quality of service and customer retention could not be evaluated given the platform needs to be adopted and evaluated with more than a platform prototype. These two elements should be evaluated better, and considered in later stages, specifically the platform development and market commercialization. Similarly, the acceptability of profits and risks is still difficult given the investments from the technology side are not estimated. Hence, we advise to review these CSFs based on the platform development stage.

Evaluation of the Business Model with an external point of view

The evaluation should be made with an external view from advisors that are specialized in the industry domain, and technology management. In this case, experts with experience in the healthcare industry or technology management could aim to identify new weaknesses, or strengths in the business model. Hence, the evaluation can have a greater focus, but this should not include participants in the design stage in order to validate the results better.

Iterations and Adaptations based on the user involvement in the Business Model

The lessons and iterations on the platform development and the business model should be consequence of the user involvement in the design of both technology and business model. Based on this, the customer acceptance is a feedback to make iterations on the platform development and the user involvement. Therefore, the business model can make adaptations an the roadmap can aim to elaborate the planning to reach the changes in both the platform and the business model. We suggest to make this in each stage of the platform.

More research is necessary to enrich this recommendation and build a complete guideline to develop digital platforms according to its platform development. In this case, we have this guideline for developing a business model for platforms in health and wellbeing before its pilot phase.

6.4. Discussion

6.4.1. Theoretical Contribution and comparison of findings with literature review

This research makes an exploration of the design of business models on platforms in health and wellbeing under living lab settings. This research contributes to the literature by introducing the importance of iterations in the business model and the platform development along with the user involvement. This leads to design digital platforms in line with the business model and with strong focus on the market introduction in order to make viable.

Up to now, the focus is based on the iterations into the technology development along with the involvement of users and stakeholders in the business modeling. In this research, we argue the importance to design the business model from the beginning, and evaluate the business model along with the users and customers, and make changes on the business model and the platform development. The argument lies on the users can aim to describe the service based on the needs, preferences, identify market changes, and thereby make adaptations on both the business model and the platform development. In the end, these adaptations lead to have iterations on the business model and the platform but with a focus in the market introduction or commercialization.

6.4.2. Practical Contribution

From the practical perspective, the research provides a vision and strategy to define, and implement the business model in the coming stages. The business model provides a clear view about the target groups and value propositions from service perspective. The value network introduces the main actors, and the values, information and operating activities that can be exchanges between themselves. Moreover, we evaluated the business model using the CSFs and the BMST. Lastly, the road mapping is described with the possible business model changes and activities that can be required beforehand in order to reach the commercialization in the pilot phase.

6.5. Limitations of the Research

At this point, it is necessary to make a critique of self, maybe critique of ours in order to define the limitations in this research. These limitations will be based on a self evaluation of this investigation in order to define the limitations of this research.

6.4.1. From the business model to business case

From the practical view, the research provides an insight about the business model to the platform before and during the roll-out of the proof of concept. This provides indications and can make some estimation in time about the possible revenue models and main cost sources to the foundation. As we stated in section 6.1.2., this evaluation can have negative effects on the viability of the business model if the profits are not visible or the costs exceeds the profits in the long run. Thereby, it is necessary to have the platform basis, and complement this business model with some estimation in costs, and investments.

6.4.2. Composition to workshops

The design and evaluation stages of the business model had as main focus the human interaction with workshops and interviews to facilitate the interaction, and involvement of multidisciplinary expertise. In general, the participants in the workshops represented the stakeholders. Yet, It is recommended to have representatives of users that are related to the operational level in order to complement the business model from the technology side.

6.4.3. Language Barrier

As it was stated in section 3.2, the workshops were in Dutch, language that the researcher does not manage it. This could affect the validity of the results that were obtained in this investigation. However, the researcher had the interviews with the stakeholders involved (same participants) in the workshops. Hence, the results about the business model were discussed, and aligned to the direction of the project. Thus, the analysis about the business model and observations to design the business model should have some reservations regarding to the findings.

6.4.6. Internal Validity

The internal validity in business models has to take into account two points: balance and consistency between all domains (Bouwman et al, 2010). Making a balance between all domains was part of the business model design, and evaluation. However, the fact of not addressing the technology domain due to lack of interface and platform basis can influence negatively in the internal validity. Unfortunately, it was difficult to achieve a description of this technology architecture given its development stage. Thus, the business model could not be described more than the IT roles we reached in the technology side. Similarly, the investments and cost structure could not be explored in more detail. This means that the validity is affected by these gaps that still have to be evaluated in further research, and balance. From this viewpoint, the internal validity to the business model has some reserves.

6.4.7. External Validity on the business model

The business model design is bounded in the healthcare industry and the Netherlands. The business model could be generalized in other countries under certain conditions. These are the legislation from the local level to rule the healthcare industry. These are the legislations as the WMO social act, the increasing expertise in IT from its population could make the business model viable within the Netherlands. This infrastructure in IT, legislation at local level in healthcare, and growing digital skills from the elderly people should be taken into consideration to not to make valid the business model in other nations. Hence, the business model cannot be applicable in nations where the municipality does not play a role to enact new legislation with greater freedom as it occurs in the Netherlands.

The generalizability of the business model to other digital platforms in healthcare industry is difficult to be achieved. The platform development in this industry is still broad, and its application can go beyond the support and communication with elderly people in healthcare

industry. Now, to what extend this can be applicable in other industries? The guideline to design the business model on digital platforms can be improved in other industries, and extend its generalizability. The platform development is a new trend across all industries due to its facility to match two or more sided markets (Tiwana, 2014). However, it is important to delimit this by now within an specific platform service in health and wellbeing.

6.4.9. Internal and External Validity on the findings

In this case, we used workshops and interviews to collect data and make observation over a single digital platform in health and wellbeing. The internal validity refers to the to which the results accurately represent the collection of data (Sekaran, 2006). The findings could have complications given the workshops were in a different language, and there filters in the translations. And, the external validity refers to whether this can be generalized other context. Based on this it is necessary to have a diverse and broad range of cases to validate this finding.

6.6. Future Research

In general, these topics of research (list-to-do-things) should be addressed with the collaboration more business models on digital platforms. Similarly, the users, technology providers and business organizations should participate during the business modeling and evaluation of the business model.

I. As we discussed the limitations of the research and its exploration purpose to build a business model to platforms in health and wellbeing, we consider the platform development of Zo-Dichtbij. In order to validate the findings and enrich the guideline in order to design the business model, more digital platforms require to be evaluated with their business models.

II. The validation of the business model can be reached with the design of the business case, and roll out of the platform development from the municipality. This needs to be specified and implemented. Now if the platform grows, iterations will have to come again, and re-define the business model and the platform again. It would be good to ask here whether the learning lessons on users and organizations compensate the changes and iterations on the platform development?

III. And lastly, governance models to align activities between the platform architecture and the organization should be studied with the user involvement. Up to now, the studies are focused on the alignment of IT and organization to design digital strategy. However, the alignment of technology, organization and users could lead to design innovation strategies. What kind of innovations can be reached with the user involvement?

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Appendix

A.1. Workshops Agendas

In this part of the appendix, the workshops agendas are included in Sections A.1.1 and A.1.2. Subsequently, the description of personas is presented one by one, and listed in section A.1.3. And lastly, the interview protocols are presented in order to make the evaluation of the business model along with the key stakeholders of the business model.

A.1.1. Workshop Session 1

Preliminaries

A total of four participants were included in the workshop design session of the business model. The participants represented important actors to the platform: voluntary caretakers, experts in elderly users, PhD student (research side), and the chair of the foundation Zo-Dichtbij. Each participant introduced itself before the beginning of the workshop, as well as, received the workshop agenda and presentation of the STOF method to design the business model.

Workshop Opening

- ✓ Audio Video Recording
- ✓ Posters in blank
- ✓ Welcome note by Moderator from Innovalor

The moderator opens the workshop session to design the business model, and introduced itself, and open the opportunity to each participant to do a short introduction along with the role and/or representation within the project Zo-Dichtbij. In order to have a greater focus on the business modeling, a short presentation about the main points to be taken into account in the STOF method are explained. This will aim to understand the methodology, and guide the participants to review the key points during the workshop to discuss, debate and interact during the session.

Introducing the STOF method

- ✓ Introduction STOF method and quick scan
- ✓ Example of how we can use the STOF method in a mobile application

The participants are adults, and thereby the quick learning methodology is the presentation of the methodology to use throughout the business model design session. Then, the example in a

mobile application is presented in order to address the four domains of the STOF method with a PowerPoint presentation. Yet, the technology domain is not addressed given the expertise of the participants in IT is low. Therefore, the session is mainly focused on the Service, Organization, and Financial domain. Afterwards, the example grounded the methodology in a real case in order to understand the domains, and goals to be reached at the end of each domain.

Service Domain Session

- ✓ Presentation Personas
- ✓ Discussion and Interaction of Service Domain

The STOF method begins from the customer and user description to the rest of domains. Hence, the description of the personas is presented along with some hard-copies to each participant, See Appendix A.1.3. Subsequently, the moderator and the participants move to identify the users, the customers of the platform, as well as the platform services that could be provided from the platform to each target group. The moderator must highlight the importance of reaching the value elements to build the value propositions to the business model in each target group.

Organizational Domain Session

- ✓ List of Stakeholders
- ✓ Possible roles and interests
- ✓ Draft of the value network

Once the platform services and business idea is debated, the session can move to the organizational domain in order to analyze the actors who are able to contribute in any stage of the business model. The list will be written down between the moderator and the participants with post-notes. And, the participants will provide reasons about the roles, interests, or contributions they can make to the platform. Lastly, the moderator will guide the session order to sum up the key stakeholders in the value network. Yet, the participants will contribute in the way these are interrelated based on the service and/or organizational domain.

Financial Domain Session

- ✓ List of Possible revenue Models
- ✓ Analysis of Revenue Models
- ✓ Costs Sources
- ✓ Investment Sources

In the financial domain, the moderator will provide some post-notes to each participant with possible revenue models. Then, the participants will make a list of possibilities to have in the platform. Afterwards, the analysis and suggestions to the selected revenue models are explored, as well as its possibilities to associate with one or more customers. Finally, the debate will move to the cost sources and possibilities to get investments.

Business Model Stress Testing (BMST)

- ✓ List of uncertainties
- ✓ Definition of extremes
- ✓ List of business model components to analyze
- ✓ Development of the heat map to each uncertainty and business model component.

In the BMST, the moderator will have some post notes in order to fill out the BMST tool based on four colors:

- Red: needs attention from the strategy perspective
- Yellow: Negative (positive) effects cannot be excluded, but attention is required
- Green: No effects
- Grey: No relevant influence

The group will analyze together the entire business model tool with the uncertainties chosen. And the moderator will paste the post notes depending the discussion and suggestion between participants.

Time and Planning

The video recording will be used to collect the data, and be analyzed by master students in order to design the initial business model design idea. The researchers will take notes based on the posters, main debates, and new elements that appear in one or more domains. The planning and schedule to the workshop session can be seen in Table A.1. The workshop occurred within the faculty TPM during the day 13th August 2015.

