The possible role of users in the Innovation Ecosystem and Innovation Process

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Preface

This research has been carried out as the final project of the Master's in Business Administration at the University of Twente. It has been written in order to fulfil the graduation requirements. This document is the result of several months of study and research and has been written to fulfil the graduation requirements.

I would like to thank some people, without whose cooperation and assistance I would not have been able to complete this research.

First, I would like to thank X for having given me the opportunity to conduct my research at their company, and in addition, I would also like to thank the employees who assisted and provided me with essential information during my research.

Second, I would like to thank my first supervisor Dr. Ir. Klaasjan Visscher, who gave me the opportunity to write my Master Thesis in his research domain, and also, thank him for his encouragement and support throughout the whole process.

Last but not least, my thanks goes out to my second supervisor Dr. Ir. Sandor Löwik, for his advice and feedback during my thesis.

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Management summary

The purpose of this research was to investigate what it takes to shift from a ''design for users innovation'' strategy to a more ''user-oriented innovation'' strategy, and the influence of such a shift on the role of the users in the existing Innovation Process and Innovation Ecosystem.

The first part of this research introduces the problem statement, which comes down to the fact that the agricultural sector should adapt to the new way of innovating. This means that firms in the agricultural sector should focus on innovation in cooperation with users, rather than innovating for the users. Further research into the literature learnt that innovating in cooperation with users concerns many topics, which resulted in the following research question:

> *''In which way could X shift from their current ''design for users innovation'' strategy to a more ''user-oriented innovation'' strategy, and how would this influence their current Innovation Process and Innovation Ecosystem?''*

The second part of this research has been dedicated to the theoretical framework. In which, most of the existing literature concerning this specific subject has been gathered. The main topics that concern this subject are: The Innovation Ecosystems, The Innovation Process and the possible involvement of different types of users in this Ecosystem and Process. In addition, the factors that may complicate and facilitate the possible participation of users have been taken into consideration.

To answer the research question and provide an insight about the current role and the expected future role of the users in X' Innovation Ecosystem and Innovation Process, semi-structured qualitative interviews were conducted with 25 respondents. 19 users, randomly chosen, and 6 actors representing the existing Innovation Ecosystem.

The results derived from the semi-structured interviews provided the users perception and the current actors perception about the subject. All of the users think that they are capable of participating in a more active role in the Innovation Process. On the other hand, not all of the users think that they will be able to get more actively involved in the Innovation Ecosystem but those who do, prefer individual participation rather than participating in user communities. Because, there remain certain at present unsolvable barriers.

The current actors have a different opinion about user participation in the Innovation Process and Innovation Ecosystem. Regarding the Innovation Process they mention that it depends on the capabilities and the willingness of the users while others have just the opposite opinion. Based on the opinions of the current actors, users can be more actively involved in the Innovation Ecosystem but rather in user communities than as individuals.

Based on the findings of this research it seems that implementing this more user-oriented innovation strategy could be possible up to the development stages of the Innovation Process for most of the users with their present theoretical knowledge. However, their theoretical knowledge remains a stumbling block to further participation in all of the innovation activities.

To allow further participation of the users in all of the innovation activities would require that the users bring their organization up to the present state of the art, theoretically and practically.

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1. Introduction

Conventionally, innovation is viewed as a closed and linear process, where a firm's research and development efforts are focussed on the development and propagation of new products, and services to meet perceived markets. There are some traditional industries, such as agriculture in which users are normally involved in testing the products, or providing feedback for improvements on their existing products. Based on empirical and anecdotal evidence, more collaboration between these parties is more favourable.

X is an international feeding company which offers feed solutions for conventional and organic livestock farming. It has multiple active locations throughout Europe and also has the ambition to become a leading company in Europe. It currently operates in an Innovation Ecosystem in which it has the leading role. Jackson (2011) in (Oh, Phillips, Park, & Lee, 2016) defines an Innovation Ecosystem as 'the complex relationship that is formed between actors or entities whose functional goal is to enable the development of technology and innovation'. Innovation Ecosystems have become a core element in the growth strategies of firms in a wide range of industries. If ecosystems work as they should, then they will allow firms to create a value that no single firm could have created alone (Adner, 2006). Several of X' strategic partners operate in this Innovation Ecosystem in order to carry out technical development, research, and to make innovation possible. In this Innovation Ecosystem the users are currently only playing a small role. But X should intensify and expand their relationship with their users in order to keep up with their mission, as given in their mission statement (X, 2016). In the Quadruple Helix literature, the shift of intensifying, and expanding X' relationship with their users, is known as a shift from a Triple Helix + users towards a more user-oriented approach (Arnkil, Järvensivu, Koski, & Piirainen, 2010). This is also known as a shift from ''design for users innovation'' towards a ''user-oriented innovation''. In theory, the user-oriented innovation strategy would fit X' mission better but the practical situation must also be taken into consideration.

1.1 Problem Statement

As mentioned in the introduction, X wishes to shift from the current ''design for users innovation'' strategy towards a ''user-oriented innovation'' strategy. Shifting towards a ''user-oriented innovation'' strategy has an influence on a company's multiple aspects according to Arnkil et al. (2010).

The first important aspect that could be influenced by this change is the role of the user in the Innovation Process. In the current situation, the ''Triple Helix + users'', the users participate either indirectly in the Innovation Process or at a very late phase when the developed products, or services. are nearly completed. Shifting towards a more ''user-oriented innovation strategy'' would mean that the users are treated both as informants as well as developers. This means that they would also participate in the early phases of an Innovation Process (Pallot, Trousse, Senach, & Scapin, 2011).

The second important aspect that will be influenced by this change is the role of the user in X' Innovation Ecosystem and the structure of the Innovation Ecosystem itself. Their role in the Innovation Ecosystem changes from being the subject for whom X and their strategic partners are carrying out the innovation to being an actor who innovates together with X and their strategic partners. The current and the desired situations are depicted below in Figure 1 in which the role of the users is shown compared to the current actors in X' Innovation Ecosystem. However, this subject is still under-researched and under-documented in many sectors, one of which is the agricultural sector.

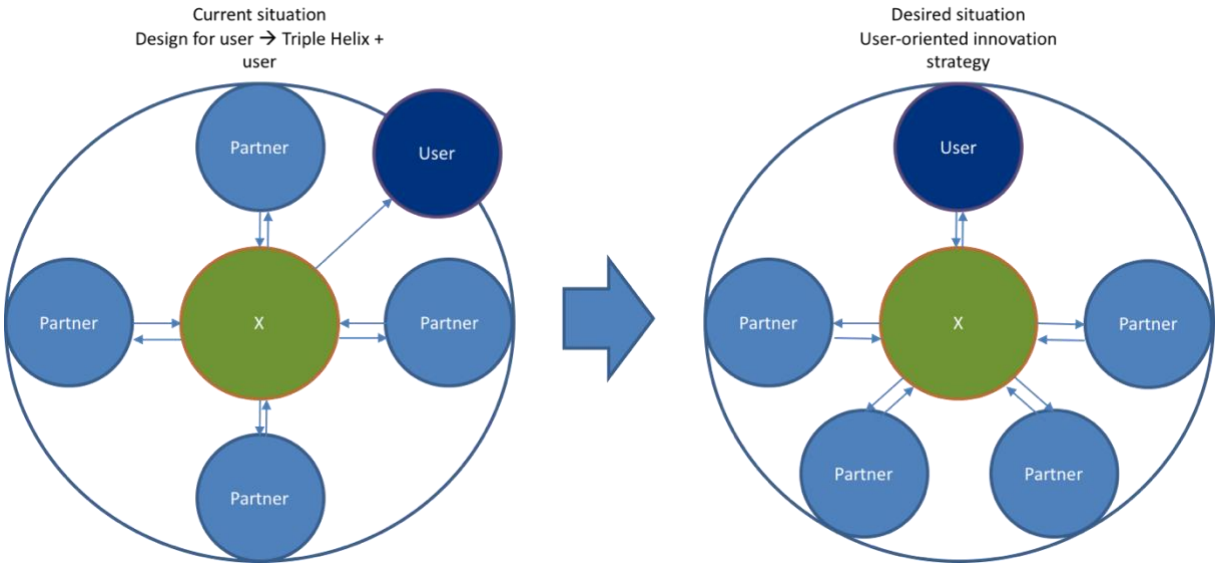

Figure 1: From a design for users strategy to a user-oriented innovation strategy.

1.2 Research goal

The theoretical goal of this research is to contribute to the Innovation Ecosystem and the Quadruple Helix literature with a specific focus on the agricultural sector.

The practical goal of this research is focussed on providing an insight into what would be the possibility for X to give their users a more participative role in their Innovation Process and Innovation Ecosystem.

1.3 Research question

In which way could X shift from their current ''design for users innovation'' strategy to a more ''user-oriented innovation'' strategy, and how would this influence their current Innovation Process and Innovation Ecosystem?

1.3.1 Sub questions

1) What does the shift from a ''design for users innovation'' to a more ''user-oriented innovation'' strategy mean per definition and how would this affect?
    a. The Innovation Ecosystem concept, and
    b. The Innovation Process concept.
2) What is the present situation of the users' participation in X' Innovation Ecosystem and Innovation Process?
3) What could be the desired situation of the users' participation in X' Innovation Ecosystem and Innovation Process?
4) In which way should X get their users involved in their future Innovation Ecosystem and process and what factors may facilitate or complicate this?

1.3.2 Operationalization of the sub questions:

Answering these sub questions lead to answering the research question.

To answer the sub questions different kinds of research must be performed and the sub questions will follow sequentially.

The first sub question should be answered by providing an insight into the existing literature about the Innovation Ecosystems and the Innovation Process, and how they are affected by a change in the innovation strategy.

The second sub question should be answered by conducting interviews with several respondent groups which should provide an insight in the present user participation in the Innovation Ecosystem, and the Innovation Process.

The third sub question should be answered by conducting interviews within multiple respondent groups. The answer to this question should provide an insight about the desired situation of user participation in X' Innovation Process and Innovation Ecosystem.

The fourth and last sub question should be answered by finding the most optimal situation of user involvement within X' Innovation Ecosystem and Innovation Process. In other words, finding the most optimal fit between; the type of users to involve and how to involve them, the factors that may complicate or facilitate their involvement, and the moment when they should be involved.

The main constructs that have been used doing this research are mentioned in Table 1 the first construct needs further explanation. The definition mentions that a ''design for users'' innovation strategy is also a form of user-oriented innovation. However, the definition does not mention that this form of user-oriented innovation is the least intensive, and it does not point out that companies with a ''design for users'' innovation strategy develop for the benefit of the users. In other words, the users are not actively participating in the Innovation Ecosystem, and a more ''user-oriented'' innovation strategy requires other degrees of involvement.

Construct	Definition	Source
User-oriented innovation strategy	Umbrella concept in which all kinds of user involvement are concentrated. The three kinds of user involvement are design for users, design with users and design by users.	(Schuurman & Marez de, 2009), (Kaulio, 1998)
Innovation Process model	A sustainable Innovation Process model can be defined as a simplified representation if the elements, and the interrelations between these elements, that an organization employs to create, deliver, capture, and exchange sustainable value for, and in collaboration with, a broad range of stakeholders	(Eveleens, 2010)
Innovation Ecosystem	The complex relationship that is formed between actors or entities whose functional goal is to enable technology development and innovation	(Oh, Phillips, Park, & Lee, 2016)

Table 1: Main Constructs.

1.4 Scope and unit of analysis

During this research the scope will be within the ruminant sector. This choice has been made because the ruminant sector is the largest sector in which X offers total feed solutions (X, 2017).

A restriction which makes doing research into all of the sectors impossible is time. In addition, this research setting is located in the Netherlands but because X has, as stated in the

Introduction, active locations in other countries which don't fall under the same legislation, makes writing an all-encompassing report difficult and in some aspects a restriction. However, this research will be set up in such a way that it will be able to accommodate the other sectors to make future research less time-consuming.

The unit of analysis in this research is the relationship between X, their users, and, their strategic partners with regard to the Innovation Process and the Innovation Ecosystem.

2. Theoretical framework

This research is focussed on shifting from a design for a ''user -innovation strategy'' to a more ''user-oriented innovation strategy''. In practice this means that the end-user will get a different, and more involved role in both the company's Innovation Ecosystem and the Innovation Process which should create value for both parties. This chapter is devoted to elaborating on the following theories:

1) The Innovation Ecosystem literature, and the possible contribution of different types of users during cooperative innovation activities with the current actors in the Innovation Ecosystem.
2) The factors that may facilitate or complicate user involvement in innovation activities.
3) The Innovation Process literature, and the possible contribution of different types of users during different stages of the Innovation Process.

These theories have been put together in a conceptual model in the final paragraph of this chapter.

2.1 The Innovation Ecosystems concept

The concept of the Innovation Ecosystem is built on an analogy with the Biological Ecosystems. A Biological Ecosystem is a concept in which living organisms are the main components that interact with the external non-living components (Jackson, 2015). For example: plants, algae, and fish live in the same lake. In this lake, the plants and algae provide food for the fish, which, in turn, poop and provide food for the microorganisms, these, in their turn, keep the lake clean by breaking down the organic matter. All of these factors keep each other in check as is done in Ecosystems.

The first notion of an ecosystem in a business context was mentioned by F. Moore in 1996. He argued that a firm could be seen as a part of an ecosystem rather than as a member of an industry. His reasoning was that the interactions between firms, and collective value creation processes are much more complex than the strategy frameworks implied.

The ecosystem concept is broader, as it covers a community of organizations, institutions, and individuals that influence the fate of the Focal Firm. The Focal Firm can be considered as the keystone player of an Innovation Ecosystem, also the ecosystem leader and/or the party that leads innovation initiatives (Adner, 2012). And the community of organizations, institutions and individuals consist of: users, supplies, including participants, suppliers, regulating authorities, standard setting bodies, the judiciary, and educational and research institutions (Teece, 2007).

