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Contextualizing for a smarter future

A comparative study on technological startups' value delivery in the agriculture sector

Authors:

Anna Goffhé

Lisa Klofsten

Supervisor:

Devrim Göktepe-Hultén

Abstract

- Title:** Contextualizing for a smarter future – A comparative study on technological startups’ value delivery in the agriculture sector.
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- Advisor:** Devrim Göktepe-Hultén
- Key words:** Digitalization, Context, Agriculture, Smart agriculture, Value delivery
- Research question:** How are technological startups in the agriculture sector influenced by their context in the process of value delivery?
- Purpose:** This study aims to create an understanding of how technological startups are influenced by their context when delivering value to the agriculture sector. The purpose is to gain a new perspective on innovation by investigating different contexts.
- Methodology:** To fulfill the purpose, a qualitative comparative study on six interviewed startups was conducted with an abductive approach, to expand the understanding of contextualization.
- Theoretical perspectives:** The literature review consists of two parts. First it presents previous research on the contextual dimensions, namely business, institutional, spatial and social. Second, these key dimensions are combined into a framework together with the concept of embeddedness, to analyze the influence on value delivery.
- Empirical foundation:** The empirical findings consist of primary data from interviews with the six technological startups and additional secondary data.
- Conclusions:** This study concludes context influences startups in different ways. Consequently, in order to develop necessary solutions, there is a need to listen to the external environment. Depending on the degree of embeddedness, insights and information about the sector are gained differently, hence the value delivery process varies.

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Enjoy your reading,

Anna Goffhé & Lisa Klofsten, 31 May 2021

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1. Introduction

In this introductory chapter a background of digital innovation and the agriculture sector are presented. Additionally, the various stakeholders are outlined to obtain a clear overview of the sector and the focus of this study. The problem discussion and the aim of the study forms the basis of the research question.

1.1 Innovations and adoption

Recently, there has been growing interest in technological innovations, due to the increased digitalization. Technological innovations were once exclusive to large established organizations due to the extensive related cost (Smith, 2010), however startups are nowadays perceived as the main driver in the development of creative technological solutions (Birner, Daum & Pray, 2021). New solutions play a crucial role for societal advancement, hence innovations are important to maintain economic development. Innovation occurs at different places, ranges from advanced new designs to modest alterations, and origins from different sources. Smith (2010) identifies four main sources of innovation, namely individuals, corporations, users and the state. In addition, the author states sub-categories, such as employees and outsiders, should not be ignored.

Innovations present companies both with great opportunities and existential threats, hence the process of launching is highly uncertain (Sebastian, Ross, Beath, Mocker, Moloney & Fonstad, 2017). Even though an innovation can be considered necessary and helpful, it is not always easy to adapt. Greater discontinuity imposes higher risk for resistance, and in regard to new technologies the discontinuity is often high, Ram and Sheth (1989) conclude. They discuss various reasons why innovations encounter resistance from targeted customers, and the barriers can be described as either functional or psychological. The functional barriers regard potential value, usage patterns and risk associated with usage. These are more likely to arise if considerable changes are required to implement the innovation. The psychological barriers on the other hand, are connected with beliefs and consider tradition, norms and perceived image. Nonetheless, the authors suggest various strategies organizations can utilize to overcome these customer barriers, such as integrating the innovation in prior activities, getting endorsements from users and providing useful information.

The adoption barriers are especially high for digital innovations in companies who became successful before the digital economy arose, as Sebastian et al. (2017) discuss. The authors argued that such companies find it difficult to implement new technological solutions. Due to strong tradition and a lack of flexibility, they lack capabilities to facilitate technological development. It is difficult to give up traditional processes and cultures, but in order to transform into the digital era, they must (Sebastian et al., 2017).

The digital era increases the need to utilize new knowledge, since the work tasks are changing. Digitalization can be defined as the use of digital technologies to provide new opportunities and transform an organization, in other words the process of shifting to a digital business (Gartner, n.d.). On the other hand, digitization concerns the conversion of analog information to digital, according to Verhoef, Broekhuizen, Bart, Bhattacharya, Qi Dong, Fabian and Haenlein (2021). There are various external factors driving the need for digital change, according to the authors. First, an increasing number of technologies, such as smartphones and cloud computing, have arisen since the World Wide Web was adopted. Although not all of these new technologies will be successful, the extensive entrance signals a need for digital transformation among companies. Second, due to new technologies, the competition changes and becomes more globalized. Third, as a response to the digital change, consumer behavior is changing. Conclusively, organizations who do not adapt to these changes are likely to be replaced.

1.2 Agriculture sector and today's challenges

All sectors are getting more digitalized, moving towards a more knowledge based economy, and the agriculture sector is no exception. Work tasks are getting more imbued with technology, hence it is important to keep up with the digitalized advancement. However, the innovative solutions face several barriers in the sector. In order to understand the development of the sector, the value chain can be examined to create an overview (see Figure 1.1). Agriculture consists of several actors and the value chain can be described in various ways. A common description is that the production flows from farmer, to industry, to retailers and lastly consumers (Konkurrensverket, 2011). Further developed, the value chain starts with farmers who produce raw material, which is then bought by a distributor. Distributors deliver the products to a processor, either domestically or internationally, who in turn delivers the food to a retailer, including exporting the goods, before it ultimately reaches the

consumer. Additionally, the improved technological solutions brought by startups need to be taken into account in the agriculture value chain. It is essential for all stakeholders in the chain to be aware of the ongoing technological changes, in order to increase the chances of value delivery throughout the chain (Djanian & Ferreira, 2020).