Time	Activity	Goal
9.30 – 9.45	Introduction of Participants	Workshop Opening
9.45 – 10.00	Presentation STOF method	Explain Methodology
10.00-10.15	Example Mobile Application	Clarify doubts about STOF
10.15-11.15	Service Domain	Platform Service Idea Target Groups Value Propositions (Elements)
11.15-12.15	Organization Domain	List Actors, roles, interests Value network (possible)
12.15-13.15	Financial Domain	Description of financial structure Money Flows (possible)
13.15-13.45	Lunch	
13.45-16.00	Business Model Stress Testing	Evaluation of the business model

Table A. 1 Planning and Activities Workshop Session 1

A.1.2. Workshop Session 2

Preliminaries

A total of four participants were included in the workshop design session of the business model. Five participants represented important organizations to the platform to CEO of Neobis (Consulting Firm in IT), CEO of MedVision360 (SME in Healthcare), PhD student (Research side), Sales Manager of Ziggo, IT business architect ICTU (Consulting Firm in IT). Each participant introduced itself before the beginning of the workshop, as well as, received the workshop agenda and presentation of the STOF method to design the business model.

Workshop Opening

- ✓ Audio Video Recording
- ✓ Posters in blank
- ✓ Welcome note by Moderator from Innovalor

The moderator opens the workshop session to design the business model, and introduced itself, and open the opportunity to each participant to do a short introduction along with the role and/or representation within the project Zo-Dichtbij. In order to have a greater focus on the business modeling, a short presentation about the main points to be taken into account in the STOF method are explained. This will aim to understand the methodology, and guide the participants to review the key points during the workshop to discuss, debate and interact during the session.

Introducing the STOF method

- ✓ Introduction STOF method and quick scan
- ✓ Example of how we can use the STOF method in a mobile application

The participants are adults, and thereby the quick learning methodology is the presentation of the methodology to use throughout the business model design session. Then, the example in a mobile application is presented in order to address the four domains of the STOF method with a PowerPoint presentation. Yet, the technology domain is not addressed given the expertise of the participants in IT is low. Therefore, the session is mainly focused on the Service, Organization, and Financial domain. Afterwards, the example grounded the methodology in a real case in order to understand the domains, and goals to be reached at the end of each domain.

Service Domain Session

- ✓ Presentation Personas
- ✓ Discussion and Interaction of Service Domain

The STOF method begins from the customer and user description to the rest of domains. Hence, the description of the personas is presented along with some hard-copies to each participant, See Appendix A.1.3. Subsequently, the moderator and the participants move to identify the users, the customers of the platform, as well as the platform services that could be provided from the platform to each target group. The moderator must highlight the importance of reaching the value elements to build the value propositions to the business model in each target group.

Organizational Domain Session

- ✓ List of Stakeholders
- ✓ Possible roles and interests
- ✓ Draft of the value network

Once the platform services and business idea is debated, the session can move to the organizational domain in order to analyze the actors who are able to contribute in any stage of the business model. The list will be written down between the moderator and the participants with post-notes. And, the participants will provide reasons about the roles, interests, or contributions they can make to the platform. Lastly, the moderator will guide the session order to sum up the key stakeholders in the value network. Yet, the participants will contribute in the way these are interrelated based on the service and/or organizational domain.

Financial Domain Session

- ✓ List of Possible revenue Models
- ✓ Analysis of Revenue Models
- ✓ Costs Sources
- ✓ Investment Sources

In the financial domain, the moderator will provide some post-notes to each participant with possible revenue models. Then, the participants will make a list of possibilities to have in the platform. Afterwards, the analysis and suggestions to the selected revenue models are explored, as well as its possibilities to associate with one or more customers. Finally, the debate will move to the cost sources and possibilities to get investments.

Business Model Stress Testing (BMST)

- ✓ List of uncertainties
- ✓ Definition of extremes
- ✓ List of business model components to analyze
- ✓ Development of the heat map to each uncertainty and business model component.

In the BMST, the moderator will have some post notes in order to fill out the BMST tool based on four colors:

- Red: needs attention from the strategy perspective
- Yellow: Negative (positive) effects cannot be excluded, but attention is required

- Green: No effects
- Grey: No relevant influence

In this case, the group is divided into three parts, and each part will analyze the uncertainty that was assigned to each group. In the end, the moderator collects the outputs, and completes the heat BMST tool. And additional feedback from the participants can be received.

Time and Planning

The video recording will be used to collect the data, and be analyzed by master students in order to design the initial business model design idea. The researchers will take notes based on the posters, main debates, and new elements that appear in one or more domains. The planning and schedule to the workshop session can be seen in Table A.1. The workshop occurred within the faculty TPM during the day 13th August 2015.

Time	Activity	Goal
9.30 – 9.45	Introduction of Participants	Workshop Opening
9.45 – 10.00	Presentation STOF method	Explain Methodology
10.00-10.15	Example Mobile Application	Clarify doubts about STOF
10.15-11.15	Service Domain	Platform Service Idea Target Groups Value Propositions (Elements)
11.15-12.30	Technology Domain	Devices Layer Description Logic Layer Description APIs Layer Description Infrastructure Layer Description
11.15-12.30	Organization Domain	List Actors, roles, interests Value network (possible)
12.15-13.15	Financial Domain	Description of financial structure Money Flows (possible)
13.15-13.45	Lunch	
13.45-16.00	Business Model Stress Testing	Evaluation of the business model under uncertainties

Table A. 2 Planning and Activities Workshop Session 1

A.1.3. Personas

During the workshop design sessions, a description of eight personas was used in order to represent the users and customers of the platform. The persona is a representation of a user about its needs, hobbies, personal information, emotions, and personal status (Cooper, 1999). These personas are general archeotypes of organizations and/or individuals (Osterwalder & Pigneur, 2010). Previous research explored these eight personas, so that these were as much realistic as possible (Keijzer-Broers et al, 2013). The description of these personas are described in Figure A1-A4.

Persona 1 : Frans Berkhout

Age	49 years
Place of birth	Schipluiden
Home environment	residential area
Marital status	married, 2 children
Profession	home care products supplier
Social class	average income
Internet use	work and private

Frans is a hardworking man who easily makes long working weeks. He is constantly looking for new customers and products.

Family members
His wife, Anne, is 50 years old, works part-time at a plumbing company in The Hague. His daughter is studying and his son works at a horticulture. Both still live at home.

Health
Frans is a healthy man, but the deteriorating economy is causing him stress.

Hobbies
Frans is a handball coach and he loves reading and music. If the weather is fine, he travels in the area with his motorcycle.

Special needs
Frans needs customers for his products. He notes that more can be added to the company's brand awareness and product sales. He is also seeking partnerships with companies / institutions to increase his customer base. He is looking for ways to approach consumers directly.

Persona 2 : Annie Ammerlaan

Age	79 years
Place	Schipluiden
Home environment	rural
Marital status	single, no children
Profession	housewife
Social class	below average
Internet	has no internet

Annie has a small pension and she is quite lonely. She lives in a rented house. Earlier she has travelled a lot, but because of health problems she has not been on tour in recent years. Annie is illiterate and has no experience with the Internet. She simply hates the phone and would rather go down personally.

Family members
Single, no children. She has reasonable contact with her neighbours.

Health
Annie is a fragile woman and has undergone several surgeries over the years. She is not that mobile, walking with a walker, but mentally well at the time. Despite her limitations, she remains happy and cheerful.

Hobbies
Reading, knitting, cards and watching TV. She loves socializing.

Special needs
Annie wants to live as long as possible in her own home environment, though lately that has become more and more difficult. She is in need of domestic help and contact. She does not have a large social network and also lacks the money. Ideally, she would like to meet someone for regular companionship and can accompany her with outdoor activities.

Figure A. 1 Description Personas Frans Berkhout and Annie Ammerlan

Persona 3 : Kees van de Ende

Age	81 years
Place of birth	Maasland
Home environment	residential area
Marital status	married, no children
Profession	retired engineer
Social class	average income
Internet use	private

Kees is an introvert but overprotective husband who takes care of his wife Toos (84) who suffers from dementia. He hopes to live independently with his wife as long as possible. Before Toos was sick, Kees never had to do much in the household. At the age of 80 he had to change his daily life a lot.

Family members
Married, no children and a limited social network.

Health
Kees is a moderate smoker, but a heavy drinker. He takes about 5 drinks a day. Physically he is still a strong person.

Hobbies
Until last year, every day he cycled a lot and enjoyed working in the garden. Nowadays, because of Toos, he stays most of the time at home.

Special needs
Kees needs social contacts and would like to take part in outdoor activities. However, he would prefer to be in control of his life and does not like nosy people.

Persona 4 : Ria van Marrewijk

Age	55 year
Place of birth	Den Hoorn
Home environment	terraced house
Marital status	husband and 3 children at home
Profession	part time care giver at Buurtzorg
Social class	average income
Internet use	private

Ria is a caring mother. Next to her job as a caregiver, she takes care of her family and her parents who also live in Den Hoorn. Ria is a social person. She is dedicated to her family and she wants to support her parents (both 80) to let them stay in their home environment independently as long as possible.

Family members
Married to Sjaak (57) whose profession is a greenhouse builder. Three young children living at home (17, 19 and 23 years old)

Hobbies
She has no time for hobbies, because of the dedication to her family.

Special needs
Ria is looking for nursing solutions for her parents. She has little computer skills, but with a little help from her children she will manage.

Figure A. 2 Description Personas Kees van de Ende and Ria van Marreij

Persona 5 : Ellen van de Windt

Age	47 years
Place of birth	Delft
Home environment	city center
Marital status	married, 3 children
Profession	coördinator Foundation Welfare Elderly
Social class	average income
Internet use	work and private

Ellen is a highly motivated and energetic woman who is committed to the welfare of the elderly and specifically in the area of Midden Delfland. Next to her job, she is a volunteer at a social care organization. She is continuously gathering funding and seeks as many volunteers as possible.

Family members
Married to Jan (51), working as an accountant, three children (12, 16 and 21). The eldest daughter studies in Groningen.

Health
Good, but their daughter (16) is slightly mentally retarded and needs extra attention.

Hobbies
Walking and biking

Special needs
Someone who can give her feedback. She is also looking for opportunities for her daughter to prepare her for society.

Persona 6 : Anton Gielissen

Age	62 years
Place of birth	Delft
Home environment	terraced house
Marital status	single, 2 children living away
Profession	civil servant Social Affairs Delft
Social class	more than average
Internet use	work and private

Anton is a middle-aged man, active in the Social Affairs Department of the municipality of Delft. He is particularly engaged with questions of the WMO (care regulations) and taxi fees for elderly and people with impairments. He is a social person.

Family members
Anton is a single (divorced) man. His two children moved out of the house recently and are studying more than 50 miles from their hometown.

Health
Anton has had a mild heart attack and is a patient of the cardiologist. Because he suffers from shortness of breath, he is under control at a long specialist.

Hobbies
Anton is an active man and that keeps him fit. His main hobbies are fishing and playing cards. In his spare time, Anton is a volunteer at the card club.