Business Ecosystems do not follow a linear value creation process and the players in such ecosystems can be considered as the Focal Firm and the other involved actors (Iansiti & Levien, 2004). Valkokari (2017) mentions that the Focal Firm and the other actors involved can focus on a narrow domain of expertise. One such example of a narrow domain of expertise within the ecosystem literature is

innovation. In which, instead of the traditional value chain, many relations between different companies cooperate to jointly launch new products, or services to users and to create value for all parties involved. These networks are called Innovation Ecosystems (Adner & Kapoor, 2010). In addition, Innovation Ecosystems are not only focussed on creating value. But according to Valkokari in 2017, the Innovation Ecosystems also focus on value sharing and creating knowledge.

There are many different and differing definitions of the Innovation Ecosystems. However, most of these definitions seem to have comparable aspects in them such as: those pertaining to the actors, the entities involved, and, the goal of the Innovation Ecosystems, which is to enable technological development and innovation. One example of such a definition is given by Jackson (2012) in Oh, Philips, Park & Lee in 2016; ''The complex relationships that are formed between actors and entities whose functional goal is to enable technology development and innovation'' (p.1). There are some Innovation Ecosystems that focus on creating value and sharing knowledge between all parties involved and other Innovation Ecosystems that focus on material resources and human capital.

The questions in this research focus on a more user-oriented innovation strategy in which the users get a more dedicated role in the Innovation Ecosystem, and the Innovation Process in order to create value for all parties involved. This is in line with the way in which Adner and Kapoor (2010) approach the goal of enabling technological development and innovation as: "A firm's competitive advantage depends on its ability to create more value than its rivals. Greater value creation, in turn, depends on the firm's ability to introduce innovation successfully'' (p. 306). An innovation does not stand alone; but rather, it depends on accompanying changes in the firm's environment for its own success. These external changes, which require innovation on the part of the other actors, establish the Focal Firm within an Innovation Ecosystem of interdependent innovations. In short, firms should collaborate with other actors in order to make innovation and technological development possible and create value for all parties involved. The next chapter will elaborate further about the possible actors within the Innovation Ecosystem literature.

2.2 From three to four kinds of actors

As mentioned earlier (top of page 11), Oh et al (2016) and Jackson (2011) speak about actors and entities which were also defined by Etzkowitz and Leydesdorff in 1995. They all mentioned that there were three major parties that make innovation, and technological development possible; the industry, universities, and the government. As they are the three major parties, these parties are referred to in literature as the Triple Helix (Etzkowitz & Leydesdorff, 1995). The Triple Helix is a model and a visualisation of the three major parties acting together which creates synergy between these parties (Etzkowitz & Leydesdorff, 2000). The three parties involved in the Triple Helix all have their own characteristics and they all contribute towards the Innovation Ecosystem based on their individual characteristics. Figure 2 shows how the actors of the Triple Helix should be related, and the part where synergy is created, is in the middle, where all actors overlap. The role of the three major parties within the Triple Helix will be discussed below.

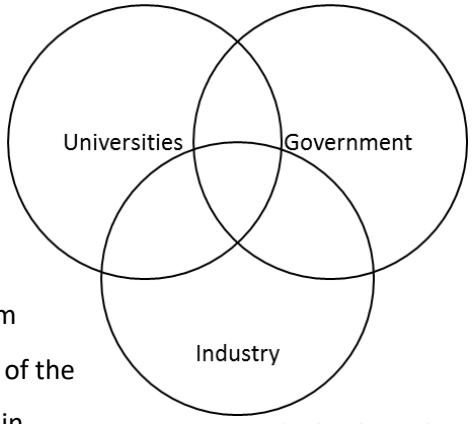

Figure 2: Parties involved in the Triple Helix (Etzkowitz & Leydesdorff, 2000).

1- The industry: responsible for the development and marketing of products, and, products and process innovation within different industries.
2- The universities: responsible for science-based technologies that are originated within research universities.
3- The government: responsible for regulating and formulating policies.

Current literature, which, to a large extent, still focusses on the aforementioned three major actors (Arnkil, Järvensivu, Koski, & Piirainen, 2010) misses according to Yawson (2009), one crucial actor namely the public or the user.

By adding the public or users to the Triple Helix, Arnkil et al (2010), have introduced the term The Quadruple Helix in literature. A general definition of the Quadruple Helix has been formulated as: an innovation cooperation model of the innovation environment in which universities, states, industries, and the public or user are involved. Where the Triple Helix is considered as a ''design for users'' innovation strategy, the Quadruple Helix can be considered as a more ''user-oriented'' innovation strategy. User-oriented innovation is known as a term which covers situations in which users do not only initiate the innovation (user-driven innovation), but also all forms of innovation where there has been a good measure of user involvement in the Innovation Process (Grunert, et al., 2008). Eason (1987) and Kaulio (1998) considered all forms of user involvement in the Innovation Process and divided them into three categories: for, with, and by. These are the three categories:

1- The ‘’design for’’ is the situation in which the users only have input when they provide the focal firm with data about the product or service after market implementation.
2- The ‘’design with’’ situation is when different solutions or concepts are displayed for users, allowing them to, select or reject, and react to, different proposed solutions.
3- The ‘’design by’’ is the situation in which the users will participate in the products’ or services’ design process.

The next chapter will elaborate further on the users and their possible role within the Innovation Ecosystem.

2.3 Types of users

As stated earlier the users should be the fourth actor in the Innovation Ecosystem. Based on research conducted by, Von Hippel (1998, 2005), Schreier and Prügl (2008), Arnkil et al (2010), and Kaasinen et al (2010) there are many ways of distinguishing between the different kinds of users. The same authors also state that there are different categories into which the users can be placed based on their specific characteristics. The majority of literature about types of users mention two kinds of users. However, to make sure that there is no exclusion of a possible third user type as mentioned in other literature, this research focuses on three kinds of users. For example, Kaasinen et al (2010) use the following differentiation: lead users, ordinary users, and advanced users; whereas Arnkil et al (2010) speak about primary, secondary, and, tertiary users. The difference between the distinctions made by the different authors is just the way in which they refer to the users. In fact, all of the authors identify the same three categories of users, with the same characteristics. For the purpose of this research, the users will be classified as; primary, secondary, and tertiary users. Their characteristics are given in the paragraphs below.

2.3.1 Primary users

Primary users, are generally the users who have a hands-on mentality, and who are also referred to as lead-users (Von Hippel, 2005). They are recognized as valuable users who can effectively stimulate explorative research that results in, breakthrough or radical, innovations. These users are characterised by two main attributes. First, they have the ability to sense important market trends, months or years earlier than most users in that marketplace. Second, they can benefit significantly by obtaining a solution to those needs. But these are not the only characteristics they display. Franke et al. (2006) tested the primary/lead user theory empirically and found that the resources which were close at hand for these users have an important influence on the commercial attractiveness of an innovation. These resources at hand are separated in two characteristics: technical expertise, and community-based resources. Members of certain communities do not come up with innovation

alone, they also receive assistance, and information from other members of the community. The commercial attractiveness of an innovation benefits from these community-based resources.

2.3.2 Secondary users

Secondary users are the users who are also referred to as strategic, or advanced users. On average, they are from the large and most powerful users who are closely related to the focal firm. They are characterised by having more in-house knowledge, experience, expertise, and resources than the tertiary users, and less than the primary users. Compared to the primary users, the involvement of the secondary users will not stimulate explorative or radical innovation activities. However, they will focus on incremental innovation, which means, innovating existing products or services stepwise, and expand on this (Magnusson, 2009). Secondary users when compared to the Tertiary users generally come from larger firms and their educational level is expected to be higher (Kaasinen, et al., 2010).

2.3.3 Tertiary users

Looking at the tertiary users, they are the most common/frequent users, and, are also referred to as the ordinary users, it may be that by involving them in the Innovation Ecosystem will stimulate exploitative research and it might also result in incremental changes.

The tertiary users are just the opposite to the primary users because they represent the average company with regard to the use and expertise of the products/service in question (Magnusson, 2009). They are characterised by the fact that they will most likely have only a little knowledge of the technology concerning the innovation in the form of a product and/or service.

However, according to Kaasinen (2010) the tertiary users are not unproductive and they should also be a part of the Innovation Ecosystem. They are productive when they are given, as far as possible, very specific asks in which their knowledge can be used. Magnusson (2009) adds that having too much knowledge might inhibit development of novel, original, and creative knowledge, therefore pleads to involve the tertiary users.

2.3.4 User groups

In addition to the aforementioned primary, secondary, and tertiary users, Stahlbrost and Bergvall-Kareborn (2011), state that user participation in Innovation Ecosystems is not just related to the individual and they also speak about user communities participating in innovation.

User communities are generally groups of individuals who share similar interests and need to interact to perform their activities, and in doing so, exchange information, and share knowledge (Parmentier, Mangematin 2014). User communities may consist out of all kinds of users, because all users have differing approaches towards innovation.

By applying this kind of innovation technique, organizations will encourage their users to interact with each other, as well as with the other organizations involved in the Innovation Ecosystem. Making user communities participate gives the organizations a chance to receive external expertise, new ideas on innovation, and support in the innovation development process (Di Gangi & Wasko, 2009).

2.4 Facilitating factors and barriers

When starting with a new relationship in the Innovation Ecosystem, one has to overthink the fact that it is not said that initiating this new relationship will be successful without keeping in mind that there might be external factors to influence this. For that reason, this paragraph of the theoretical framework is to gather information on which barriers may complicate collaboration, and knowledge sharing between the Focal Firm and the other actors in the Innovation Ecosystem. It also provides information on what factors can facilitate the initiation of an Innovation Ecosystem in which the users are involved. In the past, literature has described many key concepts which were necessary to facilitate the relation between the Ecosystem leader, and the actors participating in the Innovation Ecosystem. The key concepts which facilitate a relation between the Ecosystem leader and the other actors apply to this research because it is focussed on setting up a new relation and extending the existing one between the Focal Firm, and the other actors who are already participating in the Innovation Ecosystem, and the users. The main barriers, which are those against the integration of the users in the Innovation Ecosystem, have been taken into consideration in this research.

2.4.1 Barriers

As mentioned in the introduction of this chapter there are a couple of barriers which may prevent users from participating in the Innovation Ecosystem. However, these barriers do not only complicate matters for the users, but the Focal Firm may also find some barriers in letting the users participate in their Innovation Ecosystem.

2.4.1.1 Barriers connected to the user

According to Lettl et al (2006), there are, two important barriers against involving the users in Innovation Ecosystems.

1- First, their cognitive limitations can hinder them from delivering valuable input. In other words, the barrier of not knowing or knowledge asymmetry (Carayannis & Campbell, 2011). If the users are allotted to their current situation/position this will hinder them from generating new ideas and will probably make it extremely difficult for them to come up with radical innovations. This barrier occurs most when when companies are trying to involve the tertiary users instead of the primary ones in their Innovation Ecosystem. Obviously, this

barrier is less common when companies are dealing with primary users as they usually have more in-house knowledge and/or expertise.

2- The second barrier assumes that the users might not be willing to contribute to the Innovation Ecosystems. Research from Smith et al. (2014) shows that there are several reasons why the users may not be willing to contribute such as: a lack of trust, inequality, the lack of leadership, and cultural difference why the users may not be willing the contribute.

2.4.1.2 Barriers connected to the Focal Firm

According to Smith et al (2014) there are many barriers that might affect the collaboration between the actors in Innovation Ecosystems. Some of these barriers are common to all of the actors while others are unique to specific groups of the actors. The barriers with which the Focal Firm may be confronted when it comes to involving its users are: intellectual property, business, and people related issues regarding information and/or knowledge sharing, transparency, and the reluctance to be open. The barriers common to all actors will be discussed below.

1- The barrier to intellectual property occurs when companies which are active in an open Innovation Ecosystem have a strong focus on formal governance of their innovations, and their relationships, in the form of intellectual property rights and contracts (Hagedoorn & Ridder, 2012). A possible advantage is that firms can exchange knowledge freely without the risk of imitation whereas in many cases the intellectual property rights might threaten collaboration between some actors because it may limit their accessibility to knowledge and innovation (Pisano & Teece, 2007). Many companies have a ‘’no patent, no talk’’ policy. This type of policy and too much focus on intellectual property may tend to scare away potential partners. This is referred to as ‘’the medusa effect’’(Alexy et al., 2009).

2- The barrier to business and people related issues occurs when companies do not have an open mind-set. Creating a culture that values outside knowledge and competence is very important to becoming an active player in an Innovation Ecosystem, but it is also very hard for large companies to do. According to Gassmann et al (2010), culture is influenced by many factors and in most cases, large companies have their own well-established culture. This can be explained by the fact that both the age and size of a company may influence its capability to adapt and change its culture (Sneckenberg, 2015). Companies tend to lose their flexibility for change as they become older and the older the company, the more a certain culture and way of working is established. Which means that, when companies are not open for change, and hence, it will be more difficult to implement an open-minded strategy. However, should the management succeed in implementing an

open-minded strategy it may not succeed because of the barriers (employees) at other levels that may block the successful implementation of this strategy (Lichtenthaler, 2010).

3- Transparency is an action, method, or procedure, that lacks hidden agendas and conditions accompanied by the availability of full information required for collaboration, cooperation, and collective decision making in word or intention (Dictionary, 2018). A lack of transparency may occur when, for example, actors whom are involved in the Innovation Ecosystem are not told about the progress of an innovation (Miksen, 2017). This might lead to rumours which may destroy the trust within the Innovation Ecosystem. When the Focal Firm knowingly keeps other actors in the dark, it's like telling them that they can't be trusted with the innovation (Heemsbergen, 2015). If the Focal Firm is not transparent within the Innovation Ecosystem this may lead to decreased productivity and a higher turnover rate of the actors involved, which in turn may lead to an unsable situation.