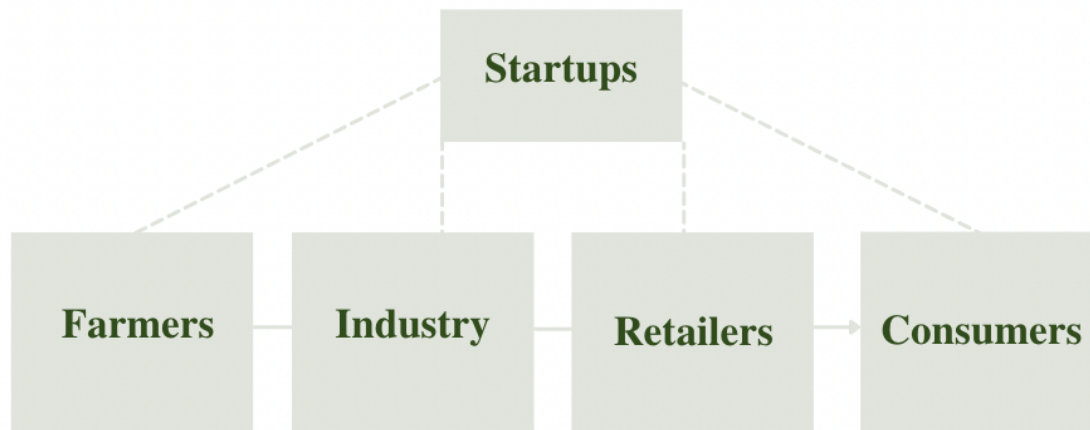


Figure 1.1: Agricultural value chain

In the early years, all agricultural work was done by hand, but when the tractor was innovated it replaced the work of sixteen horses and eight people (Tekniska museet, 2019). In other words, the work tasks changed and already, the sector has gone through tremendous changes to increase the production efficiency. Since the 1990's there has been extensive development in the Swedish agriculture sector, Hajdu, Eriksson, Waldenström and Westholm (2020) describe. They discuss the substantial societal transformation occurring, which has affected the agriculture sector in numerous ways. For instance, they argue digitalization probably has been the most significant change, making the production more effective. Nonetheless, the authors also acknowledge the cost issue as well as the skepticism and differences in local conditions, hindering the mass acceptance and purchase. Likewise, they recognize how employees' previous knowledge affects the overall approval, where younger generations find it easier to accept and utilize new technological solutions.

The biggest shift in the postwar period awaits the sector, including developed digital solutions for increased transparency and easier interaction among actors across the value chain (Djanian & Ferreira, 2020). The need for further development is imposed by the increased food demand, along with the climate change (Jordbruksverket, 2019). To increase efficiency, precision agriculture, namely appropriate responses based on observations, plays a

vital role (Jarolímek, Stočes, Masner, Vaněk, Šimek, Pavlík, & Rajtr, 2017). It is described to involve changes in the manufacturing processes or introduction of new technologies, including everything from satellite pictures and drones to AI.

Smart agriculture, including AI, Big Data analytics and information and communication technologies, influence daily work, according to Annosi, Brunetta, Monti and Nati (2019). The authors described several benefits with smart agriculture. First, it maximizes economic returns, protects resources and works for the environment. Second, the developed technology enables farmers to act more sustainable, efficient and resilient. Third, the technologies provide farmers with control and storage of historical data, which can improve managerial decision-making. Though smart agriculture has potential benefits, it is still dependent on the farmer's acceptance for integration, which Rübcke von Veltheim and Heise (2020) discuss. In addition, they raise one concern regarding the fact that the technologies will introduce new work tasks, such as monitoring and programming, which would require technologically qualified staff. As well, they mention the diffusion rate might be slow due to trust issues.

Despite the shift to more digital agricultural work, there are still challenges to overcome. Thus, there is need for improvements. First, the rapid population growth in combination with an increased food demand. If the current trend continues, the caloric demand will increase almost 70 % by 2050 and the crop demand will increase at least 100 % (Goedde, Horii & Sanghvi, 2015). However, the production in the agriculture sector needs to suffice with only 40 % of the land area (Jordbruksverket, 2019). Therefore, the growing population causes an increased demand for efficient utilization of land and production in the agriculture sector (Jarolímek et al., 2017). Even though several improvements have been made in the past to increase productivity, feeding the population is still a critical issue. Second, the rapid climate change has increased consumer demand for more sustainable products, including food. Hence, the global food production needs to satisfy the population, at the same time as it needs to be more sustainable.

1.3 Problem statement

The pace of change in agriculture is accelerating, and even though new technologies have had a great impact, the sector lags behind in embracing the advances (Laczkowski & Padhi, 2018). Digitalization is more difficult in this traditional sector since it has long cycles of

experimentation and a system highly affected by the resources in the operating environment, such as water availability and weather. Previous research has indicated the need for new technological solutions to be adopted in the agriculture sector (Porter & Heppelmann, 2015). Laczkowski and Padhi (2018) explain farmers are enthusiastic and ready for the changes that digitalization will bring, as long as the technologies can be integrated into existing operations with relatively minor modifications. Accordingly, techniques that would require changing or adding an entire design of automated equipment are not as attractive. In other words, the innovation diffusion depends on the technology's effect.

Even though farmers ask for small changes, automatic designs are emerging, as robots for harvesting, milking and fruit picking (Paunov & Planes-Satorra, 2019). Such robots can generate data relevant for agricultural producers and by combining it with additional information, new smart agriculture services can be developed. The potential of using increased amounts of data is also discussed by Goedde, Horii and Sanghvi (2015), who suggest it be used to advance crop yield, optimize the resources and lower production costs. However, the biggest challenges when integrating smart agriculture is the adoption time and the cost. In consequence, the technology is mainly restricted to large producers (Paunov & Planes-Satorra, 2019). Therefore, the acceptance of smart technologies requires farmers to redefine and rethink their habits, including their daily work tasks and strategies (Porter & Heppelmann, 2015).