Special needs
Anton needs more volunteers and donors for "his" club and to do his work properly at the municipality he needs useful instruments and communication tools to advice his clients.

Figure A. 3. Description Personas Elien van de Windt and Anton Gielissen

Persona 7 : Petra de Kort

Age	25 years
Place of birth	Den Haag
Home environment	city center
Marital status	living together with a boy-friend
Profession	advisor WMO office Midden Delfland
Social class	average income
Internet use	work and private

Petra is a young woman who has recently started as a consultant at the WMO office at the municipality of Delft. Her challenge is to get the best out of her job and she wants to make career within the municipality or in politics. Her primary goal is to stay within the agreed WMO-budget, looking very critical look at all the incoming requests and allocations.

Family members
Living together with her friend Pascal (31), who is a welder by profession. They have no children. Mother Ria past away last year and father Eric (57) is lonely ever since.

Health
Good, but she is worried about her father.

Hobbies
Petra loves reading and playing music. She also plays netball and is a member of the CDA (political party).

Special needs
Petra is looking for a good tool that can help her reach her WMO goals. In addition, she is looking for opportunities for her father, like psychological help. Next to that she would like to help him finding contacts in his own environment.

Persona 8 : Hakkan Bitez

Age	55 years
Place of birth	Delft
Home environment	poor neighbourhood
Marital status	married, 6 children, 1 living away
Profession	unemployed
Social class	below average
Internet use	private (with help of the children)

Hakkan is unemployed. He has worked for years in the garden, but due to the recession he got fired. For a year he receives a benefit from the government. Although he tries very hard, he can't find a job, also because of his poor Dutch skills.

Family members
Hakkan is married and has six children (aged 12 to 24 years). Five children still live at home. His wife takes care of the children. The eldest daughter has a job and lives in Den Haag. The two youngest children have mild behavioural problems, which is especially difficult at home and at school. For a long time the family is a searching for a larger house for a reasonable price. Until now they didn't succeed to find something.

Hobbies
None. He undertakes some activities with Turkish men in his neighbourhood.

Special needs
There is a need for a larger home and guidance for the youngest children. Additionally Hakkan needs help finding a job.

Figure A. 4. Description Personas Petra de Kort and Hakkan Bitez

A.2. Interview Protocols

Project: Business Model Refinements

Date _____

Location _____

Interviewer _____

Interviewee _____

Notes to interviewee:

First of all, I appreciate your time and participation throughout the Business Model (BM) design in the workshops, and in this interview to make the refinement of the BM design. I believe your input will be valuable to the research, and to make more objective the final BM. The questionnaire will have the objective to share the inputs of the business model design at first glance, and make some questions in order to validate some findings, and close gaps in the existing BM.

Recorded Instructions

If this is OK, I will be recording our conversation in order to get all details from the interview, and carry on an attentive conversation with you. I will guarantee the confidentiality of the responses.

Purpose of research:

The purpose will be the refinements to the business model in order to ensure the viability of the BM, and the balance between all domains.

Content

1. Explanation Business Model
2. Questions or Doubts from the interviewee's perspective
3. Questionnaire to the stakeholder

Service Domain Interview Protocol

1. "Living as long as possible independently with support at low cost"

Do you agree with the value proposition to the elderly people?

Follow up

- Can you suggest more value element to this value proposition that can be introduced in the prototype?

2. "Support and guidance to unburdening the healthcare load"
   Do you agree with the value proposition to the voluntary caretakers?

   Follow up
   - Can you suggest more value element to this value proposition that can be introduced in the prototype?
   - Can the premium services spoil the unburdening element?

3. "Support and Secure instrument with high quality, reliability, and comfort to guide, and communicate effectively with citizens at low cost"
   From your perspective, do you agree with the value proposition to the municipality?

4. "Access and Promotion of your services and products on the marketplace"
   From your perspective, do you agree with the value proposition to the providers?

5. What services should be *for free* to the voluntary caretaker from the beginning?

Figure A. 5 User Interface (Care Plan)

6. What services should be paid to the voluntary caretakers and/or the elderly people with a premium fee?

7. From your perspective, How likely the voluntary caretakers, and/or the elderly people can keep using the platform till they move to the premium services?

   Follow up:
   - May the lock-in features of the premium service spoil the adoption of the free features?

8. From your perspective, Can the platform retain and keep the voluntary caretaker and/or the elderly people with the premium services?

   Follow up
   - If yes, how do you feel about the lock-in features with monthly subscription?
   - If no, how do you see the profile and the care plan with the agenda, the diary, and the insurance information?

Organization Domain Interview Protocol

9. Do you agree with developing an open platform from the beginning?

   Follow up:
   - If yes? Which are the advantages? And, what do we have to keep in mind to ensure the roll-out of services to the municipality, near relatives, and elderly people?
   - If no? Which are the disadvantages (weaknesses)? Follow up: Why do you think a closed platform can bring both parties easier than an open platform? Which are the advantages?

10. *From your perspective, how should the foundation select the service/product providers in entertainment and comfort products?*

    - Dominance in the market
    - Geographical location to the neighborhoods
    - Simplicity and facility to join into the platform.
    - Resources and Capabilities
    - Insurance Plans

11. *From your perspective, how should the foundation select the service,/product providers in Domestic Help (Security, Home services)?*

    - Dominance in the market
    - Geographical location to the neighborhoods
    - Simplicity and facility to join into the platform.
    - Resources and Capabilities
    - Insurance Plans

12. *From your perspective, how should the foundation select the service/product providers in healthcare?*

    - Dominance in the market
    - Geographical location to the neighborhoods
    - Simplicity and facility to join into the platform.

- Resources and Capabilities
- Insurance Plans

13. From your perspective, how can we keep and retain the providers within the platform?

Follow up:

- From your perspective, how we can make transparent the delivery of services to the user when one provider needs to be replaced by another one?

14. From your perspective, Should the providers agree, and only agree to the organizational arrangement provided by the Foundation when they want to join to the platform?

Follow up:

- If yes, what are the advantages of reaching the agreement in this way to the foundation (elderly people, voluntary caretakers)? And, What are the risks of elaborating these agreements in this way?
- If no, what are the advantages of reaching common agreements between the foundation and the providers? What kind of risks are associated if they participate in the elaboration of these agreements?

15. From your perspective, how we can keep and retain the municipality?

Follow up:

- Can the foundation have a personal and close relationship on an everyday basis with the municipality to roll-out the services?
    - Follow up, advantages and disadvantages? And, when the foundation should start to make larger the distance with the municipality?

16. From your perspective, is the municipality willing to accept that the foundation will manage the platform?

Follow up:

- If yes, What does the municipality want from the foundation when the platform is launched?, And Are they willing to learn during the process?
- If no, What resources and capabilities are required in order to ensure that the foundation can manage the platform independently?

17. Can the municipality have free access to the information of the platform about their citizens?

Follow up, Should they pay to access to this information?

Financial Domain Interview Protocol

18. From your perspective, Is the freemium model coherent to the voluntary caretakers and/or elderly people?

Follow up:

- If yes, What are the advantages of this revenue model? Is there any risk?
- If no, What are the risks? And what revenue model could fit better?

19. *From your perspective, Is an advertisement fee coherent to the providers?*

    Follow up:
    - If yes, What are the advantages (disadvantages) of this revenue model?
    - If no, What are the risks? And what revenue model could fit better?

20. *From your perspective, Is an annual fee coherent to the municipality?*

    Follow up:
    - If yes, What are the advantages (disadvantages) of this revenue model?
    - If no, What are the risks? And what revenue model could fit better?

21. *From your perspective, what is the revenue model that will be the profit center in the short-run?*

22. *From your perspective, what is the revenue model that will be the profit center in the long-run?*

23. From your perspective, how we could get initial investments in the pilot phase of the platform?

Thank you note

Again, I want to express your kind attention throughout this interview. I will guarantee full confidentiality of your personal information. The recording will be used only to make the transcriptions, and do research based on this data.

Kind regards,

Carlos Hidalgo

A.2.1. Interview Voluntary Caretaker

[VC] One question about the elderly people given there is no fee about the services to access the platform.

[R] Indeed it is a good question. The relationship that exists between the elderly person and the voluntary caretaker is out of the platform. The elderly people have mental and physical problems, and they simply cannot access to the platform also, because they do not have technology skills. In this case, the voluntary caretaker would be willing to pay in order to

have the platform services. It can also be the case that the elderly person would like to access the platform without the voluntary caretaker, and they could pay.

[VC] But there is always an step, the elderly person is a vital person, and it is good mentally and physically, and think I have a children but I want to do directly an access, and I can do it. Yet now we have a step between, that always there is an step between with the voluntary caretaker.

[R] Yes, because the elderly people are above 75 years old, and their children are between 55 and 75 years old. And it is difficult from the perspective of the elderly people to access to technology in the beginning.

[VC] I understand that, and I know about people who can do it. Maybe, it is no problem to the elderly person because the may say that I can do it, it is no a problem to access.

[R] It is true, and it is part of the society of ICT, and now we are looking how the elderly people have more and more involvement with technology, but in the initial part, and because not everyone can access, and are really technology skilled. So, in this initial part, the voluntary caretaker can support the elderly people.

Interview questionnaires.
[R] "Living as long as possible independently with support at low cost" Do you agree with the value proposition to the elderly people"
[VC] Yes, I agree but I have some other.. Maybe you can living as long as possible at low cost. At low cost means for low money, maybe you can say efficiency as possible in costs. It is cheap, and it is no good in the value proposition. The efficiency as possible sounds better.
Living as long possible, I understand the reasons the value proposition. Independently, living as long as possible and independently must be combined into the value proposition. The combination of these two elements it is what they want because they want to stay at home, and it is no complex in this case.
I think the most of things are in the platform. Also, the basic is right, and we don't need to find out too much. Thus, the platform can deliver these value elements to the elderly people.

[R] "Support and guidance to unburdening the healthcare load" Do you agree with the value proposition to the voluntary caretakers?
[VC] Yes, I think it is important that the voluntary caretaker can find the information on the right place. I think it is very difficult, if the voluntary caretaker at first hand can find this information in one place is good, and also you can speak to caretakers and advisor, and you can ask questions about the health, care. But the main thing is how the information can bring together all this information in one place. Find information in one place can be one value element.
I think the freemium model do not spoil the value proposition to the voluntary caretakers. The important thing is that the free services are completely commercial. And, everybody want to

go to the platform, and when they look at the system, and then you go for more, and you can also get a nurse, and pay for this. You can pay for this, another example is if you need a book guidance, and you give value to this in order to pay. It is a nice model that you an step in something, and then you are busy with this, but you have to pay. Yet, the services must be very good in high quality, If they do free services that very good, then we can move to the premium services.