4- The reluctance to be open, is according to other actors, the mostly mentioned barrier for the Focal Firm to collaborate with the other actors. Research from Van Loohuizen (2016) pointed out that even the Focal Firms state that the reluctance to be open is a serious barrier for knowledge sharing and collaborative innovation. The barrier comes forth out of the fear that companies have that other actors will make mistakes and damage the reputation of the company. The barrier is that companies might not collaborate and try to execute the innovation activities by themselves and eventually still think that they can do everything by themselves instead of collaborating. When companies stick to this attitude it will create a distance between them, the Focal Firm and the other actors involved in the Innovation Ecosystem.

2.4.2 Facilitating factors

As the barriers towards the initiation of an Innovation Ecosystem in which users participate have been elaborated in the last paragraph, this paragraph will focus on the factors that stimulate the initiation of an Innovation Ecosystem in which the users participate. This paragraph has the same layout as paragraph 2.4.1, in which stimulating factors for the Focal Firm and stimulating factors for the users will be dealt with separately. A positive side effect is that some of the stimulating factors may also overcome barriers to integrating users in the Innovation Ecosystem.

2.4.2.1 Facilitating factors in connection with the users

When it comes to the users and their motivation to participate, and contribute to Innovation Ecosystems, the basic principle is that motivation is based on the goals, or ends, that people try to reach with their current activity (Ståhlbröst & Bergvall-Kårebom, 2011). One common approach to motivation is to make a distinction between intrinsic and extrinsic motivation. Leimeister et al (2009) define intrinsic motivation as the incentive for an individual to engage in an activity, such as a hobby, that is initiated without any obvious external incentives. This type of motivation appeals/refers to the desire to feel competent, and self-determined. Extrinsic motivation, on the other hand, is activated by external incentives, such as direct, or indirect monetary compensation, or recognition by others. Both of these motivational factors might be of importance in the user's decision to either take part, or not to take part in the innovation activities. To elaborate on this aspect, direct and indirect monetary compensation is about either direct or indirect payment to partners contributing in the Innovation Ecosystem.

Table 2 below shows several examples of intrinsic and extrinsic motivational factors for primary users, secondary users, and the tertiary users, and the user communities to participate in the Innovation Ecosystem (Ståhlbröst & Bergvall-Kårebom, 2011). To elaborate: the user communities have overlapping motivational factors as they may consist of either, primary, secondary, and/or tertiary users.

Primary users	Secondary users	Tertiary users	User communities
Identification with the company or product	Obtain short-term benefits	Obtain short-term benefits (monetary)	Reputation building/recognition for contribution
Wanting to find new innovations (altruism)	Obtain knowledge	Obtain valuable experience (knowledge)	Satisfaction of members needs and interest
Learning	Expected future rewards		Expected future rewards, benefits exceed costs
Accomplish difficult cases (achievements)			Knowledge exchange and learning
Higher incentives			Enjoyment and fun
			Status seeking
			Altruism

			Reciprocity
			Monetary rewards

Table 2: Possible motives for users to participate in Innovation activities (sources: (Ståhlbröst & Bergvall-Kårebom, 2011), (Tuomela, 2013), and (Lüthje & Herstatt, 2005)).

2.4.2.2 Facilitating factors in connection with the Focal Firm

As mentioned in paragraph 2.1, the most important factor for the Focal Firm to establish an Innovation Ecosystem in which the users are involved is to gain competitive advantage and, in the end, profit-taking. In order to do so, they will need to create more value than their competitors, which is determined by the degree of successful innovation and of introducing new products/services first on the market (Adner & Kapoor, 2012). Research from Ritala et al. (2013) has proven that orchestration from the Focal Firm during the building and managing phases of the Innovation Ecosystem is the major facilitating factor towards establishing relationships with the actors. By orchestration is meant the planning or coordination of the elements of a situation to produce a desired effect. For the purpose of this research this can be translated into the following: planning or coordinating the actors and the users in the Innovation Ecosystem in order to create value for all parties involved. Research from Valkokari et al (2017) states that orchestration has been conceived as a function performed during the building and managing of Innovation Ecosystems, by one actor, an ecosystem leader (Adner, 2012), or the Focal Firm. Building the ecosystems is seen as facilitating and defining the premises of value creation and value capture, and managing the ecosystems is seen as helping to maintain, realise and deploy opportunities for value creation and value capture. Fjelstad et al (2012) state that, both building and managing Innovation Ecosystems may involve several types of mechanisms to coordinate how value is created and captured. In general, within an Ecosystem context, these include both tangible (i.e. concrete, contractual) and intangible (i.e. relational) mechanisms. Research within two case studies from Ritala et al. (2013) has confirmed that both tangible and intangible mechanisms are facilitating factors during the building and managing of Innovation Ecosystems. Figure 3 below visualizes the facilitating factor orchestration and its components.

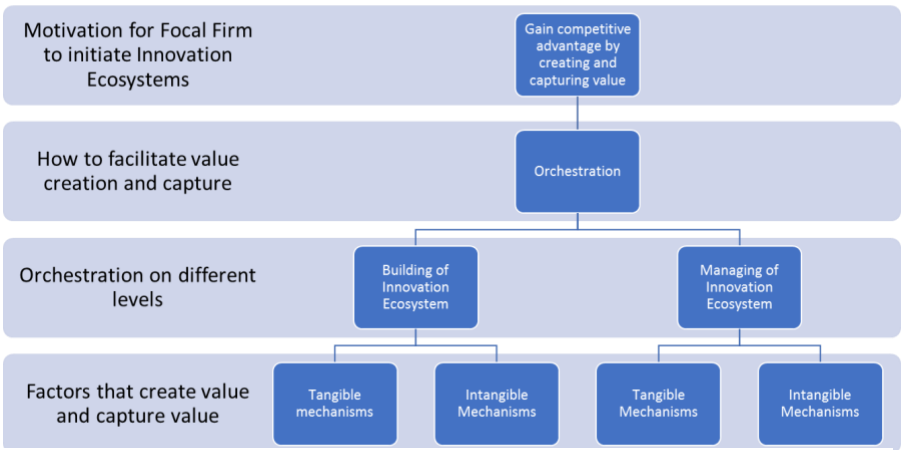

Figure 3: Visualization of the components of the construct ''Orchestration'' (source: (Ritala, Agouridas, Assimakopoulos, & Gies, 2013)).

2.4.2.2.1 Building Mechanisms

As mentioned above, during the building of an Innovation Ecosystem, the premises of value creation and value capture are defined and the mechanisms are tools to do so. First, mechanisms within the building of the Ecosystem that facilitate the premises of value creation. Tangible mechanisms include structures that connect and attract participants together, such as forums, associations, and concrete get-togethers (Pellinen, Ritala, Järvi, & Sainio, 2012). The intangible mechanisms are partially complementary to the tangible ones as they may, or may not take place through such structures. The intangible mechanisms include for example, clear communication of a common vision and building trust among the parties (Ritala & Hurmellina-Laukkanen, 2009).

Second, the mechanisms within the building of the Ecosystem that facilitate the premises of value capture. The tangible mechanisms mostly refer to setting up contractual frameworks to guide early plans concerning the innovation appropriability (Dhanaraj & Parkhe, 2006). This may involve for example, specifying which intellectual property is owned and used by the actors, or defining the rights to utilise the upcoming results. The intangible ones involve considering the motivation of the actors from the start, as well as creating a shared vision in which the goals of all actors are involved.

2.4.2.2.2 Managing Mechanisms

First, the tangible and intangible mechanisms that are related to value creation during management of the Innovation Ecosystems. The tangible mechanisms are quite similar to the building of Innovation Ecosystems, but they are more stable and evolved as the Innovation Ecosystem is further developed over time. These include again formal structures such as contracts and schedules, platforms, forums, and other arenas that maintain the possibilities for participants of the Innovation Ecosystem to create value (Fjelstad et al., 2012). The intangible mechanisms may become more sophisticated over time, and differ from the building mechanisms. Trust is known as an important and crucial success factor in Innovation Ecosystems (Blomqvist & Levy, 2005). However, trust is not something that can be mandated, but rather it is the outcome of coherency and consistency between actors over time. Other important intangible mechanisms are open communication (transparency), and maintaining a common vision over time. Together, these tangible and intangible mechanisms can help to maintain network stability and stimulate knowledge sharing in the Innovation Ecosystems.

Second, the tangible and intangible mechanisms that are related to value capture during the management of Innovation Ecosystems. Tangible mechanisms that help maintain value capture opportunities involve, for instance, common guidelines, contracts, and intellectual property rights concerning profits (Dhanaraj & Parkhe, 2006). Intangible mechanisms relate to clear communication between the actors in order to remain sharing a common vision, goals, and needs (Ritala et al., 2012).

2.5 The Innovation Process

As mentioned in paragraph 2.2, this research is focused on a change in the Innovation Strategy from a “design for users” to that of a more “user-oriented” Innovation Strategy. The “design for users” innovation strategy is about innovation driven by the Focal Firm and other actors in the Innovation Ecosystem with the ultimate objective that their product is placed on the market just after the end-users have had their say. On the other hand, the ‘user-oriented” innovation strategy concentrates on the development of products and services in collaboration with the user namely: the “design with” and “design by” innovation strategies. In fact, the users in the “design for users” innovation strategy only come into the picture after the market implementation of the Innovation Process whereas the users involved in the “user-oriented innovation strategy” have been working on all of the stages of the Innovation Process. A better picture of the Innovation Process and user integration in the Innovation Process will be explained in this chapter.

2.5.1 Innovation Process Models

In literature there is a consensus on the idea that innovation can be seen as a process and should be managed as such (Boer & During, 2001). The Innovation Process is defined as the development and selection of ideas and the transformation of these ideas into the innovation. Where, Hansen and Birkinshaw (2007) defined managing the Innovation Process as following: controlling and executing all activities that lead to innovation executed by the active and conscious organization. Additionally, Jacobs and Snijder (2008) mention that this is the same as managing the Innovation Process from the beginning to the end.

In the process of innovation, initial ideas follow a sequence of stages and there are somewhat differing sequences of the stages. As a matter of fact, there are several authors who have visualized how the Innovation Process should look like according to their findings. In order to visualize the Innovation Process, the different authors have been highlighting its stages. These highlighted stages are helpful for conceptualizing the Innovation Process and determining where drivers and barriers can occur (Hartley, 2006). Eveleens (2012) defined a model as a simplified representation/visualization of the stages, and the interrelations between them, that an organization employs to create, deliver, capture and exchange sustainable value for, and in collaboration with, a broad range of stakeholders. Based on the available literature, there are enough, but somewhat differing, Innovation Process Models. But according to Tidd et al (2009) there is one major consistency in the Innovation Process Models; the stages in the Innovation Process reflect the nature of the innovation as an invention combined with the market introduction of that invention. Eveleens’ research in 2012 has gathered twelve Innovation Process Models from various sources which are somewhat different but on the other hand they also show some similarities.

First, the differences between the models: the main differences are the number of stages in the Innovation Process model and if the focus of the Innovation Process model is within the incremental or radical innovation.

Similarities are found in the way in which the models are built. All models seem to start with some form of idea generation stage. Followed by the second stage in which ideas generated in the first stage are narrowed down. The third stage, after the narrowing down of the ideas, the key is to turn the selected idea into a tangible product or service. The fourth stage, is the one in which the new product or service is going to be implemented into the real world. The fifth stage, which is not a stage that is included in all models, but is worth mentioning; is the post launch stage in which the producer tries to sustain and support the innovation. The sixth and last stage, is also not included in all models, but it is concerned with learning, not only about the innovation, but also about how the Innovation Process was carried out.

In the differences between the Innovation Process Models, there is existing literature of some models which are suitable for radical, and incremental innovation. As this research focusses on the participation of primary, secondary and/or tertiary users in the Innovation Process such an Innovation Process model in which a radical as well as an incremental innovation is necessary and required. There are a couple of Innovation Process Models in which radical and incremental innovation are both taken into consideration, these models are designed by Tidd and Bessant (2005) and Jacobs and Snijders (2008). Both of whom, (the aforementioned parties) have also created a model in which all six stages are included. Bos-Sijtsema & Bosch (2015) mentioned that these six stages designed by Tidd and Bessant (2005) and Jacobs and Snijders (2008) can be reduced into three stages. In which the first and second stage form the pre-development stage, the third and fourth stage form the development stage, and the fifth and sixth stage form the post-development stage. How the user's participation is done in each stage is given below. See Figure 4 for a model in which the relation between the six stages mentioned by Tidd and Bessant (2005) and Jacobs and Snijders (2008) and the pre-development, development, and post-development stages is visualized.

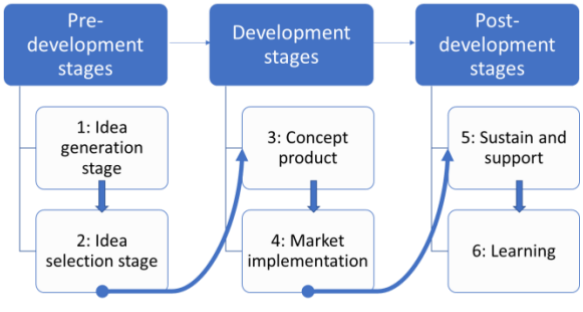

Figure 4: Visualization of relations between innovation stages and ''development stages''.

2.6 User involvement in the Innovation Process

As mentioned in the introduction of this chapter there are three different innovation strategies within user-oriented innovation. Within each of these innovation strategies, users get a different role in the Innovation Process. The activities in the ''design for users'' innovation strategy, are related to the stages of sustaining and learning with regard to the innovation and the Innovation Process. The activities in the ''design with users'' innovation strategy, are related to the stages of testing concepts and participating in pilot projects with regard to the Innovation Process. And the activities in the ''design by users'' innovation strategy, are related to the stages of idea generation and the selection of the ideas with regard to the Innovation Process.

These three innovation designs and the activities involved in those designs show similarities with the three summarized stages of the Innovation Process mentioned by Tidd and Bessant (2005) and Jacobs and Snijders (2008). Figure 5 visualizes how the designs relate to the innovation stages.