Prior research focuses on how and why farmers accept these digital changes. It emphasizes factors contributing to farmers' adoption, such as age, geographical location and risk aversion (Ofori, Griffin & Yeager, 2020). When organizations provide a new digital solution, they tend to think about how to reach the right target group, by crossing the chasm to find farmers holding factors required to adopt. However, there is no perspective focusing on how technological startups are impacted by their surroundings, and what makes them understand which solutions are needed. In other words, how they are influenced by their context and how that impacts the value delivered to the agriculture sector.

Gaining this knowledge would be helpful for startups in order to understand their operating contexts, and to recognize what is needed to create valuable solutions (Aggestam & Wigren-Kristoferson, 2017; Bryant & Sharper, 2021; Griffin, 2007; Mowday & Sutton, 1993; Welter, 2011; Welter & Smallbone, 2011; Zahra, Wright & Abdelgawad, 2014). However, this is taken for granted by many organizations, which indicates a considerable problem. If

startups do not consider how context influences the value delivery, they might overlook valuable information. Therefore, a gap is found in the research, regarding the perspective on how technological startups are influenced by context when offering new solutions to the agriculture sector.

1.4 Purpose and research question

The study focuses on technological startups operating in the agriculture sector. The startups are defined as those developing digital innovations for farmers. The connection between startups and the agriculture sector is particularly interesting since startups can contribute with essential knowledge for the technological development in the traditional agriculture sector. The study analyzes the connection from startups point of view, to establish how context influences the process of value delivery.

The study aims to understand how technological startups approach, and interact with, the agriculture sector in different ways depending on their contexts. Startups are affected by their operating environment, for example their social interactions and the applicable regulations in their locational area. This makes it important to analyze the surrounding contexts in order to investigate how startups reach their final customer. Startups have various strategies to create and deliver value based on their approach to the agriculture sector. By applying the contextual knowledge in agriculture, the aim is to gain a new perspective on innovation and entrepreneurial actions in the sector. The intention is to generalize the concept of contextualization, in order for other sectors to benefit from the information as well.

When technological startups invest their resources to target farmers, they have to be aware of the factors contributing to their adoption of new technological solutions. Yet, it is more common today to control the contextual variables, instead of investigating how they are a part of the progress (Zahra, Wright & Abdelgawad, 2014). In other words, a startup's external environment impacts the business strategy. This study investigates how technological startups in the agriculture sector are influenced by context when they intend to deliver value. To fulfill the aim of the study, the following question is formulated:

How are technological startups in the agriculture sector influenced by their context in the process of value delivery?

1.5 Thesis outline

This study consists of six chapters, excluding the list of references and appendices. In chapter one, Introduction, the background of the study is presented, including purpose and research question. In chapter two, named Literature review, an overview of previous research is given, and an analytical framework is presented in order to establish the foundation for analysis. Method, chapter three, explains the research approach and design, as well as the process for data collection. Additionally, an evaluation of the study's reliability and validity is performed and a discussion of ethical considerations is presented. In Findings, chapter four, data from the conducted interviews are presented. In chapter five, Analysis, the analytical interpretation of the collected material is presented and summarized into the framework. Lastly, in chapter six, a conclusion is drawn from the analysis and the practical and theoretical contributions are presented. As well, suggestions for further research are given.

2. Literature review

In this chapter the theoretical background of the study is presented. Firstly, context and its different dimensions are described. Thereafter, an explanation of how organizations work with value creation follows. Throughout this presentation of theory, there is an underlying focus on innovation and entrepreneurial actions, in order for it to correspond to the intended research.

2.1 Organizational environment

An organization can be defined as a deliberately structured social entity, which is goal directed and linked to the external environment (Daft, Murphy & Willmott, 2017). The organization is important for facilitating innovation and creating value, which Daft, Murphy and Willmott (2017) clarify. However, organizations face numerous challenges, such as globalization and digitalization. Additionally, the authors acknowledge there has been a development in organizational research in the past years, creating a distinction between two perspectives, namely closed system and open system. The closed system perspective focuses exclusively on the organization with only little consideration given to external elements, while the open system perspective understands the open boundaries between context and the organization.

In line with the open system perspective, Welter (2011) argues different contexts should be analyzed in order to understand the economic behavior of an entrepreneur. “Context is important for understanding when, how, and why entrepreneurship happens and who becomes involved” (Welter, 2011, p. 165). Thus, the four contexts – business, institutional, spatial and social – will be further examined in this report. The factors of the external environment can either enable or constrain entrepreneurial actions, direct or indirect. Additionally, context impacts both the nature of entrepreneurship and the entrepreneur’s behavior (Welter & Smallbone, 2011). In other words, both internal factors and external factors influence the organizational environment.

Entrepreneurs deal with a myriad of factors, arising from the context where they act, hence they respond with a certain outcome. Therefore, it is of interest to analyze those activities in their natural settings to better understand the contextual effect, which Zahra, Wright and Abdelgawad (2014) acknowledge. In order to understand the impact of a context the authors

highlight the importance of micro-processes, such as actors, objectives, dynamics and duration. These processes can be schemed and analyzed together with the context to better understand their functions.

2.1.1 Business context

In the literature there are “few precise definitions of the organizational context” (Mowday & Sutton, 1993, p. 198). However, a conclusion drawn is that a variety of contexts needs to be considered when discussing organizational behavior, one being business context. Griffin (2007) explains the business context can range from specific economic features distinguishing countries, to different management practices within an organization. He argues that this context both shapes the individuals involved, likewise are shaped by them. This complex interplay is further discussed by Mowday and Sutton (1993), who argue context has an influential impact on individuals in organizations at the same time as individual characteristics and individual behavior influence context. For example, they explain organizational context might be perceived as an outcome of individuals’ behavior and they conclude powerful individuals, within the organizations’ management, influence the business context by making decisions that affect the organization. However, they also mention organizational context may have limited influence on behavior when individuals are protected from, or chose to ignore, the contextual factors.