[R] "Support and Secure instrument with high quality, reliability, and comfort to guide, and communicate effectively with citizens at low cost" From your perspective, do you agree with the value proposition to the municipality?
[VC] Yes, I think that the low cost, when I look at the value elements, the efficiency is what guarantees the support, quality, and comfort. A lot of people think about low costs, it could mean it is cheap, but how this can happen. The efficiency is more visible rather than the costs that are associated.
I think in the prototype is no problem but if you go further and further, it is difficult when the solution moves to Amsterdam, Utrecht can become a problem, and the value proposition could change. I think it is difficult why this is a problems, but the municipalities they have their own strategies, and visions, and they want to have customized solutions. When there is a solution, Rotterdam will pay a fee for a platform, yet if Amsterdam has a different fee, this would become into a complication to the model.

[R] "Access and Promotion of your services and products on the marketplace" From your perspective, do you agree with the value proposition to the providers?
[VC] I think the value elements can be deliverable because again we have to search information, products in services in healthcare wellness, local activities. And, the platform would offer these elements to the providers. The providers have the advantage they know the advantages of the promotion, branding with their citizens, and they have to pay but the foundation should ensure they have the users to say Ok we can promote their services and products in this platform.

[R] From your perspective, what services should be possible *for free, and should be paid* to the voluntary caretaker from the beginning?
[VC] *I think the social contacts that the user has is a feature that be free. I think the diary cannot be free. It is a good trigger, and also it is a good source of information when the voluntary caretaker or providers can do this and this to help Anne. Normally you don't have this information, now you have this information. It is better to have a free but you may have this better in the premium.*
Also it is the same that the agenda for free but in a light version. It seems that the voluntary caretaker, and only the voluntary caretaker can make events that they can introduce in the systems. And, in the premium version the providers can introduce events information into the agenda and diary. Yet the model has to leave people to work on the agenda, but you will be able to see the inputs of the voluntary caretakers, and the providers. When you want to start, the people can see the nice things of the system based on these interactions.
When you can start these systems, you leave people start to adopt, and they will see the nice things in the things. For instance, windows 10, you get for free during a year, and after a year

you must pay because the system looks good, the need is created, and the information is already put into the system. And then it is very difficult to say to move other possibilities, or no more information should be added.
The local activities should be for free, definitely. And I think that the voluntary caretaker want to pay to access to the marketplace. But First, I want to see what I get, I want to have access for the marketplace to see the options. Then, the customer ask himself Is it good? Does it worth? If so, the voluntary caretaker is wiling to pay.

[R] From your perspective, what possible services should be paid to the voluntary caretakers and/or the elderly people with a premium fee?
[VC] I think when you give enough information and good and clear information. Then this can be a trigger to have the premium service, and adopt the service. Yet, when I can see the services, and the information, the users will use the platform. But, the difficult is to describe what is the basic environment to have the free services within the platform.

[R] From your perspective, Can the platform retain and keep the voluntary caretaker and/or the elderly people with the premium services?
[VC] No, I don't think the premium services can spoil the adoption of the free services. One example is when I want to have one wheelchair, when I know that I must pay, I will search in other websites and places at local level. But If I have access to the platform, and I have a discount from the premium services, I will move to the premium services, and I will use the platform. Then you have the trigger to have free services, and the premium services at the same time. For free you get this, and for premium you get these 1 2 or 3 or 4 additional services with discount. But I want to have confidence about the services and products are checked by Zo-Dichtbij to guarantee trust in the right place. It is good to bring at home the services. Zo-Dichtbij must ensure the signature of Zo-Dichtbij to ensure the right people at my home.

[R] Do you agree with developing an open platform from the beginning? *Open not only to the IT but also to the providers, more municipalities. The open system is possible, but Zo-Dichtbij must have restrictions and check these partners. Partners who have enough services to the elderly person. I like the open platform but the foundation should review the parties to ensure trust.*
The advantages of an open platform is that you get more providers, and this can bring more competition, and bring better prices and services to the customers.
You can choose between one large and smaller provider. It is good to the provider and the user. For example, the wheelchair again, I can look at providers at local level that offer a wheelchair at low price, but the big party can have a wheelchair at lower price, and you can choose. Otherwise, you give a monopoly at local. But if you can choose you will assess on what is a good Price? I want to have my wheelchair, I look at the price, but you compare based on additional services, delivery services, cheaper additional features, and this makes cheaper.

[R] From your perspective, how we can keep and retain the municipality?

[VC] Before answering, How do they assess the expenditure on the annual fee to the elderly people?
[R] The annual fee can be per inhabitant or simply the license.
[VC] I think they give more information because they would search less for finding information. I think it is very important to have the main source of revenue with the municipality. This is important to the social community and the image they will build with their citizens.
Now how to retain the municipality, we start with the annual fee, but when this grows, and we get more money from the providers then we can start make a reduction in the annual fee to the municipality, or simply the costs to the municipality can be kept because they see the success of the platform. Now if you state the reduction, this can be a trigger to retain the municipality, the foundation would have the money, the roll-out of the platform, and the users who are the citizens with the elderly ones and the voluntary caretakers. So it is very important to get money every year from the municipality. When we do it better, we will get more users, more providers, and this will be more visible and valuable to the license model or annual fee per inhabitant.
When the platform grows, I think the platform will have more marketing, more name. Everybody will see the platform services, and features. And, then the foundation can make a distance between the foundation and the municipality when the things are running good.

[R] From your perspective, is the municipality willing to accept that the foundation will manage the platform?
[VC] I think the municipality would accept that the foundation supervises, but the foundation must ensure they are going to do the things do. They must take care and manage the technology and service providers. They must ensure these parties do the things in advance and be specific as much as possible. Then, the communication between the municipality and the foundation will be better. Otherwise, it will be too much workload to the municipality to have activities in the platform, and activities with their citizens.

[R] Can the municipality have free access to the information of the platform about their citizens?
[VC] When we have information, this must be treated based on the legislations, and the contract agreements between the municipality and the foundation. Yet, if the legislations do not allow the share of information to the municipality, the agreement should state the regulations and the restrictions

[R] From your perspective, Is the freemium model coherent to the voluntary caretakers and/or elderly people?
[VC] The freemium model, we have the discussion, we will have the free services, and this will be a trigger to have the premium services. And maybe you will find out information that can be important to the elderly users. The user must do the searching but I think it is a possibility. The real risks is that there is no enough information that can help the citizens, or simply that one competitor appears and offer this for free or at low price. I think the key in this point, when you start the platform we have to listen to the needs, and preferences they

have, and based on this build this interface, and you will have one step forward, another step. Based on this, the free services will be provided in line with these comments, and also the premium.

[R] From your perspective, Is an advertisement fee coherent to the providers?
[VC] The advertisement is good, the providers know the revenue model, and which are the advantages and disadvantages. The starting point is the most difficult, because they ask how many people are in the platform. But when there is a good story to have a size within one year, or what the results are, or will be, the providers would be willing to accept the advertisements.
Advertising on the site is not a problem for the provider, but it doesn't have to be too much. The user will say that advertising is too much. This must be in the right place, and in the right time. As voluntary caretaker, I would not like to see excess of advertisements. Another point, the foundation can create transactions fee per sale but the problem is the real share that the providers are willing to pay. I want to have a good price, but this transactions can affect the price, and I want to have also good quality and reliability.

[R] From your perspective, Is an annual fee coherent to the municipality?
[VC] I think the annual fee is a municipality but they are earning money in the efficiency. The efficiency is the communication, better service to their citizens, a better guidance, all the things we discussed in the starting point.

[R] From your perspective, how we could get initial investments in the pilot phase of the platform?
[VC] The investments are difficult to be reached from my perspective. The sponsoring can be viable from companies, and the government also can provide some money at national level. It is a good way to put the information in the platform in one place. It is really useful when you bring together everything in one place the information, and parties. The government at national level would be able to subsidize or the municipality itself. From the energy sector, I have seen subsidies to the renewable energies. This can be possible to the healthcare sector, or related to the ICT sector, and the project itself has these two possibilities, and reach subsidies that can be small or large.

A.2.2. Interview to Chair's Foundation

[FO] I have a suggestion about the financial domain. I discuss with Wally the financial domain, and where it comes from and who has to pay? And it is black box, because the municipality can lower the costs, and this is the starting point. And I ask to the municipality how they would feel about this business model in order to have a view, and what they think about this.
But, It is hardly to describe this part from the financial perspective. The earnings for them (municipality) at this moment, we can see this when we offer the platform.

But this would be challenge because we may have the costs. We have to expend a lot of costs, but I think it is possible to arrange the business model in this way. You can arrange the providers, and they will know when you are I the starting point, and the foundation will have to look for after year, and discuss with the providers about the possibilities. However, in the first stage the municipality has to be the main source of revenues.

[R] "Living as long as possible independently with support at low cost" Do you agree with the value proposition to the elderly people?
[FO] Yes I think this is still the starting point to have a value proposition to the commercialization. The elements can be delivered in the starting phase. So, I think every possible that the platform has, is possible to deliver and therefore deliver the value elements. I think that there will be changes in the system, for example when you stay at home, you can see more and more accidents happen at home, and hospitals are moving the care to have this at home. Now there is a direction now compared to before. I think the line is too far and this means in my perspective, that elderly people have to stay at home, and more elderly people are in taking care homes but it is now 70% at home and 30% at home care or retirement houses. But mostly of them will go back and stay at home, because the costs are higher and they have to reduce these costs as much as possible. In general I think it is enough the value elements, and these are clear.

[R] "Support and guidance to unburdening the healthcare load" Do you agree with the value proposition to the voluntary caretakers?
[FO] I think the value proposition is very complete, and I don't see here any other perspectives. The starting point was the unburdening the healthcare load, and the platform will help to take care. Indeed, they don't have the time, and have to take care of their families, and near relatives. In our system it is not possible to do everything, and now the platform can offer more choices, and reach the unburdening to when it is possible.

[R] "Support and Secure instrument with high quality, reliability, and comfort to guide, and communicate effectively with citizens at low cost" From your perspective, do you agree with the value proposition to the municipality?
[FO] I think the voluntary caretakers will understand that the platform has to receive incomes, and has costs. I do not think the premium service spoil the value proposition. Of course, the privacy is important, but when you want something, you should pay for this because you want to reach a solution for a problem, and the solution can solve this problem.
[R] "Access and Promotion of your services and products on the marketplace"
From your perspective, do you agree with the value proposition to the providers?
[FO] I think the value elements are clear, but the low cost is an element that must be arranged. The elements can be delivered in the platform. The quality and reliability are possible deliver in the existing platform service. The low cost is one of the things that are fancy to the municipality. And the low costs are a key to make the success of the platform from the municipality. I think the municipality is interested on reducing costs as much as possible, and this is the reason why the municipality is involved in this project.

[R] What services should be *for free*, and should be paid to the voluntary caretaker from the beginning?