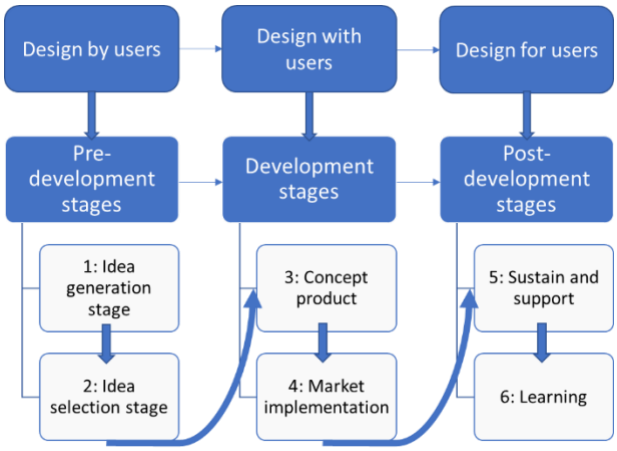

Figure 5: Visualization of relation between the designs and innovation stages

Users are normally involved in testing new products or providing feedback for improvements on existing ones. Ooi (2015) devoted a paper on user innovation in which he suggests that users are only contributing at the end of the Innovation Process. Users usually play a peripheral role in the actual research, and at the development stages of the Innovation Process. However, anecdotal and empirical evidence shows that more distributed, and collaborative Innovation Processes now question the existing Innovation Model because an increasing number of firms is actively seeking diverse sources of knowledge in all stages of their innovation activities. This evidence is also confirmed by Bos-Sijtsema & Bosch (2015). who state that feedback from the users or users has become increasingly important for product innovation. As mentioned earlier, literature defined that the Innovation Process consists out of four to additionally six stages. Bos-Sijtsema & Bosch (2015) mentioned that these six stages designed by Tidd and Bessant (2005) and Jacobs and Snijders (2008)

can be summarized into three stages. The first and second stage form the pre-development stage. The third and fourth stage form the development stage, and the fifth and sixth stage form the post-development stage. Further elaboration on how the user's participation is done in each stage is given below.

2.6.1 Pre-development stage

In the early stages in which firms primarily worked with concepts and ideas instead of prototypes or features, much of the data collected came from close interaction with a smaller set of users, or even primary users. These users were actively involved in brainstorming on ideas, as well as prioritizing certain concepts (Bosch-Sijtsema & Bosch, 2015). At this stage there is no working product or implementation and user input was only collected qualitatively through collaboration and dialogues. When the users are contributing to these stages of the Innovation Process they decide how, when and where they want to go but the Focal Firm remains the main influencer.

2.6.2 Development stage

During these stages of the innovation, different sets of data from the users can be collected. In addition, these stages include different test versions of products or services for the users so that they can react to the different solutions (Arnkil, Järvensivu, Koski, & Piirainen, 2010). However, not all users seem suitable to participate in these stages of the Innovation Process. Presumably, primary as well as secondary users will be able to participate in these stages of the Innovation Process.

2.6.3 Post-development stage

As mentioned earlier, the tertiary users are normally involved in these stages of the Innovation Process. It basically means that the products or services are developed on behalf of the users. When the product is ready to be used and placed on the market, companies could receive input through the users in order to optimise certain features of the product or service (Ståhlbrost, 2008). The tertiary users are most likely to participate in these stages of the Innovation Process.

2.7. Conceptual model

The conceptual model of this research represents the researchers' synthesis of literature on how to analyse a phenomenon. It maps out the actions required in the course of the study given his previous knowledge of other researchers' points of view and his observations on the subject of research. In other words, the conceptual framework is the researcher's understanding of how the particular themes connect with each other. Thus, it identifies the variables required in the research.

The themes, based on the theoretical framework and the problem statement, that are important to reaching the optimal situation in which the users are included in the innovation activities are: the Innovation Ecosystem, the Innovation Process, and how and when to involve which types of users in these activities.

The goal of this research is finding the most optimal situation in which all of the themes below fit together in order to create value for all parties involved in the innovation activities.

Literature in the theoretical framework concluded that there are certain themes that are important before the users can participate more intensely in the Innovation Ecosystem and Innovation Process. At first, clarification is needed regarding what kind of user could play a part in the Innovation Ecosystem and in the Innovation Process, and whether this would require users as individuals, and/or users as a community. The next aspect is about their contribution either as individuals or as communities in the innovation activities in collaboration with other actors involved in the Innovation Ecosystem. What motivates the users to participate in these collaborations, and what are possible barriers that withholds them from participating. How do the actors, who are already involved in the Innovation Ecosystem think about the users participating in these collaborating activities, and what is their motivation, or do they foresee any barriers? The last aspect questions in which stage of the innovation activities should users participate? All of these themes have been visualized in a conceptual model which is shown as Figure 6.

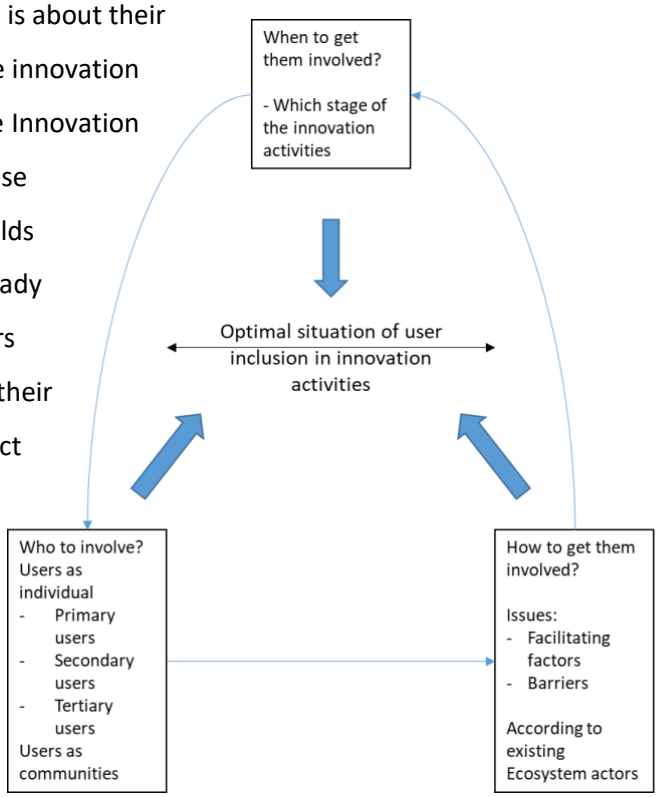

Figure 6: Conceptual model.

3. Research methodology

According to Yin (1994), explorative research questions like: ''why or how questions'' are best answered by qualitative research. Since this study is explorative by nature and has questions with ''how'' and ''why'', a qualitative research design is chosen. The aim of this study is to provide an insight into the possible roles of the users in the Innovation Ecosystem and the Innovation Process in order to create the most optimal involvement of users in innovation activities to create value for all parties involved. Conducting qualitative research means that interviews could provide an appropriate method to gather data because interviews are believed to provide a deeper understanding of the phenomenon where of which little is already known, or where further explanation is needed from different individuals (Gill, Stewart, Treasure, & Chadwick, 2008). Researchers use different types of interviews for a variety of purposes. For this research semi-structured interviews have been conducted with open-end questions. During these interviews, the researcher has the freedom to adjust the structure and content to the individual context and flow of conversation which gives him the opportunity to discuss certain topics deeper and get more data. In order to conduct a decent semi-structured interview, Harrel & Bradley (2009) identified a seven-phase walkthrough. These steps (Figure 7) will be followed during this research.

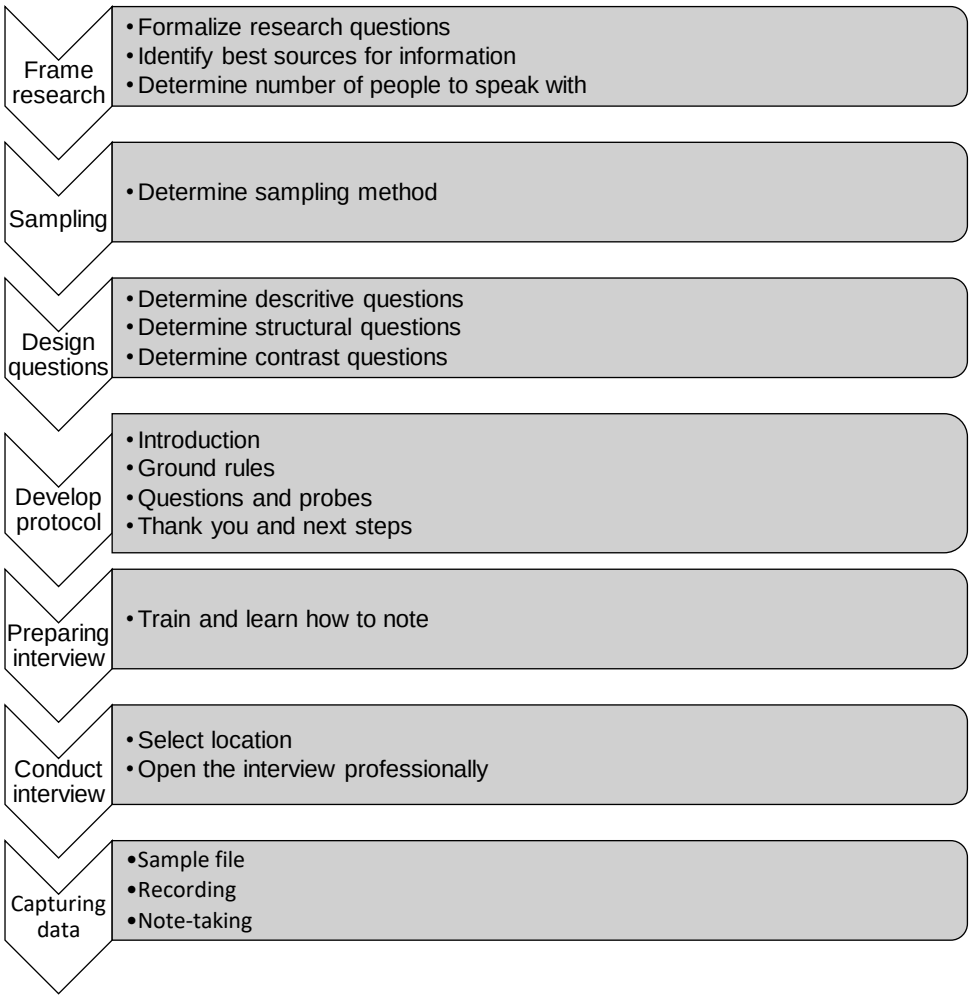

Figure 7: Steps in the process of research (source: Harrel & Bradley, 2009).

3.1 Preparation and frame of research

Setting up research questions is one of the main preparations which should be done before conducting interviews. After these research questions are made then the possible sources of knowledge should be identified (Harrell & Bradley, 2009).

The research questions have been set up based on the problem statement. The possible sources of knowledge in this research are the users, the strategic partners, and X' employees. They have been chosen as the possible sources of knowledge because they are most probably the actors within the Innovation Process and the Innovation Ecosystem. The government and the universities are not participating in the interviews, because they are not contributing to X' Innovation Ecosystem.

3.2 Sampling method

There seems to be an agreement among researchers about the number of interviews (e.g. Morse, 1995; Francis, Johnston, Robertson, Glidewell, Entwistle, Eccles & Grimshaw, 2010).

The sample size depends on the moment when data saturation is reached, and extra data would not lead to any new insights or explanations. This qualitative research is not meant to generalize, but to explore complex social issues, the sampling size needs to be sufficient to answer the questions adequately (Marshall, 1996).

According to Marshall (1996) there are three approaches for selecting a sample during a qualitative study:

1. Convenience sampling to choose the most easily accessible sample,
2. Judgment sampling to get the most productive sample, and,
3. Theoretical sampling is a theory driven sampling method.

Kolb (2008) also identifies three sample methods:

1. Convenience sampling is choosing the respondents most likely to participate.
2. Snowball sampling is choosing one participant based on a profile and ask him to identify other participants.
3. Purposive sampling is setting requirements and inviting participants meeting these requirements.

For these semi-structured interviews, it is most likely to use purposive or judgment sampling, because the participants need to meet certain criteria in order to be included/selected. Participating in the ruminant sector is a criterion for all of the possible participants, as this research is scoped on the ruminant sector.

The first group of participants are the users who need to meet the criteria based on their previous experience with X' innovation projects. So, those users who have not been involved in innovation projects, also those users who had a small role in innovation projects and users who have had a somewhat larger role in innovation projects can be included/selected. The reason for selecting the users based on these criteria is, that this research is concerned with intensifying and expanding the current relationship as well as setting up new relations with users.

The second group of participants, are the strategic partners who need to meet the criteria that they are involved in X' Innovation Processes. Otherwise, those strategic partners will not be able to tell whether users can or cannot be involved in the Innovation Ecosystem or Innovation Process because they are not involved themselves.

The third and last group of participants are X' employees who need to meet the criteria of being employed in the innovation centre and have their focus on the ruminant sector because of the scope of this research.

The interviews will be conducted in the following order: the users, followed by the strategic partners, and finally X' employees.

Before conducting the interviews, all respondents were approached to ask them if they were willing to participate in this research. During these approaches, they were also asked if they had any experience with X' innovation projects. Based on their responses and individual characteristics, they were categorized as given in chapter 2.3 of the theoretical framework. This categorization can be changed after conducting the interviews if those users seem to fit in a different category.

All of the participants who were interviewed are listed below in Table 3 in which there is also a distinction/differentiation between the users. The extended list with respondents is attached in Appendix 1.

Respondent group	Level of participation	Number of respondents involved	Referral to respondent in text
1: Users	No participation	2	UNP1, UNP2
2: Users	Tertiary Users	15	TU1, TU2, etc.
3: Users	Secondary Users	2	SU1, SU2
4: Strategic partners	Fully participating	4	SP1, SP2, etc.
5: Employees	Fully participating	2	XE1, XE2

Table 3: Summarized table of respondents.