One way of examining the business context is by considering an organization’s knowledge sharing across its value chain. A general key challenge regarding knowledge flow is the boundaries existing between different groups and levels (Boshkoska, Liu, Zhao, Fernandez, Gamboa, del Pino, Zarate, Hernandez & Chen, 2019). The perceived knowledge boundaries exist due to differences in for example how work is done, how knowledge is transferred or organizational culture. In other words, differences in the business context. Additionally, Boshkoska et al. (2019) argue the accumulated knowledge typically is situated within each entity of the value chain, due to the great variety of actors involved. The authors further explain how a need for crossing these boundaries derives from the necessity to develop better solutions for the end user. Particularly, they highlight cross organizational collaboration as a solution, since this might lead to quicker understanding of new trends, even trends within the most specialized tasks. However, this is explained to be difficult.

Another way of examining the business context is by discussing the organizational culture. As Daft, Murphy and Willmott (2017) explain, culture guides day-to-day work, and serves two crucial functions, internal integration and external adaptation. First, the authors describe that culture is what integrates members into the organization. Second, they explain that culture helps the organization adapt to the external environment. The organizational culture differs between organizations and each has its own unique culture that cannot be transferred, as Smith (2010) explains. He also states that corporate culture is something difficult to define, since it is an ambiguous phenomenon. However, Daft, Murphy and Willmott (2017) argue culture is the set of values, norms and guiding beliefs shared by the members of an organization. Likewise, Deal and Kennedy (1982, cited in Smith, 2010, p. 238) define organizational culture as “the way we do things around here”, which is interpreted as the values and norms underlying the work of the organization.

Depending on the organizational focus, there are different cultural designs to adopt. The design determines the cultural aspect of the organization’s business context. The “right” culture is extremely important and some cultures are more supportive than others, as Smith (2010) emphasizes. Further, he describes how creativity, defined as the ability to come up with ideas, is a vital ingredient in innovation development, hence one of the most important cultural aspects is the level of supportiveness of creativity. Daft, Murphy and Willmott (2017) examine four different designs, described below. First, *Adaptability Culture*, a culture needed for technology focused organizations. It involves flexibility to meet customer needs, a focus on the external environment and encouragement of entrepreneurial values. Second, *Mission Culture*, suited for organizations operating in a stable environment. It is characterized by a clear vision and achievement of goals. Third, *Clan Culture*, common in rapidly changing environments, such as the retail industry. The culture has a primary focus on involvement and commitment of the members. Lastly, *Bureaucratic Culture*, best suited for organizations in a stable environment. It is characterized by an internal focus, methodical approaches and consistency resulting in high efficiency.

When discussing the cultural aspect of business context, management plays a central role, since one of the most important challenges for management is to support the “right” kind of values. The “right” values make the business thrive, while having the “wrong” set of values could be devastating (Daft, Murphy & Willmott, 2017). In other words, management is in charge of determining the corporate culture. This is also examined by Smith (2010), who

states management has to work with developing and maintaining a supportive culture in order for innovation to be accepted. Nevertheless, having a too strong, or set, culture might be destructive as well, since it can make it more difficult for the organization to adapt to environmental changes (Daft, Murphy & Willmott, 2017).

Additionally, management has the responsibility for directing and coordinating the organization. This responsibility is accompanied by authority and *legitimate power*, as Daft, Murphy and Willmott (2017) explain. They also describe that the top management provides strategy and goals to the organization, giving the organization its purpose. The innovation process of a venture is impacted by the management as well, which Smith (2010) illustrates. He adds that when poor, it often leads to innovation failures. Yet, managers seem to often lack competencies. This lack hinders them from identifying new opportunities, which in turn demands a focus on both their cognition and how they receive external information (Annosi, Brunetta, Monti & Nati, 2019). In order to overcome these obstacles, the manager's ability to listen to the surroundings is of utmost importance, as Bryant and Sharper (2021) discuss. Active listening helps to recognize signals of opportunity as well as danger, though the authors emphasize the listening must be without judgement and distraction in order to build a well-functioning listening ecosystem, something many managers oversee.

Nonetheless, there are several contextual factors to be managed, as Smith (2010) discusses. In order to deal with uncertainty, complexity and creativity, he argues that managers have important functions to help stabilize the innovation process. First, planning, which involves future forecasts in order to make decisions that act accurately with desired outcomes. Second, managers' organizing skills, in terms of coordinating working relationships in order to have all skills available where it is needed. The third activity is leadership, which provides the organization with a purpose and a motivational environment. Lastly, managers' control of the process, namely to follow the stated plan, is argued to be important in a context of high degree of uncertainty.

Lastly when discussing the business context, an organization's technological advancement should be examined. Digitalization influences all businesses and regarding the agriculture sector, it is no exception. In other words, "Digitalization may cause the next agricultural revolution as it has a unique potential to make crop and livestock production more efficient and environmentally friendly, thereby creating substantial benefits for farmers, consumers,

and society at large” (Birner, Daum & Pray, 2021, p. 1). However, digital agriculture is dependent on an active digital infrastructure to work, as the authors mention.

The adoption of new technological innovations in agriculture is still slow, as Annosi, Brunetta, Monti and Nati (2019) note. They argue that small and medium-sized enterprises (SME) are the ones mostly focused on smart agriculture, however there are still limitations regarding diffusion. Nonetheless, they mention a few specific factors important for a company’s success. For example, they discuss the opportunity of recognition, the active search for evidence-based knowledge and the supporting external environment.

2.1.2 Institutional context

Today’s business environment is generally challenging, consequently one needs to pay close attention to the institutional environment (Welter & Smallbone, 2011). The institutional context can be divided in two aspects, formal and informal institutions (Welter, 2011). Together, the two are described as the rules to follow in order for entrepreneurship to be accepted.