[FO] I think they will be willing to pay when they see the efficiency of the system. For instance, if the employees can do exactly the same tasks, and the platform can help to reduce these costs with less employees and faster. Then the platform is useful and it is a reason to pay to this service. My question to Rotterdam is how and where do they see the efficiency in the system? Because when they see this, they will make the decision to adopt the platform. At this moment, we don't know. One example is in Helsinki, we discussed what are the costs and earnings to the municipality, and also the foundation. Because both parties are interested in to solve problems but also they don't want to have looses in money. Then, at that moment we came to Rotterdam, and we took some starting point about the disabilities, the problems with the population size, and based on this you can see that there is a lot of people with mental physical problems, and caring problems. But if there is initially forty people who are attending these problems, and then we could take into account this comparison. We need to see how does the municipality see that they solve these problems or reduce costs, or become more efficient.

But I know there are more profits that can be reached more than the efficiency, and the information is other value elements because this is organized and is in the platform. But in general the starting point is good.

Yes, I think it is possible this, because the providers here, they can see the platform is reliable and trustful they will access to the platform. I think it is the main proposition that you want to be in the platform. I think we can reach the municipality in the initial phase, and then the providers can see the value for the platform, and the municipality will see the value of the providers. I think the service providers, and the municipality and the citizens should be connected in parallel. And it would help those big parties such as multinational in IT in healthcare, when they want to participate, the municipality would have more trust and reliability to the platform and the rest of parties, especially to the municipality. But I think it is part of the platform evolution and the growth that the platform has.

The free access is an starting point to adopt the service, and this is very important, because, the users will be able to see the platform and services that are being offered.

The light version can be possible, I don't know if the agenda it is an option, and the agenda can be to information services of events, it is not only to medical professionals. Then, the users would have to pay to some services, but it would be good to have light versions in the agenda and the diary. I think the contacts and local activities should be for free, but in the local activities some information could be in a soft version. The products and services is better to see the possibilities of services and products, and then the users should have the possibility to pay. And the feedback about the platform services, and providers must be for free in order to know the feedback and what the users think about the features of the platform or services of the providers.

[R] From your perspective, How likely the voluntary caretakers, and/or the elderly people can keep using the platform till they move to the premium services?

[FO] I think this depends on the information and services provided in the platform, when they use the platform, and find the solution. I don't think there will be a problem to keep using the

platform. And how can this be measure, the feedback from the user can be a way. Of course, when more and more users in the municipality, and the citizens, the importance to the platform will grow. And it could be a driver to keep using the platform.
I don't think the premium services can be a boundary to adopt the free services. But it depends on the costs; this must be low and be within the budget they can pay. Again, if they see low prices, and find the solutions, they would be willing to adopt.

[R] From your perspective, Can the platform retain and keep the voluntary caretaker and/or the elderly people with the premium services?

[FO] I think it is possible to have a monthly fee, when you see the need is filed out by the platform, then they would be willing to pay. Of course it depends on the price, but the voluntary caretaker would not mind to pay for the services. But if this helps to reduce the healthcare load, reach the information they will be willing to pay and keep using the platform with these premium services.

[R] Do you agree with developing an open platform from the beginning?
[FO] An open platform must keep open at first. When we started, we had to find deeper insights to the users, the functionalities that were important. I think to the systems and technologies , this also must be opened. The user must access and keep options to see what they can pay. In my opinion, the access to the databases or the provision of information should be restricted to the providers. I don't think this could be allowed to the providers. And, there should be restrictions between the foundation and the rest of providers. The user should make the request to have the services and products to the providers rather than having commercial purposes in their profiles from the providers to the users. The possibility to contact directly the users should not be allowed to reach more customers.

[R] From your perspective, how should the foundation select the service/product providers in entertainment and comfort products?
[FO] The selection of partners should take into account the brands. The brands are connected to the platform; there is a possibility to a channel to reach the citizens. When you think about the healthcare, the elderly users can stay at home, and then the providers should be aware about this type of services.
One important point is the certification to provide the services. One weaknesses is to what extent we can deliver these certifications to the providers. I think they should be certified.
In general, the voluntary caretaker and the elderly people are in local neighborhoods. I think the platform must satisfy the providers, because they should be interested in the provision and delivery of services in healthcare, wellbeing, entertainment, local activities. And, this is part of the certifications, we want to see in the platform that providers deliver services related to the healthcare, wellbeing, etc.

[R] From your perspective, Should the providers agree, and only agree to the organizational arrangement provided by the Foundation when they want to join to the platform?

[FO] I think the providers and foundation should participate in the elaboration of the agreements. If they participate is good because the services and responsibilities can perform better, and developed better. Although making restrictions to the providers is difficult and tricky, in my opinion, the providers sometimes have resources and capabilities to participate in the elaboration, but not all providers are able to do this. If they do not have these resources and capabilities, the foundation should elaborate the agreements. Now the foundation should have very good reasons to determine who can or who cannot participate in the elaboration of the agreements.

[R] From your perspective, Is the freemium model coherent to the voluntary caretakers and/or elderly people?
[FO] I think the three possible streams of money that in the business model are possible and are good starting point. The free services are a good element to see the features, and they access to extra functionalities. And, then they can pay.

[R] From your perspective, Is an advertisement fee coherent to the providers?
[FO] The advertisement model is necessary and the providers must pay for this. But, the entrance should be paid for the entrance, in my opinion. The advertisement can be for a large number of people, and the foundation can receive money from this if there are a large number of people. But I would think that the providers should also have two revenues a fee for placing the providers, and advertising.

[R] From your perspective, what is the revenue model that will be the profit center in the short-run?
[FO] The main source in the short run the main profit should come from the municipality. In 2016, the municipality will have to pay and look for solutions to solve the problems they have to manage this.

[R] From your perspective, what is the revenue model that will be the profit center in the long-run?

[FO] In the long run, it will be still in the same level, the municipality will have the same problems, and the foundation will receive main revenues from the municipalities. And also, more municipalities can join to the platform, therefore, they will pay for these services, and the voluntary caretakers and elderly people will be more and more. And this is good for the long-run of the platform, because we have growths from the municipalities and the citizens who can adopt the services of the platform.

[R] From your perspective, how we could get initial investments in the pilot phase of the platform?
[FO] I think we have one party in the living lab that is the municipality. We have to think about how they will do this, we have to know what they think about this, and how they would be willing to pay to this. I think when the municipality decides to roll-out the service, they will

be able to see if the platform works or it doesn't. Once this happens they will see how the platform improves the services to the municipality.
At this moment, I think we can ask to the municipality, and propose them to the municipality the idea, and ask directly the situation, because we are waiting to see whether it is possible or it not possible. Currently, we could find the subsidies from the national level in ICT and healthcare, but we would have to see the alignment to the innovation policies and regulations to see the possibilities. I think we could leave also pay these services to the list of companies that are involved.

A.2.3. Interview to Municipality

[MU] The only question that I have by now which is the foundation, and what is the stage of this foundation, and what is the governance that exists in these parties because this is crucial for further developments of the platform. It is just the parties in the foundation to roll-out the services, or this foundation involves information about services, products. But, this foundation could be important to the municipality given there are parties involved that can influence in the governance of the platform, but these could be important in coming stages.

[R] "Living as long as possible independently with support at low cost" Do you agree with the value proposition to the elderly people?
[MU] Yes, basically I agree. I would add other elements, one is rather than low costs is living as long as possible with support and guidance if this needed. Moreover, I don't see the values of quality to the users, and I consider these can be important elements that in this moment are not visible to neither elderly people nor voluntary caretakers.

[R] "Support and guidance to unburdening the healthcare load" Do you agree with the value proposition to the voluntary caretakers?
[MU] I agree partly because I don't think in average the unburdening is a value element to the voluntary caretaker. It can be when the healthcare load is out of hand. But I would not agree to present everything as unburdening with healthcare load. There is also in the social support that there are volunteer organizations that can help to support other kind of activities, prevention, domestic help, and I miss these kind of more practical services in the value proposition. And I would say not every healthcare situation don t come from alone to each situation.
We are trying to mobilize the volunteer to support the elderly ones, and there is no previous relationship between the volunteers and the people who require care. So, you should take into account the reasons why volunteers want to join to the platform, without taking the wrong motivations.

[R] "Support and Secure instrument with high quality, reliability, and comfort to guide, and communicate effectively with citizens at low cost" From your perspective, do you agree with the value proposition to the municipality?

[MU] Yes I agree but I would like to know what is the level of quality. I think it is important that the users can choose and have free choices. But the freedom choice is an important aspect that not only applies to the providers but also the citizens. The citizens would be willing to join without problems with a free choice. And besides the user would be able to select freely the providers, as well as the providers will have the choice to provide their services and products in a free environment.

[R] "Access and Promotion of your services and products on the marketplace" From your perspective, do you agree with the value proposition to the providers?
[MU] *I think this value proposition is good. It is also from the provider perspective. It is probably the most important one, and can be in the board.*

[R] What services should be *for free*, and should be paid to the voluntary caretaker from the beginning?
[MU] I am not sure, it could be a good way. I think the agenda; the diary can be provided for free. I don't think the platform for free will survive, because the platform requires some revenues. There are lot of sources of information that could be integrated into the platform. What is important to the volunteer, is the information and what kind of guidance or assistance can be within the information of the platform. For instance taking a shower, how this should be, then the platform would provide this information, and give free access to this knowledge, and could be a big attraction to the volunteers to join to the platform..
I think when people start to receive coaching and training on specific knowledge and skills, then we can move to premium services. Yet, we have to specify the providers, care providers, information providers, and take into account the image that providers have regarding to the citizens. But the more personalized the service, the more likely to pay this service.

[R] From your perspective, Is the freemium model coherent to the voluntary caretakers and/or elderly people?
[MU] I am not sure the freemium model, I think it depends on which services are for free and which services could be paid. The municipality cannot allow the platform to people pay for this. The use of platform should lead to solve the problems that people have. So, when you are selective in the care providers, and others, people cannot take the right choice. I think for the municipality everybody should have access to the information in their own personal situation, specifically to elderly users.
If the services are so specific that not everybody is entitled to them, then we can support the commercial model. We also don't want the government to rule the platform. We believe that the platform should not be commercialized, but they could provide some commercial basis. The point here is that the municipality seeks a solution rather than making profits to the platform.
The services can be spoiled if someone cannot offer their own personal care. There should not be any delay in the delivery of services, because of the costs that are involved.

[R] From your perspective, Is an advertisement fee coherent to the providers?

[MU] The advertisement model can be as long as there are no exclusivity and excess of these ads into the platform for the users and citizens.
From The municipality perspective, they don't want to take responsibility in the governance of the platform and supervision of activities. This is something that the municipality desires to have since the beginning; we would like to leave to the platform. The municipality won't select provider, these should be responsibility of the foundation platform owner. The municipality could provide information of the citizens, about the social contract, and this information could be linked to this problem and this shouldn't be a problem.