3.3 Design questions

Spradley (1979) in (Harrell & Bradley, 2009) speaks about the different types of questions, with different goals. In the most general sense, descriptive questions ask people to describe certain aspects regarding the subject of the research, and who may provide insights or suggest areas for query that the researcher might not have considered. Structural questions help the researcher to understand the relationship between things and to categorize them. Contrast questions help the researcher to understand what the terms mean.

In this research the questions are descriptive because they should provide an insight about the current status of user participation in X' Innovation Ecosystem and Innovation Process and should also provide an insight/opinion about a possible situation of user participation in X' Innovation

Ecosystem and Innovation Process, which, could be an area the researcher has yet to consider, and may be beyond the scope of this research.

3.4 Design protocol

An interview should always start with a short introduction about the researcher, in which he/she introduces himself or herself, their organization, the purpose of the research, and the reason why the participant has been chosen as a respondent (Jacob & Paige Furgerson, 2012).

The ground rules should explain the length of the interview, assurances about the privacy of the information, and information about the reporting of the data.

The questions within the protocol should be grouped in such a way that they make sense and allow for the flow of the conversation. The actual conversation might not follow the specified protocol, but it will help to keep track of what has been answered, and what still needs to be answered.

At the end of the interview the researcher should take time to thank the respondent and to indicate the next steps in the research.

The interviews always started with a short introduction about the researcher, in which he introduced himself, the organization, the purpose of the research, and the reason why the participant had been chosen as a respondent (paragraph 3.2). The interviews were supposed to take between 30 and 45 minutes, depending on the amount of additional information the respondent came up with regarding the topics. The way the protocol has been set up needs some more explanation. The questions within the protocol are grouped and based on the literature in the theoretical framework, and so the first mentioned aspect in the theoretical framework will be the first subject of the interview. The protocol is attached in Appendix 2.

3.5 Preparing the actual interview

Fowler (2009) bases the interview protocol on a team, in which there is an interviewer, and a note-taker both of whom have a role with specific tasks.

The main responsibilities for the interviewer are to: gain the cooperation of the participant, listen carefully, be neutral and maintain the confidentiality of the respondents. Whereas the main responsibilities for the note-taker are recording accurately, note subtleties (nonverbal behaviour), understand when clarification is needed and to be cost-effective (not applicable to this research).

In this specific research, both roles are carried out by the researcher because of the lack of financial resources. The researcher uses a recorder, whenever the respondent agrees to its use so as not to

miss any crucial information during the interview. Whenever, the respondent does not agree to the use of a recorder, the researcher takes notes of the interview.

3.6 Conducting the interview

Selecting the location to conduct the interview is important. Interviews should be conducted in a private, quiet space without any distractions. The participants decide where the interviews should take place and the researcher will adapt to their preferences (Harrell & Bradley, 2009).

In this research, the first batch of interviews will be conducted at the location of the end-user. The second batch of interviews will be held at each of the strategic partners' company locations. When the specific location has been chosen, the interview will be conducted following the prescribed protocol. The third batch of interviews will be held at X' head office.

3.7 Capturing data

After conducting an interview, the researcher should have several data sources

The first potential data source and way of capturing the data during the interviews is to record the interviews. The second data source is the notes taken during the interview (Harrell & Bradley, 2009).

Based on what is mentioned before, the researcher will gather information about the participants, record the interviews whenever the participants agree to recording the interview and the researcher will also take notes during the interviews.

3.8 Validity

Lazar, Feng and Hochheiser (2017) refer to validity as a very important concept in qualitative research. Validity is measuring the accuracy of the findings we derived from a study and that the analysis of qualitative data does involve interpreting the study findings. However, this process is arguably more subjective than the process associated with quantitative data. Burnard, Gill, Stewart, Treasure and Chadwick (2008) mention that it is debatable whether qualitative researchers should have their analyses verified or validated by a third party. It has also been argued that a third party can make the analysis more rigorous and reduce the element 'bias'.

To minimize the concerns about the validity of this research the following precautions were taken:

Before presenting the interviews to the respondents, pilot tests of the interviews were conducted with two parties. The first pilot was held with an employee of X, to verify the main constructs and the questions related to these topics. The second pilot was held with an outside expert, working for

IMEC, a lab that conducts researches similar to this one all over the world. After the pilot tests, the given feedback was processed in the questions.

The validity of the outcomes of this research however, will be guaranteed by triangulation within the different groups of sources. Because the users, partners and employees will all participate in the interviews, then if the provided data by the sources does not show similarity it would mean that the research is not valid (Morse, Barret, Mayan, Olson, & Spiers, 2002).

3.9 Reliability

Joppe (2000) in (Golafshani, 2003) defines reliability as: ''The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable''. Though, the data collected through semi-structured interviews only reflect reality at a certain point of time, with dynamic and complex circumstances, and thus might not be intended to be repeatable (Saunders, Thornhill, & Lewis, 2009)

Reliability, according to Lazar, Feng & Hochheiser (2017) checks span two dimensions: stability and reproducibility.

To minimize the concerns about the reliability of this research, the method of stability has been chosen. Stability examines whether the coder rates the data in the same way throughout the data analysis. In other words, if the coder is asked to rate the data multiple times, is the rating consistent over the periods of time? Stability seems to be the most suitable method for this research to verify the reliability since it will not be possible to let different coders rate the data because of the time that would take and the lack of financial resources. The method of stability has therefore been applied and the researcher has chosen a selection of interviews and rated them multiple times to verify the reliability of this research. On addition, the researcher has rated a number of interviews in cooperation with X' Employees to make sure that the outcomes are reliable.

3.10 Operationalization

Figure 8 below shows the operationalization of the literature above. The interviews should also be conducted in the subsequent order.

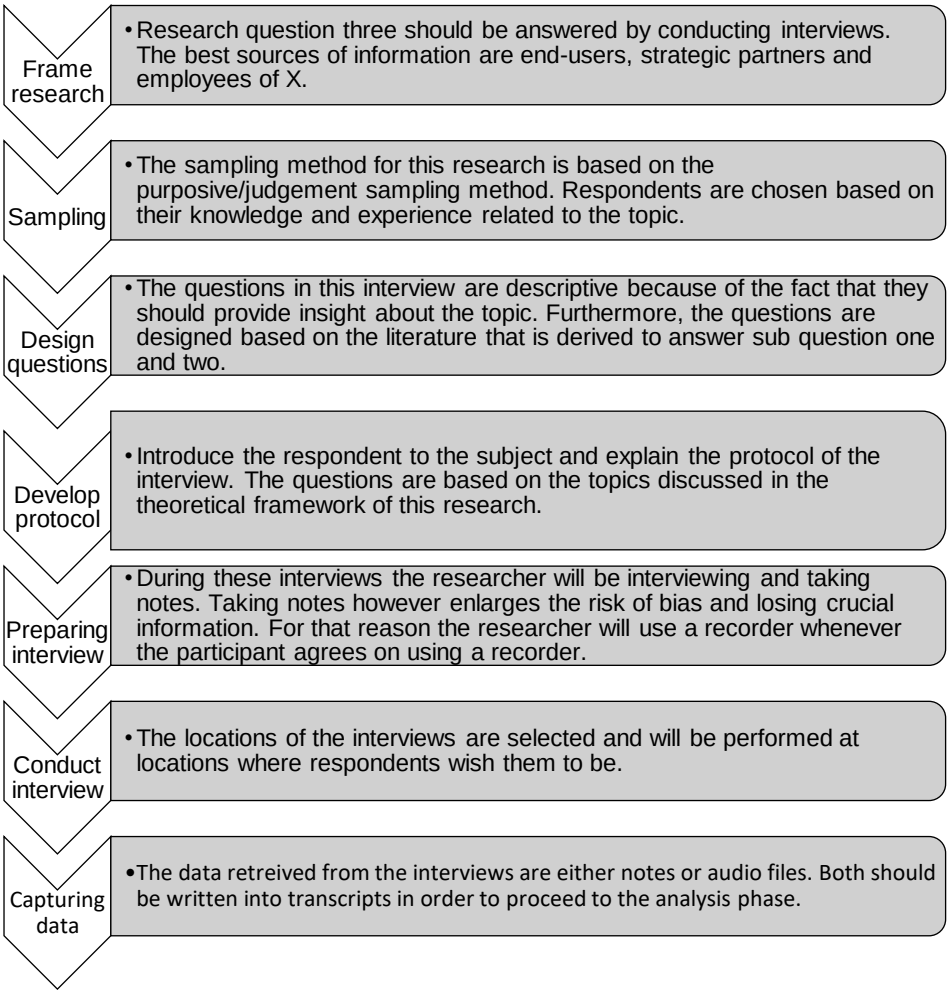

Figure 8: Operationalization of the way the interviews are conducted.

3.11 Analysis

This paragraph of the research methodology will explain how the conducted interviews have been analysed. The majority (20/25) of the interviews have not been recorded, the remaining interviews were recorded.

The first step after conducting the interviews is to make sure that the data retrieved from the interviews in the form of notes and audio files are written into transcripts. The transcripts have been sorted based on the theme of the questions, i.e. the current role of the users in the Innovation Process, the possible role of the users in the Innovation Process, the current role of the users in the Innovation Ecosystem, the possible role of the users in the Innovation Ecosystem, and the motives and the barriers concerning user participation in innovation activities.

The second step consisted of analysing the respondent's answers, and highlight (code) the most important and interesting elements. Afterwards, all of the highlighted elements received labels in order to sort out similarities and differences between the respondents' answers.

The results of the interviews have been subsequently used to visualize the current roles in the Innovation Ecosystem and process, possible roles in the Innovation Ecosystem and process, and motives and barriers with regard to user participation in the Innovation Ecosystem and process. Examples of how the analysis in this research has been executed are attached in Appendix 3;9.

4. Results

This chapter of the research is devoted to the results that are derived from the internal desk research and from the semi-structured interviews which are based on the Theoretical Framework.

The results are presented according to the three groups of respondents, i.e. the Users, the Strategic Partners and the Employees who are involved in X' innovation projects. Table 3 provides an overview about the different groups in the user respondents, X' employees, and the Strategic Partners.

The first theme that will be discussed is the current role and perceived possible role of the users in X' Innovation Process. Followed by the second theme that will discuss the current and perceived possible role in X' Innovation Ecosystem. The third, and last theme focuses on the motives and barriers that may facilitate or complicate the user's integration in the Innovation Ecosystem and process

4.1 The current role and the possible role of the users in the Innovation Process

This paragraph focuses and elaborates on the current and possible role of the users in X' Innovation Process. There is a clear distinction between the role of the users within the Innovation Process and the role of the users within the Innovation Ecosystem. The role of the users in the Innovation Process is related to ''when'' the users could be capable of participating in innovation projects, and the role of the users in the Innovation Ecosystem is related to ''whom'' to involve based on the respondent's perception to participate as an individual or as a community.

	Stage within Innovation Process ↓	Other users		Tertiary users		Secondary users	
		Current Role	Possible Role	Current Role	Possible Role	Current Role	Possible Role
Pre-development stages of innovation	Idea generation	-	1	1	1		1
	Idea selection	-	-	-	-		1
Development stages of innovation	Concept product	-	1	2	6	2	2
	Market implementation	-	2	6	15	2	2
Post-development stages of innovation	Sustain and support	2	2	15	15	2	2
	Learning	2	2	15	15	2	2

Table 4: Current and possible role in the Innovation Process.

4.1.1 The post-development stages

Present

In the current situation, all of the respondents in the user groups participated in the post-development stages of the Innovation Process (Table 4). Users participating in the post-development stages of the Innovation Process only provided the current actors with requested feedback (sustaining and supporting) and feedback on their own behalf (learning) about the products and/or services after the products were on the market for a while.

TU11: We are not actively involved in the Innovation Process. We do provide X with feedback about products and services

UNP2: We have not been contributing to X' innovation activities at all, except for the usual stuff, providing X with feedback about products and services.

Future

For the possible situation, all of the respondents in the user groups will continue providing the current actors with either requested feedback or feedback on their own initiative about the products and/or services after the products are on the market for a while. This may be seen as a commonality, because all of the respondents mentioned that they would provide the manufacturer of feedback about products/services when they are (not) satisfied.

TU4: I do not think that I will come up with something totally new, but my feedback may lead to potential improvements on existing products.

TU11: . I will, however, continue with providing X with feedback about the products/services I am using.

4.1.2 The development stages

Present

In the current situation a minority (8/19) of the users has been contributing to the Innovation Process during the development stages. 4 Out of 8 have been participating during the concept product stage (testing the products/services when the effects have not been measured before), and 8 out of 8 have been participating during the market implementation stage (projects related to large-scale testing of products/services just before they are marketed). Of these 8 users, there were 6 users who were expected to participate in development stages of innovation because of their previously mentioned characteristics (paragraph 3.3), but some of them were not. The specific users (2/8) who were not expected to participate in the development stages are the Tertiary users that participated in the concept product stage.

Future

For the possible situation, all of the respondents (19/19) in the user respondent groups say that they are capable of participating in the so-called market implementation stage of the development stages. In practice, this means that those users think that they are capable of participating in the so-called ''pilot projects'', initiated by the current actors. See these projects as beta products/services. Three users mentioned that participating in these stages of the Innovation Process is manageable for most of the users, because the effects of these products/services have already been measured.

TU2: I do not see a situation in which I will participate earlier in the Innovation Process than my participation in the pilots.

In addition, a smaller group of users (9/19) suggest that they are capable of participating in the concept products stages of the Innovation Process. Which means that 5 users are convinced that they can contribute more actively. 4 Out of these 5 users are confident that they will be able to participate in the concept product stages, have not been contributing actively before, which means that they have previously participated in the post-development stages. One of these users mentions that they may have been neglected during previous selections because of other aspects that influenced the selection process (barriers). Though, their perception about the matter does show their ambitions.

TU5: Depending on the time and the effort which I will have to put in, I would like to participate from testing the concepts.