Formal institutions, described as the political and economy-related rules, either create or restrict the possibilities of exploiting perceived opportunities (Welter, 2011). Both the development of entrepreneurship and the development of entrepreneurs’ behavior are affected by the formal institutions, as Welter and Smallbone (2011) illustrate. Additionally, they argue that formal institutions influence the values and norms of the society, since “the design and operation of formal institutions is directly under the influence of the state” (Welter & Smallbone 2011, p. 109). Examples of formal institutions include laws and other regulations regarding both market entry and exit, as well as regulations regarding private property. Informal institutions on the other hand, are the norms and attitudes formed by society (Welter, 2011). In other words, social rules. These rules both influence the recognition and exploitation of opportunities, as well as the possibility to access resources. For example, different societal roles might restrict or assist the entrepreneur in opportunity exploitation depending on the norms permeating that specific context. Entrepreneurship is highly influenced by the specific values and norms in the society, since these reflect whether entrepreneurial actions are accepted or not (Welter & Smallbone, 2011).

Stable and efficiently operating institutions can reduce risk and uncertainty for the entrepreneur, as well as transaction costs. However, changes in the institutional context might also create entrepreneurial opportunities, since institutional changes might generate uncertainties in the institutional rules (Welter & Smallbone, 2011). The change from one set of rules to another creates weaknesses in the institutional context, which in turn creates new opportunities for innovation. Specifically, gaps in regulations, or other rules, can be exploited by entrepreneurs recognizing possibilities of new innovations. However, entrepreneurs differ in ability to identify and exploit opportunities, as Welter (2011) acknowledges. On the other hand, the author argues other weaknesses in the institutional context, such as a lack of judges or other law specialists, can constrain entrepreneurship. Likewise, the risk of a negative impact by informal institutions is mentioned. Nevertheless, "... an institutional approach to entrepreneurial behavior needs to acknowledge that entrepreneurial behavior might trigger institutional change just as the latter can impact on behavior." (Welter & Smallbone, 2011, p. 114).

2.1.3 Spatial context

When entrepreneurship happens in a specific environment, it occurs in a spatial context (Welter, 2011). Being in a certain location can generate geographical advantages such as key resources and collaboration with other valuable organizations (Zahra, Wright & Abdelgawad, 2014).

Different contexts are often intertwined, which Welter (2011) argues makes it difficult to concretize in which context entrepreneurship actually happens. The community of spatial context often has both social, cognitive, culture and shared meanings. An example of a location with a heavily intertwined context is the district in Sweden called Gnosjö, which is influenced by spatial, business and social contexts. Zahra, Wright and Abdelgawad (2014) discuss that such locations create clusters, with a network sharing information in order to gain organizational learnings. The authors explain how cooperative clusters, between local industries and regional institutions, work as support for new ventures.

However, geographical location may not be as important in the future, as information technologies allow interaction and coordination at a distance (Zahra, Wright & Abdelgawad, 2014). As Lubell and McRoberts (2018) describe, the agriculture sector would benefit from forming a community network. The network should be focused on specialized topics and

include experts who regularly interact to share information and expertise with a diverse set of stakeholders, to close the information gap. For example, by including digital technology specialists from outside of agriculture in the community, who can contribute with knowledge on different technical tools.

2.1.4 Social context

The context where entrepreneurs operate can be either an asset, if supportive, or a restraint (Welter, 2011), and in order to overcome liabilities of a context, social ties may work as an important resource. “Networks can provide financial capital, information, potential employees, or access to clients, but also the emotional understanding, encouragement, and support that family and friends are able to offer.” (Welter, 2011, p. 169). In other words, social relations can encourage opportunity recognition. Further, Baron (2006) describes the benefits of social networks as a pattern recognition. He claims that it contributes to the development of the cognitive framework which can be helpful for entrepreneurs to determine whether new ideas are feasible in terms of being practical and valuable, rather than simply fascinating.

A social network can be described as a constellation of relationships among individuals in social systems, which can happen in a business, through activity or similar processes (Zahra, Wright & Abdelgawad, 2014). “Networks foster the creation, growth and success of new ventures ... Knowledge spillovers from these networks also encourage the formation of new ventures in specific industries or across industries, helping to develop and sustain vibrant and productive ecosystems.” (Zahra, Wright & Abdelgawad, 2014, p. 490). In other words, being a member of a social network helps an individual gather valuable resources, information and get access to a market.

However, the social context does not only affect the entrepreneur when finding opportunities, the context is also affected by the individual actions (Welter, 2011). This indicates recursive links where the social network is a complex system affected by actions from other contexts. Furthermore, Staber and Robinson (2005; 2006, cited in Dacin, Dacin & Matear, 2010) explain that an entrepreneur with a lack of understanding about the norms and values associated with an external social context might encounter cultural barriers. Though, when facing barriers and obstacles the entrepreneurs contact their social network in order to work for a solution (Sarasvathy, 2001).

A valuable source when building networks is ICT, an acronym for information and communication technology (Lubell & McRoberts, 2018). The way people access information and build social connections has changed due to the technology revolution, also in the agriculture sector. The information technologies act as a valuable resource for farmers and their stakeholders to build a network. Though, there is a technology gap between stakeholders' use of ICT in relation to farmers'. The quick information spread of a social network acts beneficial, though the integration with digital technology requires time to adopt and learn. The adoption is connected to diffusion of innovation theory which examines how innovations spread through the population of users, where the acceptance to use these social networks is an uncertainty factor (Lubell & McRoberts, 2018).

2.1.5 Embeddedness

The contextualized view of entrepreneurship is closely linked to the concept of embeddedness. Embeddedness can be described as “a comfort zone whereby an entrepreneur becomes a part of a local structure” (Aggestam & Wigren-Kristoferson, 2017, p. 254). However, the embeddedness perspective does not solely relate to environmental context, “... rather, it is primarily concerned with the study of human practice viewed in relationships with others” (Aggestam & Wigren-Kristoferson, 2017 p. 254). Additionally, the authors describe how more opportunities can be identified if the entrepreneur is embedded in the contexts, since being embedded makes context-dependent resources accessible for the entrepreneur.