[R] From your perspective, Is an annual fee coherent to the municipality?
[MU] *I don't think it is fully coherent; maybe other municipalities could be willing to do. We don't want to get into the foundation, into the financial view, and we aren't going to pay annual fee. But what kind of use we get from the platform? We want to find the importance for the elderly people, to stay at home and with quality, but this is no being obtained from the platform as a user.*
[R] The platform provides information services, and organized this information to the municipality and the WMO office. Based on this, the municipality would have better instruments to reach efficiency, and improve the help-desk by reducing cost and reaching efficiency. What do you think about this?
[MU] I don't think so, we have already organized ourselves in our own contracts with other parties to the citizens. This is what we use for the citizens, And, we give consultancy and advisory services. I don't think it is possible to build other layers. This should be based on care providers, elderly people, voluntary caretakers to get more contact with each other, share things, and I don't think the municipality has a specific role into this process.
[R] How the municipality will be willing to join?
[MU] I don't think the municipality would be willing to join. We are not users; this is really being developed by the market, there are other development parties that build the platform in order to have successful in the commerce. There are other platforms in research that people can also use, and why the municipality should use this platform. This is a situation that the municipality wants to avoid.

[R] Is the municipality willing to join if the investment and the prototype comes from the private sector ?
[MU] This could be possible then we have to see what the platform provides. See if this success, see if this provides information and advisory services to the municipality. The idea in principle can be used and rolled-out in Rotterdam. We have an opinion that the citizens can use the platform, and this could help them, and be done from the research side to other initiatives. There are other initiatives in research from other platform initiatives, and also because there are representatives from other parties from multinationals, large companies that can aim to improve the services, and makes interesting to these.

[R] Do you agree with developing an open platform from the beginning?

[MU] *Basically I think it should be open to citizens, providers, more municipalities in order to grow more and more municipalities. But, the developer should ensure the control of customized solutions, if every municipality has specific demands, This is my opinion, the platform should be aware that municipalities want specific services and features. then the developers should maintain the integrity of the platform. They should believe in their product, and build the vision as much as possible based on the user side rather than the municipality.*

A.2.4. Interview with Provider

[R] Living as long as possible independently with support at low cost. Do you agree with the value proposition to the elderly people?
[ZI] *I agree but I would slightly change. This is not about living as long as possible. It is about welfare, and have elements to have a nice living. It does not have nothing be related to living independently, and low cost. I think the goal must to reach as much as possible welfare at acceptable cost.*
Living independently is to touch point such as loneliness. For instance, if we look at our part in Ziggo, people pay money for more services, and then they can have extra TV, more programs. It is how to bring more pleasure their life with these extra services.

[R] "Support and guidance to unburdening the healthcare load" Do you agree with the value proposition to the voluntary caretakers?
[ZI] *If you are a volunteer, I don think that people support the elderly ones. But, I do mind here it is that I feel voluntary caretakers are doing the dirty job. Some elements is missing, and is that I can help other people. We cannot reach the success by raising the unburdening as element. Because, this element is more negative, we have to make it more positivie rather than remarking the unburdening.*

[R] "Access and Promotion of your services and products on the marketplace" From your perspective, do you agree with the value proposition to the providers?

[ZI] *One thing that I want to see here as provider, is that If Zo-Dichtbij becomes into a party, I will be a trustful party to Zo-Dichtbij. And this is a real proposition form me. So it should not be that… What I see in the model based on advertisement, so If I can sell the products and services, I still pay the advertisements. So it should be better that the market itself does its own work to create a feedback. The provider will offer products that are popular, and if you sell a lot and the customer is willing to pay more, you also create a situation that small providers will not be able to sell the products compared to others.*
One example that I don't like is that some advertisements are annoying from products and services that I do not need. Of course, in the beginning, the advertisements should be available to everyone, but in the mid-time we should learn about what companies are preferred in the market. Based on this, the platform should start to advertise with a better focus, more based on the market.

[R] "Support and Secure instrument with high quality, reliability, and comfort to guide, and communicate effectively with citizens at low cost" From your perspective, do you agree with the value proposition to the municipality?

[ZI] *The elements are really clear in this value proposition, and I understand why this value proposition has to be in this way. Because it is an important party to roll-out the platform service. But in general, the value elements described are focus on what I believe the municipality wants to reach.*

[R] What services should be *for free*, and should be paid to the voluntary caretaker from the beginning?

[ZI] *In the beginning, we should not ask anything to elderly and voluntary caretakers. This is a matter of time. We should not ask for money in the beginning, maybe some people are willing to pay. But, I don't know that people are willing to pay for long time, and we have to ensure the low cost. And, to the voluntary caretakers is difficult, because they are paying with their free time to access to the platform. And, especially to the services provided, apple has small amounts from the service fees.*

[R] Do you agree with developing an open platform from the beginning?

[ZI] *I am in favor of the open platform, but we have to constraint and work with APIs, and control measurements to all parties. It is more a walled garden platform with governance, and partner selections. The openness aims to solve the chicken-and-egg problem, and bring both sides at the same time. But, we also want to have controlled platform with other companies that can offer services to their customers. In the Netherlands, we follow the trends, and market in order to deliver services, and let them to be part of the platform. We could have great players that are small players, but can offer good solutions.*

For instance, providers in the neighborhoods are smaller compared to other large firms. Yet we have to keep the added value of the provider from the platform to the provider. This can be an element the reputation to be recognized to reach their customers. The providers can reach more reputation, and if this happens we can keep, and be part of the platform as providers.

[R] From your perspective, Is the freemium model coherent to the voluntary caretakers and/or elderly people?

Well, this depends on what can be obtained from the platform. The timing, and ease of use, services can aim to adopt more and more services. But We have to ensure the services are relevant to the customers in order to ensure they will pay to Zo-dichtbij. If we see the costs reduction to the customers and organizations, the adoption will be likely to occur.

Now, we have to analyze the retention or movement to the premium account. The problem is we have to validate, test, and then whether they adopt the service. If they like the services, they will be more willing to pay. And, this has to apply to these types of services.

[R] From your perspective, Is an advertisement fee coherent to the providers?

[R] *the most important is that ads should be relevant, what is behind to advertisements, the information and statistics. This can be used to providers, and if you offer these to me I will be willing to have more a mostly fee to the advertisements. Now we have to keep in mind the conditions to the customers the annoying advertisements, and the trends in this point.*

[R] From your perspective, Is an annual fee coherent to the municipality?

[R] *the municipality will have cost reduction and be more efficient within their operations. And, this is what makes interesting also to insurances. And, these elements will aim to be more willing to invest on the platform development, and annual fees to operate the platform in their organizations. Now we have to see this as start-up company, the public sector and some private firms can invest, but we have to create relationships, and negotiate to create a situation where we help each company to communicate and reach their customers. IT firms with more infrastructure in companies, providers with customers, and municipality with low costs.*

A.3. Actor Analysis to the business model on digital platforms in health and wellbeing

In Table 3.5. is breakdown the analysis of actors into their possible roles, interests and activities. This description follows the sequence proposed by Allee (2008) in order to make an stakeholder analysis for the value creation in business models.

Table 3.5. Stakeholder Analysis and activities in the business model

Stakeholder	Role	Interest	Activity
Elderly people	Last end user	They want to have direct social contact in order to have support, and domestic help. And they want to stay at home as much as possible.	They would make requests through the intermediaries in order to have their services at home.
Voluntary Caregiver (Near Relative)	Intermediary channel to elderly people.	They want to support older people, be guided through the healthcare system, yet they require instruments to unburdening their healthcare load.	They will support and monitor the elderly user by using the tool, and updating information with the providers.
Municipality	Launch and deliver the platform to the citizens when they make a request. (Potential	They are interested in having communication with their citizens, especially with elderly people, and have greater corporate social responsibility.	The municipality would design the legislations at local level, adopt the platform service, and do the marketing before the rolling-

	customer)	They want to reduce transaction costs, and become more efficient the WMO help desk to provide support to their citizens.	out of the platform.
Foundation	Platform Owner	The foundation seeks to reach a positioning into the market as a intermediary channel for service providers and elderly people in the healthcare system.	They have to design and manage the platform at technology and organizational level to keep alive the platform over the time. The marketing and branding with clients to rollout the platform. They have to design the architecture, and governance to the platform.
Support desk institutions, and WMO (Information Providers)	Content delivery Information Providers	They want to have more visibility, and have an instrument to guide and support the users within their healthcare institutions.	They would be able to provide content in the user profile, or in the platform to guide the users to the right entities.
Pharmacies /Domestic services	Product Providers	They want to reach the more customers and users in order to increase their profits. They are looking for distribution channels to deliver the services, or benefit from branding.	Their activities are focused on providing their products to the users.
Healthcare professionals (Service Providers)	Content delivery and human help support.	They want to increase their visibility within the healthcare system, especially with the end-users and informal caregivers. They want to reach higher economic profits from sales of their services.	They would deliver content the user profiles, and support the medical help when this is required.
Telecom Operator	Access Network Operator	They want to have access to the healthcare system in order to have more customer relationships and increase services to elderly people. They want to gain competitive advantages, and experiences in this sector.	They initially would provide the web hosting, and infrastructure to the mobile network. Yet, they would be able to provide services to the platform based on the experiences of the platform.
ICT firms	Technology Provider Middleware Integrator Systems Hardware Integrator Platform Developer Advertiser	They want to earn more money, and boost their sales profits. They want to access and learn in the healthcare sector.	They are responsible of the development of the platform, maintenance activities, security systems, database developments, business intelligence systems, and CRMs.
Health Insurance	Potential Channel to reach users	Similarly as the municipality, they are interested into the reduction of	No activity on the platform. Informal (Formal) meetings

	(Potential Customer)	costs for healthcare and wellbeing to elderly people. Yet, they want high quality care at low cost.	can lead to adopt the platform services.
SVB	Supervisors	(1) Improve the quality of care (2) Reduce the costs; and, (3) Promote the cooperation between care providers at regional level.	Given the stage of the innovation, these actors have not made interventions, but may give an impulse to the growth of the platform at national level with new policies.
Ministry of Public Health	Regulator		
Public Health Advisors	Advisors and Regulators of the Ministry of Health		
Professional Associations	Define Standards		
Patient Associations	Advisors of citizens		

A.4. Notes Workshops

A.4.1. Workshop Session 1

Service Domain

- After explaining the methodology, the business model design session begins.
- Participants were talking about the platform service to the elderly people and the providers. It is difficult to come up with a business idea in this moment.
- Moderator explains the first step is to identify the user and the customer, and then identify the service design.
- Researcher introduces the personas in order to identify the user and the customer.
- Annie as persona is the first one that is studied by the participants And the debates began in order to define the voluntary caretaker and the elderly people.
- VC believes that near relatives are responsible of elderly and parents.
- FO exposes an example of a person in a extreme case with the elderly people, a son and person who needs support due to volunteering. This is the most extreme. Help is needed.
- R1 goes back to identify the users and customers
- VC: believe that near relatives can be users and customers at the same time based on the cases he described and FO.
- FO assumes a position the elderly people are users.
- DI and R1 repplied it is no the case, disabilities and technology skills.
- DI defines two type of voluntary caretakers the informal and formal ccaregivers
- The group is finding the importance to help this people to unburden the reposnabilities in healthcare that they have
- DI reacts that voluntary organizations don't need this, and requires management and coordination to find people
- VC says they need visibility and reach the people who needs volunteers for domestic help.
- R1 describes the technology skills between elderly ppl and near relatives but VC replies be careful this is not true more and more ppl are on facebook

- In the end it is concluded the lack of technology skills will disappear
- Everyone agrees on the budget limitation of this ppl. And the desire to stay at home and live at home
- DI asks what are the services and R1 replies a set of service, information services and products in domestic help, nursing solution, information from the municipality, info in health and wellbeing.
- DI reacts and makes requests to have social contact and information but social contact in person.
- FO asks How to finance elderly ones? Solutions are given: (1) PGB from R1
- And every one agrees on financial help of the government if solutions services are expensive.
- R1 and FO talks about the providers and importance of service and product providers
- DI doesnt care about this in fact, they inly car the delivery to the users.
- FO asks why this is important when in the end this is in the municipality.
- [R1] adds the importance of improving the communication between the municipality and the citizens especially in healthcare, improve the business operation and become more efcient.
- The WMO social act is mentioned and ppl start to talk about how they will save for the elderly life. Moderator call back again people, and summarizes important aspects from the service domain with four target groups. He asks about possible services
- R1 and D1 have worked on this, and answere the marketplace, local activities, diary, agenda insurance information medical information, feedbacks.
- [R1] and D1 makes association
- Moderator, its time lets move to the organization domain.