UNP1: I see some sort of cooperation when the products should be tested without being introduced to the bigger market. Let's say testing the concept products when it is not yet certain what the effects may be.

4.1.3 The pre-development stages

Present

In the current situation there has been just one exceptional story with regard to participation in the pre-development stages of the Innovation Process. This story is about a user who proposed his own idea (idea generation) to the current actors as a result of a complaint that had not been fixed.

TU9: My company has been contributing to a pilot of a product which I proposed to X myself.

Future

With regard to the future situation, there are some users (3/19) who are of the opinion that they will be capable of participating in the pre-development stages of the Innovation Process in the future.

Remarkable note is that the user who has been participating in this stage in the past is not considering this role anymore. This user considers himself as a problem solver instead of an innovator who generates ideas for a greater good. The focus however, is on the users who perceive themselves to be capable of contributing to the pre-development stages of the Innovation Process. These users see themselves capable of providing new, and different insights for innovation projects.

TU14: We are currently testing a concept of a new service/product. But, we would also like to participate earlier in the Innovation Process. We think that we can make a difference when generating new ideas, because we think on a different level than X does.

4.1.3.1 *Perception of current actors about the possible role of users in the Innovation Process*

A part of the current actors does not see any situation in which all of the users can contribute earlier in the Innovation Process. While the other part of the current actors sees a possibility for them to contribute earlier. But, it has not been said that all of the users who think that they could get a more active role are also capable of filling that role. Which has been understated by the current actors that the capabilities of the users who would like to participate in specific roles in the Innovation Process need more clarification.

> *SP4: I also think that we will be able to get some of the users involved in our Innovation Ecosystem. However, I question the way in which we will get them involved. That depends entirely on the level of their knowledge and their willingness.*

4.2 The current role and the possible role of the users in the Innovation Ecosystem

As mentioned in the introduction of the previous paragraph there is a clear distinction between the role of the users within the Innovation Process and the role of the users within the Innovation Ecosystem. The role of the users in the Innovation Ecosystem is related to ''whom'' to involve based on the respondents, either users and current actors, perception to user's participation as an individual or as a community.

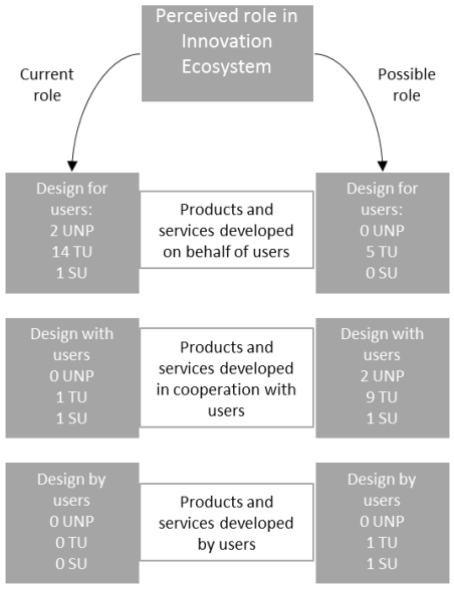

Figure 9: Current and possible role of users in the Innovation Ecosystem.

4.2.1 Design for users

Present

The majority of the users (17/19) have not been contributing actively to the Innovation Ecosystem in the past (Figure 9). Which means that those users have not been cooperating with the current actors in order to make innovation and technological development possible. Instead, the current actors have developed new products and services on behalf of them.

Future

The results with regard to their perceived future role however, show a massive shift from the ''design for users'' to the ''design with users'' strategy. Only five of the users participating in the ''design for user'' prefer remaining at this stage. Because, these five users also mention that they prefer individual contribution to X' Innovation Ecosystem. Their individual goals are more important to

them than common goals which is a key requirement to make cooperative innovation activities possible.

Furthermore, the majority of the users (8/12) that do perceive a shift from the ''design for user'' innovation strategy to the ''design with user'' innovation strategy as achievable prefer to contribute individually too.

4.2.2 Design with users

Present

With regard to the current situation there are two exceptions to the majority, these users have been contributing to technological development and innovation. One of these users has been contributing to innovation projects where multiple current actors were involved related to a service innovation, and the other user has been contributing to an innovation project related to a product innovation. Those users have been previously involved in the concept testing stages (development stages) of the Innovation Process.

Future

The users that have currently been involved in the ''design with users'' innovation activities are also the ones that perceive being capable of participating in the ''design by user'' innovation activities. However, they reckon that they will not be able to participate to the Innovation Ecosystem individually, they prefer to participate in communities of users.

4.2.3 Design by users

Within this research, there have been no respondents that currently participated in the ''design by users'' innovation strategy. Which means that there are no current results regarding this role in the Innovation Ecosystem.

4.2.3.1 Perception of current actors about the possible role of users in the Innovation Ecosystem

The current actors have a somewhat differing perception about the possible role of the users within the Innovation Ecosystem. First, in their perception, users may be able to participate in innovation and technological development in different degrees, i.e. design for users, design with users, or design by users. However, what they do not agree on, is to what degree. The second aspect, with regard to either individual users or user community participation, it appears that all of the current actors are in agreement that the users should get involved in their innovation activities, but only when the users participate in groups.

4.3 Motives and barriers in connection with the users, and the current actors

This paragraph focuses on the motives and barriers that may facilitate or complicate user integration in the Innovation Ecosystem and process. The barriers that may withhold the users from participation in the Innovation Ecosystem and process are detailed at first, followed by the barriers that may withhold the current actors (Focal Firm and Strategic Partners) from involving users in their Innovation Ecosystem and process. Afterwards, the factors that might motivate users to participate in the Innovation Ecosystem and process are detailed, followed by the factors that might motivate the current actors to involve users in their Innovation Ecosystem and process

4.3.1 Barriers in connection with the users

There are eight possible barriers that might prevent the users from participating in X' innovation activities (Table 5). The groups of respondents who have mentioned those barriers most often, and the meaning of the barriers will be elaborated on below.

Barriers	Users		
	Users not participating	Tertiary users	Secondary users
Size of company	1	2	
Lack of knowledge		2	1
Lack of transparency	1	1	
External management experts		2	
Possible negative impact of innovation	1	5	
Time and effort		2	
Lack of financial resources		1	
Way of feeding the herd		1	

Table 5: Barriers mentioned by the users concerning either the current actors or themselves.

1- Size of company

A minority of the users (3/19) have the idea that they are being excluded from X' innovation projects because of the ''size of their company''. The reason for this may be that X prefers to work on a larger scale because it gives a more reliable picture of the outcomes of an innovation project. The reason for dealing with larger companies is undoubtedly a reflection of the size of the herd, which can be divided to give more accurate results of the effect of the feeding additives. This barrier has been mentioned by those users who are operating on a relatively small scale. These users assumed that they will only be selected for the post-development stages of innovation and not for any other stages because the criteria for reliability used by the current actors can only be met by companies with a larger herd. This however, does not reflect on the innovative capabilities of these users, it is only an assessment based on the size of their company.

2- Lack of knowledge

Three users stated that they thought that they did not have enough theoretical knowledge to work successfully in the pre-development stages of the Innovation Process. The users who brought up this barrier figure that their lower educational knowledge would prevent them from participating in any other stages of the Innovation Process other than that of the post-development. In addition, they mention that their lack knowledge about the supplements in the feeding additives is also a disadvantage. The results confirm that those users who are involved in the pre-development stages are of a higher educational. However, they mention that even though they are convinced that they will not be able to participate theoretically nevertheless, they might be able to participate successfully in the practical situations.

3- Lack of transparency

Two of the users each referred to a different problem which, which, in some way, is related to the lack of transparency. The first barrier, which falls under this heading, has to do with communication in which it is claimed that X have not always been explicit in their communication about possible innovation projects. There has been some concealment of certain aspects such as clarity and openness as to what sort of Innovation Projects were being developed, when they would start, and, what was their goal. This has resulted in the Users and other Actors pursuing different goals. The second barrier concerns the products/services that were delivered during the innovation projects in which it was not exactly clear what the ingredients/parts were in these products/services.

Some of the current actors (2/6) mentioned that it is not to be expected that the Users should know all aspects pertaining to the Innovation Projects. However, in the users' opinion they should have at their disposal all of the necessary information, items, tools etc. which would allow them to execute their work timely and efficiently.

4- External management experts

This barrier has been mentioned by two users both of whom run their own companies but have sought external help and now run them together with External Management experts. It seems as though the Users have found themselves in a situation where their "decision making" was not clearly defined and consequently led to this being experienced as a barrier. In their opinion this need not to have been experienced as a barrier but, if handled well, may (have) open(ed) possibilities to multidisciplinary solutions.

5- Possible negative impact of innovation

A relatively large group of the users, almost a third, are afraid of the possible negative impact of the innovations (service or product related) may have specifically with regard to any negative results at the Users' own company (financially, animal health wise).

These users who have mentioned this barrier have been participating only in the post-development stages because participation in the first development stages requires acceptation of a possible negative impact. They have also stated that they are not willing to participate in any extended/intensified projects unless this requirement is withdrawn.

6- Time and effort

Two of the users are willing to become actively involved in the Innovation Projects but fear that a lack of time will make this impossible. This barrier for these users is related to a "lack of time and effort"; it may be interpreted as time in addition to their normal working time which it would ask of them to become up to a level in which they could actively participate in innovation projects. This does not say anything about the unwillingness of these users. They want to become involved in the innovation projects.

7- Lack of financial resources

This to a large extent the same barrier as the negative impact of innovation and has only been brought forward by one User. The main difference is that the users who do not lack the financial resources do not want to participate because they do not want to risk the long-term negative effects. This case is different because this user is not in a position to take a financial loss related to those long-term negative effects. Under these circumstances, a User in such a financial position would not be able to test products which have not been thoroughly and consequently tested which makes its effect and impact unsure.

8- Way of feeding the herd

This barrier is one of a kind. This user and has to do with the deviant way of feeding his herd, which is focussed on his preparing one silage once a year. A fixed amount of food additives is calculated to which, during the course of the year, only small incremental changes may be allowed/made.

Any radical changes in this feeding programme, will affect his company for the entire year and the negative effects will be catastrophic. Incremental changes will however be possible which means that users with these deviant ways of feeding their herd would be capable of carrying out pilots instead of

tests. The user that mentioned this barrier does not know a proper solution, but it may help the current actors with monitoring effects in delimited and strong regulated situations.

4.3.2 Barriers in connection with the current actors in X' Innovation Ecosystem and process

There are five possible barriers that might prevent the current actors of getting user involved in their innovation activities (Table 6). The barriers and the meaning of them will be elaborated on below.

Barriers	Focal firm and other actors	
	Employees	Strategic partners
Lack of knowledge	1	3
Intellectual property rights	1	1
Communication failures	1	1
Reluctance to be open		1
Company size of users		2

Table 6: Barriers mentioned by the current actors concerning either the users or themselves.

1- Lack of knowledge

A respectively large group of the current actors (4/6) have mentioned this barrier. Previously, the users mentioned the same barrier, which means that their perception of lacking knowledge seems correct. As already mentioned by the users, they fear lacking theoretical knowledge. This is confirmed by the current actors, where they additionally mention that users will probably only lack theoretical knowledge, and have more practical knowledge than the current actors. Based on what the current actors mention as facilitating factors, this is an aspect where the users can contribute to the innovation activities.

> *SP3: Most of the users in this sector do not have enough theoretical knowledge, but they base all of their assumptions on practical knowledge*

2- Intellectual property rights

The current actors fear that users will leak information to the outside world when they would get engaged in cooperative innovation activities. The current actors mention that this is sensitive information, with regard to, to be executed innovation projects. However, exchanging ''knowledge freely'' can be an advantage, because it may lead to different approaches mentioned by outsiders. Additionally, where the current actors, choose not to share information, this may cause a lack of transparency in the users' perception.

3- Communication failures

The difference in knowledge levels might be an obstruction to the communication between the current actors and the users. This has led to different perceptions of the goals of innovation projects.

4- Reluctance to be open

Only one of the current actors mentions this barrier. Unwillingness of sharing key figures is what the current actors are afraid of. As mentioned before, the current actors assume that they will be responsible for the theoretical part, which means that in order to measure effects, they will need theoretical figures.

5- Company size of users

As feared by the users, a couple of the current actors confirm that the ‘’size of the company’’ may be a barrier towards successful cooperative innovation activities for exactly the same reasons.

4.3.3 Motives in connection with the users

There are five key motives for users to participate in X' innovation activities (Table 7). The groups of respondents who have mentioned those motives the most, and the meanings of the motives will be elaborated on below.

Motives	Users		
	Users not participating	Tertiary users	Secondary users
Gaining knowledge by sharing knowledge	2	6	1
Financial compensation	2	7	1
Working more efficient in the future		5	
Guidance by other actors during innovation		6	1
Firm-specific innovation projects		1	

Table 7: Motives mentioned by the users.

1- Gaining knowledge by sharing knowledge

Nine users mentioned this motive and reasoned that it would give them an opportunity to get an insight into the products and services which are delivered by the current actors, and to extend their theoretical knowledge about it. This motive has been mentioned the most by users that are currently contributing to pilots. In other words, users that were slightly more involved in the Innovation Process in the past, and those users show their ambiguous just as they did before by getting selected for those stages of the Innovation Process where other users didn't. Sharing knowledge is not a motive that is financially supported, which means that users whom mentioned this motive are not only looking after themselves, but they are looking for the bigger picture.

2- Financial compensation

Ten users mentioned motives that relate to financial compensation. There is however, a distinction between the mentioned motives. The first motive is related to direct financial compensation and the second motive is related to indirect financial compensation. The users motivated by direct financial compensation prefer to get money for their possible participation during innovation projects. The users motivated by indirect financial compensation would rather receive discount on the products and services. Most of these users currently participate in the post-development innovation stages. The fact that they are not driven by innovation itself, but need other incentives, is only benefited by the individuals.