An entrepreneur who is dis-embedded is outside the comfort zone and therefore lacks specific resources and misses entrepreneurial opportunities (Aggestam & Wigren-Kristoferson, 2017). In order to move from this sphere of being dis-embedded, the entrepreneur has to build social relations, local networks and gain valuable resources to become embedded in a context. In contrast, one can also be over-embedded in a context, as Aggestam and Wigren-Kristoferson (2017) indicate. They argue that being too embedded might restrain a creative mind and therefore cause one to miss business opportunities. Additionally, this over-embeddedness might result in a closed local network (Welter, 2011).

2.2 Value creation

Stakeholders have different views of what is valuable depending on contextual factors, and these opinions might contradict. Lepak, Smith and Taylor (2007) states there is no general

agreement on what value creation is, or how it is achieved. They describe that the concept refers both to the content, specifically what is regarded as valuable, and the process of creation. Therefore, the authors acknowledge that difficulties and confusions might occur when the concept is named. However, they argue “value creation depends on the relative amount of value that is subjectively realized by a target user (or buyer) who is the focus of value creation” (Lepak, Smith & Taylor, 2007, p. 182). In addition, the perceived value must be translated into a willingness to pay.

The Customer Value Measurement and Identification framework (CVMI), is a practical contribution to research on value delivery, presented by Peralta, Echeveste, Lermen, Marcon and Tortorella (2020). The framework connects lean principles of delivering value to both customers and stakeholders. The authors present five phases – *Ideation*, *Value Prospection*, *Requirements*, *Construction and Measurement* and *Value Delivery* – together creating a logical order for activities to be performed. In addition, they describe the CVMI as a guide on how to develop innovations demanded by the customers. First they explain the *Ideation* phase, which involves obtaining an understanding of customers’ needs and identification of possible development difficulties. Secondly *Value Prospection*, focusing on understanding how to develop the product. Thirdly, they explain the *Requirements* phase, which regards specification of technical requirements based on listed needs. Fourth, the *Construction and Measurement* phase, concerning the determination of relative importance of value features. Fifth and last, the authors describe the *Value Delivery* phase, which contains the evaluation of the potential value delivered to customers. In other words, the framework presents practices transforming ideas into requirements based on customer value by using lean methods and thereby customer development. They describe how the process is cyclical since information is shared interdependently between the steps, a way of working iteratively and experimentally as in a lean startup.

The CVMI framework can be applied both to generate new ideas and to identify customer value in order to understand what is demanded (Peralta, Echeveste, Lermen et al., 2020). Additionally, the authors state value proposition is a crucial function in innovation, since it is closely connected to customer satisfaction. Likewise, Onyemah, Rivera Pesquera and Ali (2013) describe how value is created when the finalized product or service matches the customer needs. The authors emphasize the importance of listening to the customers, since they are the ones buying, and explain there is a greater risk of failing if the product is

finalized without any customer feedback. By gaining extended customer knowledge, through the CVMI, an organization can reduce the risk of developing something the market is not willing to pay for (Peralta, Echeveste, Lermen et al., 2020). The market size depends on customers' demand, which in turn is influenced by various factors such as public pressure (Birner, Daum & Pray, 2021).

Furthermore, the CVMI framework is explored by Peralta, Echeveste, Martins and Lermen (2020). They describe how more and more sustainable solutions are developed by startups. However, they mention how these innovative startups face numerous challenges on the way to establish economic growth and to stay in the market. They discuss a number of reasons behind the high failure rates, for instance they mention a lack of research on the targeted segment and a lack of necessary knowledge. Their study of the CVMI framework focused on three of the phases, Ideation, Value Prospection and Requirements. The authors emphasize how these three phases are especially critical, and how a startup by applying the CVMI framework, instead of the usual "trial and error" methods, can mitigate uncertainties in the business model and update the initial idea to correspond with customers' valued aspects.

2.3 Combined analytical framework

The combined framework (see Table 2.1) facilitates an analysis of findings on several organizations, based on the literature on contexts. When examining organizations' contexts and reviewing the degree of embeddedness in the operating field, a comparison is made in the framework. Thereafter, a conclusion can be drawn on contextual influence in the value process. The context around an organization is often intertwined. However, frameworks often simplify the reality, so in order to make this study comprehensible, the framework simplifies the external environment by separating the four selected contexts, yet maintaining their equal importance. The framework is general, hence intended to be used by all sectors to gain an understanding of how organizations are influenced by their context in the value delivery process. Additionally, the framework helps recognize similarities and differences between organizations' contexts to analyze possibilities with different value delivery approaches, which in turn might affect the strategy decision.

In this study, the framework is applied as a comparison between technological startups in the agriculture sector. The framework is used in the analysis with a purpose to analyze one

context at a time to reach a conclusion on the startups’ possibilities to deliver value. This establishes an understanding of how the technological startups are influenced by the external environment.

Table 2.1: A combined framework

	Organization x	Organization y	Organization z	...	Organization n
Business context	E.g. Listening to surroundings, previous experience				
Institutional context	E.g. Facilitating or hindering				
Spatial context	E.g. Geographical location and market				
Social context	E.g. Connections, facilitating or hindering				
Embeddedness	E.g. Embedded or dis-embedded				
Value delivery	E.g. Acceptance or not				

3. Methodology

In this chapter the structure of the study is outlined along with a description of the study's design and approach. Furthermore, the data collection method and the study's validity and reliability are illustrated. Finally, the ethical considerations and limitations are discussed. The purpose of the chapter is to, by transparency, give the reader an opportunity to take a stand on the study's credibility.

3.1 Research design

To fulfill the study's purpose, a qualitative comparative study was conducted, which Bryman and Bell (2017) describe as a comparison between two or more cases. The study was designed in line with the authors' premise that comparisons expand the understanding of a particular social phenomenon, in this case contextualization. Several technological startups in the agriculture sector were studied, and an analysis was made to create an understanding of the external environment's impact on their value delivery. In order to understand the specific social context, the study was made in a qualitative nature, which Bryman and Bell (2017) describe gives insight into how several respondents' perceive their reality. As well, a qualitative study enabled an in-depth examination of startups with the focus on words and meanings, rather than statistically verifiable relationships (Alvehus, 2013). The lack of research in the area motivated the explorative study with a qualitative design to be conducted for this purpose.