Organization

- Participants ask the main idea of the organization
- Moderator replies looking at the actor analysis, he suggests to write it down some stakeholders in post notes and give reasons why they should be included
- All participants agree that given healthcare sector insurances are the key
- The pension funds are included to help people in finances R1
- FO includes the municipality
- R1 breaks down the public sector into ministry of health VNG and municipality
- DI and FO adds the importance of patience associations and elderly association to influence, and ask themselves if they cannot be customers.
- R1: the ministry of health wants better quality, cost reduction, and could promote the cooperation between industries to develop platforms in healthcare and technologies to reach this.
- VC and DI analyzed the case the of the ministry of health from the modification of policies and financial aid to the elderly people.
- The association of Municipalities is being seen as the next customer by FO and R1, yet it is necessary to launch this in one municipality.

- R1 adds they could promote these platforms in other municipalities or help insurances
- FO says why insurances? If municipalities are interested on cost reduction and better healthcare services, why to search insurances. From his view, the platform could be a rival for insurances because this offers services in healthcare. It is a new competition.
- DI FO believe that this could be the case but they can be promoters if they adopt the platform. In the end, they can receive benefits.
- Moderator asks about the intersts of the municipality.
- FO admits the corporate social responsability of firms to adopt the platform service and its development and help the healthcare system.
- R1 mentions the WMO Office and opportunities to build a better communication system and supporting tools for them.
- Moderator makes a time, and says the value network, ask for the post notes, and introduces the foundation as central role actor.
- R1 yes the foundation coordinates and manage the matchmaking between providers and users, and they should be the central role
- Moderator adds the regulators are the municipality, but could be the case other institutions?
- The moderator makes a time and ask for the post notes with reasons to complete the value network, 5min to think
- DI and FO asks discuss whether the actors in the value network are in the present or will be in the future.
- Moderator pastes some post it notes that are given by the articipants.
- Time is almost up.
- The FO adds the platform should be designed but the foundation.
- R1 says no, the ICT suppliers will do that, but they will be supervised by the foundation.
- DI adds that this governance should be done also to the providers in order to ensure good quality of service especially to select partners and users.
- FO and VC says that parties should be reliable with credibility. FO suggest to start in the municipality and reach other coordinators.
- R1 says the problem is that there are many providers but a few coordinatos.
- VC says what about the district neighborhoods. They could contribute
- FO finishes they can be coordinated with the municipality to use the platform and help to coordinate more activies.
- Moderator paints the value network for a while, and he asks about the intersts of the providers.
- The participants say access to the customer, but DI adds the point of receive coordination and better management to find the right people.
- R1 and FO that this guidance also applies to the elderly people be guided throughout the healthcare system is part of the elements that could be provided to the elderly people.

- In the end, the participants take the poster to finish the value network,they add the feedback from the elderly people and near relatives to make improvements on the platform service or provider services.

Financial Domain

- The moderator asks about what is the stage of the existing platform. The project is interesting but what are the features.
- The features are the portal marketplace social contact diary the agenda. But, these are in a portal and were evaluated with a few users.
- Moderator It is possible to make estimation about costs?
- FO it is difficult right now, even we don't have a price for the platform and how to charge providers or the municipality.
- The moderator then suggests to analyze the case in the revenue models. He gives to the participants post it notes with possible revenue models.
- Short break is given to the participants while the moderator exposed the idea of listing possible revenue models, and make decisions about the revenues that could be chosen to each target group.
- VC and R1 suggest the subscription to the voluntary caretakers and elderly people with a monthly fee.
- DI agrees with this but at low price, look at the financial limitation
- What is the price? FO
- Price could be 10 euros approx. each person but this needs more research
- R1 suggest the freemium service.
- Moderator explains the freemium service
- VC considers this revenue model is better thatn subscription because they can experience the platform service.
- FO asks again the role of the insurances given some people are paying the healthcare plan to insurances. It is complex that elderly people have to pay the platform and the healthcare plan
- VC and DI agree with this but also look at possibilities to join the insurance and receive the platform service with the healthcare plan
- Moderator suggests the license or subscription to the insurances.
- FO and DI agree with this but suggest to establish a partnership with insurances intead of compete with them
- The advertisement model was studied but the FO and DI, but the VC says that they have to ensure the adoption of users otherwise the providers wont be interested
- The usage and access fee was not fully understood by the participants the moderator explains the revenue model
- The FO and VC says this is complex because many variable have to be taken into account
- And the transaction fee is analyzed by the VC, he believes this is better because the fees are by demand, of the customers and the platform can charge each transaction.

BMST session

- Explanation overview of the business model from the moderator.
  Target groups, value elements, the value network, the financial domain with no revenue models clearly defined. 10min
- Explanation of the BMST tool takes 20min
- The moderator begins the identification of uncertainties
- There are 5 scenarios that could be studied
  1. Aging society a plus that that government would like to see everyone stay at home as long as possible [FO] is this the target group and end user?
  2. Digital skills, debate between VC and R1. On the hand, there are more digital skills on people older 55 and even more than 75. R1, says yes but between 55 and 75.
  3. Competition and speed to find competitors in the market. This is a mutual agreement.
  4. Availability of regulations: standards, certifications and regulations from the policy sector [R1, DI].
  5. Participation of society in the design of technologies [DI], in the end this was skiped for time reasons.
- The moderator design the BMST frame with the extreme points. Aging society with only one case, digital skills with high and low, competition with fast and slow, and the other two with one case.
- Then the business model components, it is recommended to have value propositions, target group, value network and actor analysis, and revenue models, moderator.
- R1 suggests the technology but accept that they don't can give potential insights on this.
- In general it is difficult to talk about technology given the expertise of the participants from the user side and the foundation.
- 3 min organizing how it will be done the activity, everyone will look at the frame while the rest of people interact
- Digital skills (bad) vs target group: it was red because then this explains that it is not the target group and should be other from the voluntary caretaker [DI,FO]. But R1 suggests trainings, and VC reacts trainings can helpful. So in red.
- Digital Skills (good) vs target group : everyone can be user and this is good for the business model and the platform [FO VC]. So green
- The session has been large, and it is exhausting right now.
- Value proposistion (orange) vs digital skills (bad): VC simple interface is important, with trainings [DI]. These elements are difficult to see in the business model. Researcher argues the user profile and possibilities to define it now in the business model. This could be fined but the platform does not have it in this moment.
- Value Proposition (green) vs digital skills (good): There are many possibilities to provide value to different parties. We have four groups and each one would have the

digital skills to adopt the service [DI, R1]. Especially in elderly people and voluntary caretaker, VC and FO.

- Digital Skills (good) vs technology: interface should be intuitive, and adapt to the users [DI and VC]. It is not problem this is the reason why users are involve [R1 and FO]. Yes, but then the digital skill skills are bad it is more difficult so orange.
- Digital skills (bad) vs technology: Agreement bring advantages to develop the platform.
- Digital sills (bad) vs actors and roles: The end user cannot work with the platform if digital skills are really bad. Change to the value network. Near relatives can solve this [R1]. No result on this red and yellow makes orange.
- Digital skills (good) vs actors and roles: it is in red because more regulations, contracts and access to the elderly people can be possible [FO], so more actors more IT firms, more providers can be involved [DI]. The problem is more complex from the strategic point of view and the partnerships.
- Moderator says red and yellow makes oranges, and there is excess of oranges, and analysis more difficult.
- Digital skills (good) vs revenue model: Again this open more possibilities to the business more revenues can be analyzed. Green.
- Digital skills (bad) vs revenue model. The foundation has to accept less profits [FO]. Again the education and training can solve this problem [R1] red and yellow.
- Competition (slow) vs target group: platform can be a monopoly, no many competitors [VC FO R1].
- Competition (fast) vs target group: Focus on niche players [R1] Municipality could be seen in this moment and we would be in the leading position [FO]. Orange
- Competition (slow) vs value proposition: This gives more time to search the value propositions [VC DI].
- People think about whether what they designed, is in reality a good choice in this moment.
- Competition (fast) vs value proposition: Differentiation is the goal at this point [VC FO]. It should be red, but the platform can adapt before acting if we have users.
- Competition (slow) vs technology: work with available technology
- Competition (fast) vs technology: technology can aim to be element of strategy if there is something new on it [VC, R1]. Orange.
- Short break to eat and drink something before continue in each participant.
- Competition (slow) vs actors and roles: there is more time to build the business ecosystem [R1, FO] also there is more time to coordinate activities [DI] green
- Competition (fast) vs actor and roles: competitors can win and rule the market [VC R1 FO DI] orange.
- Competition (fast) vs revenue model: Profits are less [FO], [DI R1] suggests other forms to make profits, data analytics statistics.
- Competition (slow) vs revenue models market size is big, but the coming profits will be delay, both orange

- Regulation vs Target group: green the change doesn't affect the target group, but in the planning is important, especially to finance subsidies [VC DI].
- Regulation vs Value proposition: green because all regulations will address the elderly peopluation [R1]
- Regulation vs Technology: The technology could lead to mak changes in the regulations but depends on the adoption and quality of service [VC, FO, R1]
- Regulation vs Actors and Roles: Red more actors can come, it is similar as the digital skills and competition [DI, FO, VC].
- Regulation vs Revenue models Medical professionals could be affected with new regulation especially nursing solutions, less providers less opportunities to coordinate parties [DI].
- Feedback:
- In general the target groups have more focus now, the value propositions have a good starting point, the organization is now more described and focus on what is coming. Gaps need to fill out in governance, organization, management, planning. And the revenue model have to be evaluated. More inputs are required here.
- The BMST is a good tool it helps to look at the scenarios and see if this withstand in the market. Also to change the strategy. It is difficult to make a decision on extremes when there are ways to take the other direction