3- Working more efficient in the future

This is a collective name/term which is associated with many motives which ought to lead to a future in which work would become more efficient and productive. Users mentioned that shortening labour

time, requiring less feed additives, or that reaching a higher production are good examples of motives to engage in innovation activities in cooperation with the current actors. These motives have been mentioned most by users who also mentioned sharing knowledge as a motive, and most of these users have been participating in the development stages of the Innovation Process. In other words, users that work for a common cause, and users that are looking for a more active role in the innovation activities compared to their current role, which is confirmed by their perception of their possible role in the Innovation Process.

4- Guidance by current actors during innovation

This motivation was brought up by seven (7) users and specifically about guidance during the innovation projects which could result in the users not having to put in so much time and effort in the projects. These are some of the same Users who pointed out before, that time was a constraint of participating in innovation. The other users who were also participating in the post-development stages figured that they would be capable of participating earlier if they were given some guidance.

5- Firm-specific innovation projects

With Firm-specific innovation projects is meant: product/service innovation projects that are tailored for individual companies, which means that these innovations will not fit in with other companies. This motive has only been mentioned by one single user. This user also mentioned that ''the size of his company'' has been a barrier towards integration in the innovation projects. This is something which is most presumably not realistic. This user has a small company and is not the first in line with whom the current actors would like to cooperate based on the current actors' perception about this subject.

4.3.4 Motives in connection with the current actors in X' Innovation Ecosystem and process

The Focal Firm and the strategic partners have mentioned three key motives to get users involved in their cooperative innovation activities (Table 8). As indicated there are two main motives to involve the users in the innovation activities according to the Focal Firm, and, two main motives according to the Strategic Partners.

Motives	Focal firm and other actors	
	Employees	Strategic partners
Creating value	2	
Decreasing the lack of transparency	2	2
Gaining practical knowledge		3

Table 8: Motives mentioned by the current actors.

1- Creating value

This motive to get users involved in the innovation activities has been mentioned by a couple of current actors. This is a motive for the current actors, because they hope that creating more value will most probably improve their competitive advantage. Creating value can, however be interpreted different for all parties involved. But, one of the current actors mentions that: ‘’*When value is created for all parties that are involved or could possibly get involved in innovation projects, it will probably keep all parties attached to your system, instead of them switching to a competitor's’’*.

2- Decreasing the lack of transparency

Four of six (4 of 6) Current Actors listed different motives under the “decreasing lack of transparency”, examples such as: giving the users all of the information about the innovation projects, being transparent throughout the complete Innovation Process which means that users should be up to date from the start of an innovation

The barrier with regard to the lack of being transparent has also been mentioned by some users.

The current actors are reluctant to give the users too much information about the innovation projects, because they are afraid of the information being leaked. This is also a barrier for the current actors

Decreasing the lack of transparency would probably get certain users more interested to participate in the innovation projects. But since there were only 2 users who mentioned this barrier, one should reconsider if it is worth giving all of the information to multiple parties.

3- Gaining practical knowledge

Two (2) of the Current Actors expressed their concern about the innovation projects in which the users will participate in either the pre-development and the development stages of the Innovation Process Current actors would like to monitor the key theoretical figures to measure the effects of the innovative products/services, and they would also like the users to keep them up to date about the practical outcome of the tests.

The Current Actors mention that as they always won't be at the place where the innovation is continuously taking place, that they would appreciate if it would be possible for someone to keep track of any effects which could only be seen by a person but would not have been recorded, in figures, as having taken place.

4.4 Summary and discussion of the results

This paragraph of the research will discuss briefly the outcome of the results chapter. The results have been summarized in the conceptual model in Figure 10. Further discussion about each of the topics in the conceptual model is explained below.

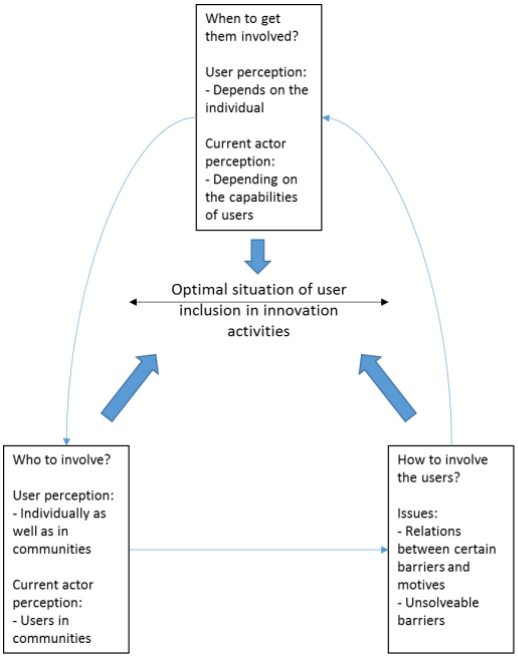

Figure 10: Conceptual model in practice.

4.4.1 Who to involve

In the present situation a lot of users (17/19) have not been actively participating in X' Innovation Ecosystem. Which means that they did not have an active role in cooperative innovation activities, those users found themselves in the existing ''design for users'' innovation strategy. The other users (2/19) were more active in X' Innovation activities. They have been designing products with the current actors.

However, the majority (14/19) perceive being capable of participating in a more intensive role in X' Innovation Ecosystem. In specific, 12 users would prefer a role in which they design with the current actors, of whom 8 as individuals and 4 in user communities. Only 2 users would prefer to participate in the ''design by users'' strategy, but both would prefer to participate in user communities.

From the current actors' point of view, users could be participating either actively or remain in their current situation. But, the current actors made it clear that they would rather see users participating in their innovation activities in user communities to make the innovation projects in which the users are participating more reliable.

4.4.2 How to involve the users

Both, users and the current actors came up with factors that may facilitate or complicate user participation in the Innovation activities. Specifically, the users mentioned 8 potential barriers and 5 potential facilitating factors. Where the current actors mentioned 5 potential barriers and 3 potential facilitating factors.

The most common motives for users to participate in the innovation activities are related to ''gaining knowledge'' and receiving a sort of ''financial compensation''. The most important barriers for the users not to participate in the innovation activities are related to the ''possible negative impact of innovations'', and, the ''lack of knowledge''.

The most common motive for the current actors to get the users involved in their innovation activities are also related to ‘’gaining knowledge’’ and ‘’reducing the lack of transparency’’. The most important barrier for the current actors to exclude users from their innovation activities is related to the ‘’lack of knowledge’’ and the other barriers have been mentioned the same amount of times.

There are however, some barriers that show similarities i.e. the ‘’size of company’’, and the ‘’lack of knowledge’’. In addition, a causal relation has been found between the ‘’lack of transparency’’ and the ‘’intellectual property rights’’ and the ‘’communication failures’’ barrier. Moreover, some motives may overcome certain barriers, as explained below. There are other barriers left such as the ‘’negative impact of innovations’’ on the users’ company, and the ‘’lack of financial resources’’ to which there is no obvious solution in the present circumstances.

The first similarity is found where both users and the current actors mention that the ‘’size of the company’’ of the users is a barrier to user participation in X’ Innovation activities. However, neither party came up with any motive that might overcome this barrier.

The second similarity is found where both the users and the current actors mention that the ‘’lack of knowledge’’ may be a barrier to user participation in X’ Innovation activities. Both parties are afraid that the users may not have enough theoretical knowledge. On the other hand, one of the motives mentioned by the current actors is that of ‘’gaining practical knowledge’’. This creates an opportunity, because the users also state that they would be capable of contributing practical knowledge. So that this barrier may be overcome. In addition, the most mentioned motive by the users is ‘’gaining knowledge’’ in which the users would like to gain theoretical knowledge. This means that both parties have mutual interests and both parties may provide each other with different perspectives of knowledge.

The third barrier ‘’lack of transparency’’ mentioned by the users seems to be caused by the ‘’intellectual property rights’’ barrier and the ‘’communication failures’’ barrier mentioned by the current actors. The users experienced that the current actors have not always been transparent about innovation activities. But, it seems that the users may have misunderstood the current actors, because of the ‘’communication failures’’. The ‘’intellectual property rights’’ may have resulted in a lack of transparency, but this has been a choice the current actors made together. However, the current actors also mentioned a motive to overcome the ‘’lack of transparency’’ in which they mention that they will try to be as transparent as possible.

A fourth barrier related to ‘’time and effort’’, brought forward by the users may easily be overcome if the current actors agree to a solution put forward by the users to assist and guide them during innovation activities.

Another issue regarding the motives has been brought up by the users is ''financial compensation''. However, it seems that is no easy solution in the present circumstances because the current actors have not come up with any solution to this.

4.4.3 When to get them involved

There seems to be a clear understanding within the user respondent group about their current role in the Innovation Process. In specific, the majority of the users (11/19) have been participating in the post-development stages of the Innovation Process. A smaller part of the users (7/19) were involved in the development stages and the minority (1/19) has been involved in the pre-development stages of the Innovation Process.

However, the majority of the users (12/19) perceive being capable of participating in more responsible stages in the Innovation Process. Specifically, (10/19) wish to shift from roles in the post-development stages to roles in the development stages. The remaining users (2/12) perceive being capable of shifting to the pre-development stages of the Innovation Process.

The current actors' point of view regarding this topic is somewhat differing. Some of the current actors do foresee a situation in which users participate in earlier stages of the Innovation Process, and others don't. The current actors that do think that users will be capable of participating in earlier stages of the Innovation Process reckon that, it all depends on their capabilities, and on their willingness.

5. Conclusions and recommendations

Conclusions

The purpose of this research was to investigate what it takes to shift from a ''design for users innovation'' strategy to a more ''user-oriented innovation'' strategy, and the influence of such a shift on the role of the users in the existing Innovation Process and Innovation Ecosystem. This research has shown that there are factors that determine if it is possible.

The influence of the previously mentioned shift, requires that user will take part in either, the development or pre-development stages of the Innovation Process. It also requires inclusion of the users between the existing actors. Which means, user participation in cooperative innovation activities, i.e. users participating in designing with the current actors, and users designing products/services by themselves.

The results of the interviews have shown that many (12/19) users are willing and interested to participate more actively in the Innovation Process. Specifically, (10/19) wish to shift from roles in the post-development stages to roles in the development stages. The remaining users (2/12) perceive being capable of shifting to the pre-development stages of the Innovation Process. The majority of the users (13/19) would prefer to participate individually and only six of them would prefer to participate in user communities. However, their perceptions may not always be realistic because they do not exactly know what is expected from them during the more active stages of the Innovation Process.

However, the current actors have a different point of view about the usefulness of the users. The current actors are not well aligned about the user's participation. Based on what they have said i.e. that the users will not be able to participate individually, but only in user communities and, also where the users should fit in, in the Innovation Process. In addition, they have different opinions about the type of users they would like to involve.

Additional factors that limit the possibilities of user participation in X' innovation activities, are the barriers that are unsolvable; such as the ''size of the company'', ''possible negative impact of innovations'', and the ''lack of sufficient financial resources''. But, the main constraint against the present users participation in all of the innovation activities is the level of their theoretical knowledge which prevents them from taking part in the pre-development stages of the innovation activities, hence the ''design with users'' innovation activities.

Based on the aforementioned statements it can be concluded that implementing this user-oriented innovation strategy seems possible up to the development stages of the Innovation Process for most

of the users with their present theoretical knowledge. However, their theoretical knowledge remains a stumbling block to further participation in all of the innovation activities.

To allow further participation of the users in all of the innovation activities would require that the users bring their organization up to the present state of the art, theoretically and practically.

Recommendations

This paragraph will elaborate on how to implement a user-oriented innovation strategy, and how to evaluate the implementation.

As mentioned in the existing literature, the Focal Firm is responsible for the planning and coordination of current and possible actors in the innovation activities. Which means that they are responsible for the placing of specific actors in specific roles. In this research this relates to aligning the existing actors and users that seem capable of participating in innovation activities.

As concluded the majority of the users show their willingness to participate more actively in the innovation activities. However most of them are restrained in participating more actively by their theoretical knowledge and barriers which are unique and specific to them.

So, if this user-oriented innovation strategy must be implemented, all factors that determine if users are capable of participating in innovation activities should be brought to the attention of the Current Actors who are responsible for, and involved in, the specific stages of the innovation activities. Who in turn should make a specification of what is expected in each of the roles involved in the innovation activities. These specifications, not only theoretical but also practical should be made known to the users who in turn may apply for the role of their choice.

After the users submitted their application, the current actors will advise the users whether they are eligible or what they must do in order to be eligible. This decision then is up to the users.

6. Discussion

The theoretical implications are presented in this chapter of the research, which means; the contribution to the existing literature and in addition, the limitations and suggestions for further research are also proposed in this chapter.

6.1 Theoretical implications

The theoretical implications of this research will be presented based on the different themes that have been mentioned in the theoretical framework and the results.

The role of users in the Innovation Ecosystem and Innovation Process

As mentioned in literature from Eason (1987) and Kaulio (1988), there are different ways of getting users involved in an Innovation Ecosystem. Current actors (Focal firm and other actors) may involve users in their Innovation Ecosystem in three different degrees. The first degree is ''design for users'', the second degree is ''design with users'' and the third degree is ''design by users''. Additionally, users may participate either individually or in user communities. The only result that came up and differs from the existing theory is that the degree in which users may participate in the Innovation Ecosystem does not always match with the stages of the Innovation Process.

Furthermore, this research does reveal additional perspectives to the existing literature about the user's contribution in the Innovation Process. Where existing literature mentions that most information during the pre-development stages comes from the primary users, the results from this research (without any primary users as respondents) pointed out that, depending, on the motives and barriers, secondary users, as well as tertiary users, and the users who have not been participating in innovation before, think that they would be capable of contributing to these stages in the Innovation Process.

Barriers mentioned by the users and current actors

Existing literature mentioned barriers that are connected to the user and barriers which are connected to the Focal Firm (existing ecosystem/process actors).