3.2 Research approach

This research's foundation lies in abductive reasoning, a mixture of inductive and deductive. Thus, the abductive approach is in between empirical and theoretical reflection (Alvehus, 2013). The logic behind this approach is that it starts with an introduced problem, which can not be explained with existing theory. This study was based on the perceived problem that the perspective on context had not previously been focused on in the agriculture sector. Thus, social reality acted as empirical material enabling theoretical ideas to be developed, in line with the descriptions by Alvehus and Bryman and Bell (2013; 2017). In other words, the empirical findings were gathered to gain new insights causing the theory to be modified and developed in order to build the study. The theory on contextualization was modified in this

study after new insights were gained from the interviews regarding startups' use of environmental factors in value delivery. This allowed for the most appropriate explanation for the formulated problem to be concluded, in line with the understanding. This indicates the importance of being open-minded and reflecting the data objectively, and not using it to confirm existing understanding (Bryman & Bell, 2017).

3.3 Sampling

3.3.1 Selecting the literature

The study's literature focus on context, which is an important part influencing entrepreneurship:

contextualization can improve the quality of future entrepreneurship research in several ways. It encourages, indeed compels, scholars to become more familiar with the phenomena they are studying ... This can help to develop a deeper and more insightful understanding of the issues under consideration and reveal alternative explanations (Zahra, Wright and Abdelgawad, 2014 p. 494).

The general understanding of the contextual concept has deepened, however a gap was perceived in this research regarding the agriculture sector. Today's literature focuses more on finding the right target group, without considering the external factors and their effect on the value delivery. As Zahra, Wright and Abdelgawad (2014) describe, it is more common to control the contextual variables today, instead of investigating how they are a part of the progress. In order for startups to reach customers they have to listen and ask for what is needed before finalizing the product to make it correspond to these requirements. Thus, selected literature focuses on this topic.

3.3.2 Selecting the study objects

The selection of the study objects can be compared to a *purposive sampling*, which Bryman and Bell (2017, p. 406) describe has a motive to "select cases or participants in a strategic way so that those selected are relevant to the research questions that have been formulated". Startups were chosen based on two factors – their technological operation and their target in the agriculture sector. This study is solely concentrated on the Swedish market to simplify the

interpretation of gained information, since previous knowledge here was accessible. Thus, the search process was based on several Swedish networks such as Hushållningssällskapet, Livsmedelsakademin and Agriventure 2019 to find startups of interest to contact. The interviewees were contacted based on their position in the startup, in order to collect answers intended to fulfill the theory. The purposive selection can not generalize a population, nor can it be regarded as a convenience sample (Bryman & Bell, 2017). The six startups selected to participate in this study were those eager to collaborate and discuss contextual dimensions of their work. This study's purpose was to understand how technological startups are influenced by their context when creating new opportunities. As in this case, the intention was to describe the technological startups external environment and compare the similarities and differences found in their contexts.

3.4 Data collection method

3.4.1 Primary data

The primary data for this study was collected through interviews. The interviews were of semi-structured nature, which means that the questions were asked from an interview form (see Appendix A), but the interviewee had great freedom to design the answers in their own way. This corresponds to the description by Bryman and Bell (2017). The form was created with the purpose of getting answers related to the theory without mentioning the concepts, in order to avoid confusion. Yet, additional questions outside the interview form were allowed as well, in line with Bryman and Bell (2017). This had the purpose of connecting what the respondents were discussing with the underlying theory. However, broadly the interviews were conducted according to the form, in order to stay to specific themes. After transcribing the recorded interviews, interpretation of collected statements was performed in line with the predetermined form (see Appendix B).

3.4.2 Secondary data

The secondary information was mostly retrieved from article databases, such as LUBsearch, as these articles are written by researchers. This choice was made since prior research indicated a need for further investigation in the area. Keywords were used to find the right information, for instance value delivery, value chain, agriculture, agricultural technologies

and context. Moreover, the latest annual reports from the examined startups were analyzed to gain additional information, for instance revenue and number of employees.

3.5 Research quality

A vital part of a qualitative study is interpretation, however this is what makes it vulnerable according to Alvehus (2013). He describes how researchers try to give the reader a more general understanding by interpreting a phenomenon. This directly links the interpretation to theory and problem formulation as well as creates the boundaries of the study. To obtain high trustworthiness in the study, several preventive actions were taken to reduce the risk of subjectivity. In order to evaluate a study's quality, Bryman and Bell (2017) suggest the two criterias *reliability*, describing if the study is consistent and repeatable, and *validity*, which investigates if the study measures and observes what is intended. However, the authors acknowledge that several researchers have discussed the relevance of these criterias for qualitative studies. Thus, an alternative way for quality assessment, by LeCompte and Goetz (1982, cited in Bryman & Bell, 2017), has been applied to this study and is further explained below.

3.5.1 Reliability

The reliability of the study can be impacted by random or temporary errors which lowers the dependability (Bryman & Bell, 2017). For a qualitative study, LeCompte and Goetz (1982, cited in Bryman & Bell, 2017) suggest the reliability should be divided into external and internal for a more specific quality assessment. First, the authors explain that the *external reliability* regards the possibility to replicate the study. It is difficult to meet this criteria when performing a qualitative study, since it is impossible to freeze the social environment to achieve replicability. However, they mention strategies to maintain this criteria, for example the replicator must take the same social role as the first researcher to make the insights comparable. In order to facilitate this, a clear description of research design and approach is given in this chapter. Additionally, the interview guide was constructed to manage the risk of getting different answers from the interviews. However, the semi-structured approach involves the possibility for interviewees to answer freely, why the criteria can not fully be met. Second, the authors explain that *internal reliability* refers to the importance of making an agreement with co-researchers on how to analyze and interpret collected data. In line with

this, continuous discussions were conducted to create equal understanding throughout this research. Additionally, a common interpretation of the theoretical concepts was ensured.