A.4.2. Workshop Session 2

Service Domain

- Session starts 9.30 people came late.
- 20 min in the explanation of the STOF method
- Service design begins with personas
- Difference between elderly people and near relatives is the first debate.
- In the project Elderly people are seen as users NE, IC
- R1 R2 reacts elderly people are the end users but they have mental disabilities, or physical skills, so it is necessary the near relatives.
- In addition technology skills is difficult to be seen in this people, R1.
- This is not total true more people have facebook social media, mobile phones and are also elderly people. ZI
- R1 The elderly people are above 75 and young elderly people are between 55 and 75
- IC suggest two things: (1) elderly people still is the end user; (2) the near relative will have the supporting tool but if the elderly wants, we have to be flexible.
- The platform is about healthcare and wellbeing we have to move on and have focus, moderator.
- IC moves to the provider side, and it suggests that they have a dual role as user and customer. As user because they have the profile the marketplace, and customer because they want to reach more visibility promote their products etc.
- How to select partners? Moderator

- Big parties better to attract more big parties MV and NE
- Small parties can be chosen but competition space should be open ZI and R2.
- R1 adds the importance to look at resources and capabilities of providers to deliver services to the elderly people.
- The discussion starts to be irritating for the IT firms because again we move back to have an interface to different users. MV suggests to have a focus on the municipality
- MV adds the healthcare plan does not allow all providers, and the service is really new how we can ensure the insurances can see the platform.
- NC IC MV R1 come back to the idea of moving to the municipality. The municipality should buy the platform service.
- MV Why??? Because they want to reduce costs and improve communication with their citizens.
- Moderator platform services?
- R2 organize digitalize information and can do data analytics for insurances or municipality. MV says insurances are difficult in this moment. We need experience test the platform.
- Moderator Ok where to launch it?
- R2 big citites in Netherlands with large user base, the reason why we have to look at municipalities or insurances or patient organizations lies on the user base they have.
- [MV NE, R2] agree with this point to accelerate the diffusion with companies that have user bases established.
- The municipality can improve their advisory services and improve the organization to deliver better support to find solutions with high quality of care.
- ZI gives an important insight giving the strong focus on the municipalities. If they address the municipality and elderly people, it is fine but no space for providers.
- ZI adds in this moment we don't want to make profits, we want to promote and access to the platform with a large partner since now.
- Moderator what can we offer to the municipality the platform Ok sth else?
- Value element are transparency quality of service, reliability but to what extend we can offer these values? Is it possible to do this? In the beguining we will have changes. NE MV and IC
- R1 R2 and Zi unburdening the healthcare load to the voluntary caretakers.
- Live independently can be a value element to the elderly people and the matchmaking. [MV R1 R2]
- The providers would have the marketplace and a ranking [R1 R2] the ranking can based on fees or user feedback [R2]. If we do this ranking, it is more expensive [MV].
- The users elderly people and near relatives would have the user profile with diary agenda, social contacts and feedback.

Technology Domain

- MV: I suggest to be in the organization domain instead of the technology domain. The interface is not developed.

- Moderator explains the idea behind the three layers and make a description of the IT architecture.
- Participants said by now we have the cloud service PaaS and connect this to mobile devices and laptops NE and MV
- Infrastructure is one database, one integrator system and system to integrate the information MV NE
- NE: The architecture makes senses when we have an interface.
- Platform features are the same mentioned in the service domain. MV
- Security across all system R2 MV (later organization and finance domain)
- In the end, moderator asked two things:
- 1. Interest=> increase sales and gain experience in the healthcare industry
- 2. Costs=> No possible because no interface but development is the main investment.

Organization Domain

- The Platform owner is the foundation, and is the central actor in the value network, Moderator.
- ICT firms develop the platform and foundation supervises [R2].
- The IT firms do the storage information process, content delivery in the interface.
- R2 suggests to use technologies in the market no innovations more risky.
- Alignment between the organization and the technology is essential, strong relationship between IT firms and foundation.
- The elderly people and the near relatives are users of the platform and can be customers. They want to unburdening the healthcare (voluntary caretakers) and stay at home independently (elderly people).
- Moderator dominant position?
- R1 dominant position no clear in this moment, initially the foundation later we don't know.
- ZI advises to have customized solution with the municipality and takes distance afterwards.
- R2 highlights that if the municipality has problems the foundation should help on this.
- ZI Yes but the problem comes with the providers. We don't make profits we the foundation, providers want to deliver services and products with the platform.
- R1 providers can deliver their services to the clients and the municipality should understand this to grow the project more.
- ZI providers are not interested to make profits, and if the municipality is interested on this, then it is important the platform has communication to their citizens and has focus on the citizen as well.
- R1 suggest that the municipality should understand the earnings in capabilities resources, and experience on the investment.
- Moderator what providers in the platform?
- R2 providers are domestic help, pharmacies, medical professional psychologists, psychiatrists, nursing solutions, volunteering organizations.

- R1 no supervision and management to coordinate the parties with elderly people, we could provide this service with the platform for the providers.
- ZI: suggest In the governance to have filter to select who are the elderly people who really need professional. This is expensive and needs to be taken into account with the insurances or municipality.
- Municipality should be responsible of financial aids to citizens if they require additional services, especial cases with elderly people [ZI, R1]
- Moderator begins to make the value network
- The idea to connect the providers and the elderly people is no clear via platform or not, Moderator.
- R1 and R2: no the elderly people receive services form the providers, but can make requests on the platform to do the matchmaking.
- Description of the value network and brief sum is done by the moderator.

Finance Domain

- Almost lunch time
- Moderator makes a summary of the value network
- Results are given in technology domain by Carlos no so many given no interface
- Moderator asks same question as Carlos about estimation of costs to MV
- MV states again they must have focus on revenues, costs are the platform development and operating activities in IT.
- Revenues are key
- The business model can be sustainable if there are constant revenues from the municipality or elderly people. He suggests annual fee to the municipality and freemium service to elderly people and near relatives
- MV NE and IC agree with annual fee to the municipality but freemium model not sure again coming back to the insurances
- Insurances can have a dominant position and accept or leave the platform.
- Freemium model is good revenue model and very applicable in Netherlands, but thay have to ensure heroine model create the addiction to the service, and then pay. [ZI].
- People laughed about heroine model joke
- MV the platform cannot reach the insurances yet, because the platform needs experience in the market. He advises to have the municipality first and then reach the providers. It is complex to attend all parties at the same time, we can learn with the municipality and elderly people. And it is better for them. The healthcare plan is difficult to be changed they have their own providers and somebody has to pay for these services in the end.
- The platform needs the interface, we have been for long time waiting to see the interface features, but slow results at very low costs but very slow
- In general the evaluation is good between the stakeholders, the vision is clear, new things go out from the discussion, they would have like to talk about numbers but they couldn't. The business model is still in progress.

BMST session

- In this session the BMST will only gather the list of uncertainties, and in order to speed up the session, the moderator suggests to divide the group based on the number of uncertainties.
- Three uncertainties are chosen:
    1. Competition [R1]
    2. Dominance of insurance [MV, ZI]
    3. Privacy [R2]
- Each uncertainty will be analyzed by 2 people.
- Once the discussion finishes the groups describe the inputs and fill out the business model stress testing tool.
- Based on this we present the following results:
- Competition studied by [NE, ZI]
- Competition (Fast) vs Target Group: Focus on niche market, these niche markets should be near relatives or providers with the platform. The regional function is important in this case to compete if rivals are in other municipalities. orange
- Competition (Slow) vs Target Group: It is better for the platform, but the platform owner has to do everything and work with high demand orange
- Competition (Fast) vs Value Proposition: The values proposition have to be narrow and more differentiated compared to rival platforms. orange
- Competition (Slow) vs Value Propositions: More time to build on the value proposition and the platform
- Competition (Fast) vs Value Network: Possibilities to leave the platform are high, especially developers.
- Competition (Slow) vs Value network: They suggest to build the platform and learn in the municipality red
- Competition (Fast) vs revenue model: They have to select a platform service, and select a revenue model is risky but try. orange
- Competition (Slow) vs revenue model: The costs higher given more platform development, more time to reach the platform, and less profits. Yet, it is green they can wit more.
- Privacy studied by R2 and IC
- Privacy (Closed) vs Target Group: medical services are restricted, authentication loops for users => something to add to the service and the value proposition (Orange)
- Privacy (Closed) vs Value Proposition: The value proposition should be narrowed with a threshold you can get you can't get medical information (orange)
- Privacy (Closed) vs Value network: It is really difficult to work together with a closed system given governance is more strict, and scope of activities and roles are less wide.
- Privacy (Closed) vs revenue models: No difference
- Privacy (Open) vs Target Group: The main problem is what is open and closed.
- Privacy (Open) vs Value proposition: No difference
- Privacy (Open) vs Value network: No difference

- Privacy (Open) vs Revenue Models: Some revenues are out of scope in this case. Subscription pay for entrance
- Dominance of insurances studied by MV and R1.
- No difference as target group if the insurances are partners. No difference in the value propositions as well. The reason is because any target group is affected by the dominance of insurances. The insurances affect more the organization rather than customers.
- MV insurances can follow their own conditions to develop the platform. And on the other hand, insurances can become into rivals for the platform to defend their business or to create another digital platform.
- R1 insurances can be seen in both cases as potential customer but first the experiences and success is required.
- As partner the insurances would exclusivity but as rivals they will not be able to be in the value network (orange) because the foundation can search other customers.

A.4.3. Figures BMSTs of both workshops

	Digital Skills		**Competition**			
BM Component	Low	High	Slow	Fast	**WMO regulations**	**Aging Population**
Target group	Caretaker is not the target group	Everybody is potential user	Monopoly	Niche markets Municipality, platform is leading position	No relevant but planning (subsidies)	Elderly people is the right group
	Education/Training					
Value Proposition	Simple interface and training	More possibilities	More time to search the VP	More differentiation, focus before act	No relevant but be ready to react on the healthcare act	
Technology	Intuitive Interface, and adapt to users	More functionalities	available technologies	Analysis before profits	Technology could change policies.	
Actors and roles	End user cannot work with the platform	Regulations: more contracts	More time to build the platform ecosystem	Rival platform competition	Other actors can entry	
Revenue Model	Less revenues	More possibilities	Market size less revenues	Less profits but data analytics	Nursing solutions	

Figure A. 6 BMST Workshop Session 1

	Competition		**Dominance Insurance**		**Privacy**	
BM Component	Low	High	Rival	Partner	Closed	Open
Target group	Niche market Use regional function	Looks better Building everything by its own. No resources and capabilities in the market.	It is difficult not to look at the insurances. In the end they accept the service or part of this.	No difference	No medical files Authentication and security	Continuous roll-out. Feedback users What is open and closed?
Value Proposition	Narrow VP and make differentiation	More time to build the VP	No difference	No difference	Level medical info Level no medical info	
Actors and roles	Organizations can leave	Slow development; do it	Build their own platform	Risk to share platform and then rival	Parties couldn't work together restrictions	Open with governance
Revenue Model	Select revenues and act quickly	Cost become higher. This could take more time	No revenue models for insurances	exclusivity	No difference	Some revenues out of scope

Figure A. 7 BMST Workshop Session 2