Smith et al. (2014) mentioned that reasons which are specific to the users may prevent them from participating in the innovation activities. The most of the barriers (seven out of eight) mentioned by the users can be related to these specific reasons which may differ in different researches. For example the barrier related to the ''possible negative impact'' of innovation, when individual users do not want to risk a negative impact on their company, they have a user-specific reason to not participate (Lettl, Herstatt, & Gemuenden, 2004). The last barrier, the lack of knowledge, mentioned by the users can be related to the theory from Carayannis and Campbell (2011) who point out that

knowledge asymmetry, the barrier of not knowing, may occur when there is not enough in-house knowledge or expertise.

Some of the barriers that have been mentioned by the current actors during the interviews differ from what is known in the existing literature. There is a match with regard to the barrier related to the intellectual property rights, but the other barriers are user-related and in no way related to the current actors.

Motives mentioned by the users and the current actors

Similarities between the results of this research and the existing literature are found with regard to the following motives:

1- Gaining knowledge,
2- And financial compensation.

Differences have been observed with regard to the motives:

1- ''Guidance by other actors'', this motive has not been mentioned in the literature that has been studied in this research, which makes it an addition to the existing theory.
2- ''Working more efficiently in the future'', this motive is referred to frequently by the primary and the secondary users, but the results of this research have shown that many tertiary users are also driven by this motive.

In existing literature, ''creating value'' has been defined as the most important motive for a Focal Firm to get the users involved in its innovation activities. The results of this research however, point out that ''decreasing the lack of transparency'' is more important. ''Gaining practical knowledge'' can be seen as a common goal, which is a motive that has also been mentioned in the existing literature.

6.2 Limitations and further research

As all studies, this research is subject to a number of limitations.

The first limitation is related to the respondents who have been selected for the interviews, is the population, not the sample size. The population for this research has not been equally represented over all of the respondent groups, fifteen out of the nineteen (15/19) were tertiary users. The results might differ when studying a substantially larger group of respondents, in which the respondents are more equally spread over the different types of user groups. This may also be a suggestion for further research.

The second limitation to this study is related to the sector in which this research has been conducted. This research has been conducted only in the ruminants' sector, which is just one sector

of the existing agricultural sectors. These results might differ if this research had also focussed on the poultry and swine sector.

The third limitation is related to the restricted area in which this research has been conducted. It has specifically focussed on the users in the Netherlands, where, for example, research focussed on the users in the USA would probably have revealed completely different perspectives of the user involvement in the Innovation Ecosystem, and the Innovation Process. Furthermore, this would have provided different results with regard to the motives and barriers.

The fourth limitation is related to the analysis in this research, of which the “interrater reliability has not been measured properly. In theory, this means that another researcher may interpret these results and come up with different outcomes to this research.

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Appendix 1: Extended list of respondents

Participant no.	Company	Position	Previous experience	Related to theoretical framework
1	Dairy Farm / user	Owner / manager	Not with X	Not involved user
2	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
3	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
4	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
5	Dairy Farm / user	Owner / manager	Test group/ somewhat larger role	Secondary user
6	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
7	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
8	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
9	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
10	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
11	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
12	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
13	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
14	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user

15	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
16	Dairy Farm / user	Owner / manager	Not with X	Not involved user
17	Dairy Farm / user	Owner / manager	Test group/ somewhat larger role	Secondary user
18	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
19	Dairy Farm / user	Owner / manager	Pilot group/ small role	Tertiary user
20	Strategic partner (ecosystem participant)	Global marketing and application specialist	Fully participating partner in Innovation Ecosystem on different stages	Organization participating in the Innovation Ecosystem of the Focal Firm
21	Strategic partner (ecosystem participant)	Innovation manager	Fully participating partner in Innovation Ecosystem on different stages	Organization participating in the Innovation Ecosystem of the Focal Firm
22	Strategic partner (ecosystem participant)	Product manager livestock	Used to be a participating partner, brainstorming at this moment	Organization in the Innovation Ecosystem of the Focal Firm
23	Strategic partner (ecosystem participant)	Head of ruminant innovation cluster	Fully participating partner in Innovation Ecosystem on in later stages of the process	Organization participating in the Innovation Ecosystem of the Focal Firm

24	Employee X	Nutrition and Innovation Director	Fully participating in the Innovation Ecosystem and guiding the system	Focal Firm
25	Employee X	Innovation manager	Fully participating in the Innovation Ecosystem and managing the innovations	Focal Firm

Appendix 2: Questionnaire

1: Background of the end-user or strategic partner:

- Personal data
    - Name
    - Age
    - Previous education
- Company
    - Strategic partner or customer
        - If customer, what kind of customer within ruminants sector?
        - Size of company (only relevant for users)
        - Relation to X
- Previous experience with innovation
    - Have you been employed somewhere else where you have been participating in innovation projects?

2: Role of users in Innovation Ecosystem:

- What is the current role of users in the Innovation Ecosystem of X?
- What could be the role of users in the Innovation Ecosystem and would it be possible to let users contribute on their own or would this require communities of users? Answers according to:
    - The user
    - The strategic partner
    - X
- In which way should the user add value towards innovation with multiple partners based on the opinion of partners, X and the user him/herself? (These are just examples)
    - Would this be based on utility value?
    - Would this be based on knowledge
        - Practical or,
        - Theoretical
- In which way should value be added towards the customer for participating more intense within the Innovation Ecosystem? (These are just examples)
    - Would that be based on intense guidance from partner and X?
    - Would this be based on financial compensation?
    - Would this be based on sharing knowledge?
    - Towards a more efficient future of the company's

3: Role of user in Innovation Process:

- What is the current role of the customer within X' Innovation Process and in which role of the Innovation Process could they participate according to the user, X, and strategic partners?
    - Would that be in the phase of idea creation for new products or services? (generating ideas)
        - If no, why wouldn't that be possible?
        - If yes, what value could they add in this part of the process?
    - Would that be in the phase of research and feasibility of the innovation? (selection of ideas)
        - If no, why wouldn't that be possible?
        - If yes, what value could they add in this part of the process?
    - Would that be in the phase of testing the new products or services at farms of customers? (concept product)

        - If no, why wouldn't that be possible?
        - If yes, what value could they add in this part of the process?
    - Would that be in the pilot phase at farms of customers? (market implementation)
        - If no, why wouldn't that be possible?
        - If yes, what value could they add in this part of the process?
    - Or would that be at the phase in which the product is introduced in the market and the customer can only provide X or strategic partners of feedback about the product? (post-development stages, Sustaining & Support, and Learning)
        - If no, why wouldn't that be possible?
        - If yes, what value could they add in this part of the process?

4: Design by, with or for user:

- Do you think that it would be possible (for users) to shift to:
    - Design by user
        - If no, why not?
        - If yes, what could be the added value by the end-user? (example: margin in feeding supplements)
    - Design with user
        - If no, why not?
        - If yes, what could be the added value by the end-user? (example: minimal viable product)
    - Design for user
        - If no, why not?
        - If yes, what could be the added value by the end-user? (example: feedback)

5: Remaining question:

- Do you have any other suggestions about customer participation in X' Innovation Process and ecosystem?

Appendix 3: Transcript current role of users

Respondent:	Answer with regard to question about their current role in the Innovation Ecosystem	Label	Code
UNP2	We have not been involved in the innovation activities of X at all. Which means that we have not had a role in the Innovation Ecosystem. We have not been contributing to make innovation and technological development possible, X and other actors have always been innovating in order to keep us satisfied.	No active role in the Innovation Ecosystem Designing for users	Company is designing and innovating for user

Respondent:	Answer with regard to question about their current role in the Innovation Ecosystem	Label	Code
TU14	We are somewhat involved in the Innovation Ecosystem, as we are contributing to a new dataplatform that is supposed to help X and other parties develop products stepwise.	Small involvement in multi-actor innovation	Company (X) has developed product by themselves, and is adjusting and testing in collaboration with user

Respondent:	Answer with regard to question about their current role in the Innovation Process	Label	Code
TU9	My company has been contributing to a pilot of a product which I proposed to X myself. Which means that I have been contributing early in the development stages of the Innovation Process	Pre-development (idea generation), development (pilot) and post-development (providing feedback)	Pre-development stages, and Development stages (partially), and Post-development stages

Respondent:	Answer with regard to question about their current role in the Innovation Ecosystem	Label	Code
SU2	I have been involved in innovation activities, but not in such a way that multiple parties were involved. I have been contributing to testing concept products with my knowledge, and by observating the positive/negative impact of the products on my company. I did take note of these effects and I reported the negative effects back to X in order to change these effects.	Small role in Innovation Ecosystem (individual contribution)	Company (X) has developed product by themselves, and is adjusting and testing in collaboration with user

Appendix 4: Transcript motives for users to participate

Respondent	Answer with regard to user motives	Label	Code
UNP2	I would say that there is a difference in motivational factors. The most important factor would be financial compensation, as this is something which is mentioned immediately. Second would be knowledge sharing in order to work towards more efficient solutions in the future.	1: Financial compensation 2: Knowledge sharing	Intrinsic motivation, and extrinsic motivation

Appendix 5: Transcript barriers to user participation

Respondent	Answer with regard to user barriers	Label
TU4	We have external experts involved in our decision making and only based on their advice will we get a more active role in X' innovation activities The second barrier not to participate is more serious and is about the possible negative impact of testing concepts. The third barrier is time; we do not have enough time because of our company scale to spend it on innovating in collaboration with X and, eventually, other actors	1: External management experts 2: Possible negative effects

Appendix 6: Motives for the Focal Firm and other actors

Respondent:	Motives to get users involved	Label
XE1	I would say that there are several motives for us and for the users to get them involved in our innovation activities. First, creating value for all parties involved. Which means that the users are happy with the outcomes, and that the other involved actors are happy with the outcomes. A second motive would be that we lower the lack of transparency, because of the fact that we open up our innovation activities to others	1: creating value 2: decreasing the lack of transparency
XE2	Has the same motives as XE1	1: creating value 2: decreasing the lack of transparency
SP1	We will be able to expand our knowledge with practical knowledge of users. A second motive would be that we eliminate the lack of transparency because of the fact that we are getting them involved in the	1: gaining practical knowledge 2: decreasing the lack of transparency

	innovation activities bottom up.	
SP2	A motive to get users involved in our cooperative innovation activities is related to reducing the lack of transparency	1: decreasing the lack of transparency
SP3	We would like to take integrate the user in our cooperative innovation in order to get a clear vision about certain aspects during innovative projects. For example, the way in which the user experiences certain products/services.	1: gaining more insight in the innovation activities, and in particular gaining insight in user experience
SP4	I do think that there are several motives to get users involved in our cooperative innovation activities. The first motive in my opinion is decreasing the lack of transparency about our innovation activies, this will also contribute to a shared vision during cooperation.	1: decreasing the lack of transparency

Appendix 7: Barriers for the Focal firm and other actors

Respondent:	Barriers to get users involved	Label
XE1	I would say that there are several barriers to successful integration of users in our cooperative innovation activities with other actors. The first barrier is the lack of knowledge. A second barrier would be that we are affraid of users leaking information to the outside world.	1: the lack of knowledge 2: the risk of leaking information to external people
XE2	I do think that users will be able to cooperate within our innovation activities. But, where I think that there are motives to get them involved, I do also foresee some barriers. The first barrier would be communication failures because of a difference in knowledge levels.	1: communication failures because of a different level of knowledge
SP1	I do think that there are several barriers to user integration within our cooperative innovation activities. The first and most important barrier would be the lack of knowledge of the user. A second barrier would be that we are affraid of users leaking sensitive information about new products/services to the outside world.	1: the lack of knowledge 2: the risk of leaking information to external people
SP2	I would say that there is one big barrier to getting users involved in our cooperative innovation activities. This barrier is related to the reluctance of being open. In order to create a successful	1: the reluctance to be open

	relation with users we need to have open access to all of their key figures.	
SP3	I do think that it would be possible to get users integrated in our cooperative innovation activities. But, I do foresee some obstacles to a successful relation. The first barrier is related to the company size of the users, I would prefer large-scaled users. Another barrier would be that most of the users in this sector do not have enough theoretical knowledge, but they base all of their assumptions on practical knowledge.	1: the company size of the users 2: the lack of knowledge
SP4	I do foresee multiple obstacles to getting users integrated in our Innovation Ecosystem. The first obstacle is related to the lack of knowledge. A second obstacle is related to their company size. The third obstacle is the communication. Where certain discussed aspects might seem clear to us, users may interpret the different.	1: the lack of knowledge 2: the company size of the users 3: communication failures because of a different level of knowledge

Appendix 8: Transcript possible role of users according to users

Respondent:	Answer with regard to a possible role in the Innovation Ecosystem	Label	Code
TU14	We are already somewhat involved in the Innovation Ecosystem. We are always open to participation in such ecosystems, as we are trying to be forward-looking and to keep our company up-to-date. We do not foresee a situation in which we would participate as the only user but rather a situation in which we cooperate with other users with the same issues.	User community to innovate and design new products/services in the ecosystem	Design by users

Respondent:	Answer with regard to a possible role in the Innovation Process	Label	Code
SU2	I think that I am capable of participating in the all stages of the Innovation Process because of my history of working, and my specific knowledge. I think that users may contribute to the idea generation stage in teams, in order to brainstorm and discuss specific problems, issues, and, or possibilities. In my specific case I also think that I am capable of participating in the	Generating ideas, selecting ideas, testing and providing feedback	1 Pre-development 2 Development 3 Post-development

	selection of the ideas because I have the same level of knowledge as X' employees.		

Appendix 9: Transcript possible role of users according to Focal Firm and other actors

Respondent:	Possible role of users in Innovation activities	Label	Possible role ecosystem	Possible role Innovation Process
XE1	I do think that we can give certain users another role in our Innovation Ecosystem. However, I do not foresee situations in which users will be able to contribute to the direct development of our products in cooperation with others. Which means that I do not foresee situations in which the users designs the product, starting with the idea generation. I do think that users are able to re-design in cooperation with our company. I would like to see a situation in which the users are testing our concepts, and provide us feedback about positive impacts and negative impacts of the products/services.	Different role as current role, testing products	Design with users innovation	Concept product