3.5.2 Validity

In a qualitative study there is less focus on the measurements, yet this criteria is consistent with the general description of doing what is intended to do (Bryman & Bell, 2017). LeCompte and Goetz (1982, cited in Bryman & Bell, 2017) explain validity can be divided into external and internal for increased specificity. The *external validity* involves to which extent the result can be generalized to other contexts. They acknowledge that a problem with qualitative studies is that case studies use limited selections. Thus, the external validity might be considered low for this study, since only one aspect and perspective were taken into consideration. The collected data was based exclusively on the Swedish agriculture sector, influenced by Swedish values and norms, making it more difficult to generalize to other situations. However, this was a purposeful delimitation facilitating closer connection with the study objects. *Internal validity* on the other hand, implicates that there should be great conformity between the observations and the developed theoretical ideas. The authors indicate that this usually is a strength for qualitative studies, since the researcher is embedded in the study group for a longer period of time, hence increasing the possibilities of secured conformity. In this study, there was an imminent risk that the interviewees would misunderstand the analyzed theoretical concepts, thus clear questions were asked and specific theoretical terms were avoided. Moreover, the analyzed concepts are anchored in previous research, which facilitated the analysis and further increased the internal validity of the study.

3.6 Ethical considerations

In business research several ethical problems might arise. However, Bryman and Bell (2017) address that there is no consistency regarding what is considered to be unethical. Nonetheless, several ethical principles proposed by the authors were considered to ensure this study was conducted ethically. The first principle recognized was the *information requirement*, including that the interviewees must be informed of included elements and purpose of the study. This was achieved by introducing the study in the initial email correspondence and further explanation was then given during the interview. Thus, this

requirement is regarded to be fulfilled. Second, the *consent requirement* was regarded, containing that the interviewees must know it is voluntary to participate and therefore that they can choose to withdraw. By offering chosen startups the opportunity to decide whether they want to participate in the interview or not, this requirement is considered met as well. Furthermore, the *requirement of confidentiality and anonymity* was acknowledged, concerning that information about those involved must be treated with the greatest possible confidentiality and stored out of reach for others. This was managed by collecting business-related information only, as well as openly asking the interviewee if the company's name could be stated in the paper. Lastly, it is declared that "the participants should not be harmed by the study" (Bryman & Bell, 2017, p. 141), hence it was clarified that if use of quotation, confirmation would be asked for. Additionally, transparency has been strived for throughout the process, making sure to clarify in the interviews that the purpose was to understand what factors made the participating startups successful. As well, we guaranteed the report would be available for them to read. Moreover, the transcripts were stored safely, and due to the General Data Protection Regulation (GDPR) these are not fully presented in the empirical work, however they can be available upon request. In addition, answers were anonymized due to this regulation, yet the startups' names have been revealed to increase interest for them as specific drivers of change in the agriculture sector.

3.7 Limitations

A qualitative study is influenced by subjectivity (Bryman & Bell, 2017). The study is built upon unsystematic perceptions of what to include, hence perception influences the outcome. This factor can limit this study's result, since a similar background in business and economics may have influenced our perspective. Moreover, the startups selected for the study differed in terms of type of solution and geographical location, which also might have limited the result, due to the difficulty of making comparisons and generalizing the startups' environments.

Another limitation of a qualitative study is the difficulty to replicate the investigation (Bryman & Bell, 2017). This study consisted of semi-structured interviews, where the interpretation is based on personal connection, thus the result may be different another time. The analysis was based exclusively on data collected from the interviews, hence there is a risk that the interpretation was biased. In other words, if the interviewees did not answer the question thoroughly, additional information has not been considered. Thus, the study's

conclusion might be limited due to complete reliance on the interview responses. In addition, the interviews were conducted online due to the covid-19 pandemic, which might have further limited the data collection, since interaction online is more complex. However, conducting online interviews was also an opportunity, since it saved time for the interviewees and opened up further flexibility for the authors.

4. Findings

In this chapter information about the technological startups are presented with relevant results extracted from the interviews. First, a further explanation of the agriculture value chain is provided to present an overview of technological startups' functionality. Thereafter, the startups in this study are presented, and the information acts as the basis for the analysis.

4.1 Stakeholder mapping

In order to create an overview of the Swedish market, highlighted in this study, the value chain is further specified to include relevant actors (see Figure 4.1). The chain starts with farmers who produce the raw material, which then is bought by a distributor. One large distributor in Sweden is Lantmännen, who has grain receptions across the country, and also works as an agricultural cooperative conducting research for a more sustainable future (Lantmännen, n.d.). The distributors in turn, deliver the raw material to a processor. For example a company as Skånemejerier who collaborates with actors in agriculture, research and healthcare, in order to produce food and drinks in the most sustainable way (Skånemejerier, n.d.). The processed material, in other words food, continues to a retailer, such as grocery stores, before it reaches the final consumer.

In order to deliver value throughout the chain, there are several supporting actors as well. First, startups, contributing with specific expertise, such as new technological solutions. In addition, startups connect multiple actors in the complex agricultural value chain. Second, universities, contributing with academic knowledge to develop areas in the future. Universities often work together with innovation parks, where organizations can cooperate both with each other and with the school. An example of this connection is the Green innovation park in Uppsala, where academics, industries, businesses, students and creative freelancers co-work (Greeninnovationpark, n.d.). Third, advisory firms, giving professional advice in the agriculture sector, such as Ludvig & Co, (Ludvig & Co, n.d.) Finally, there are various platforms, such as Innovation Skåne and Facebook groups, acting as support as well.

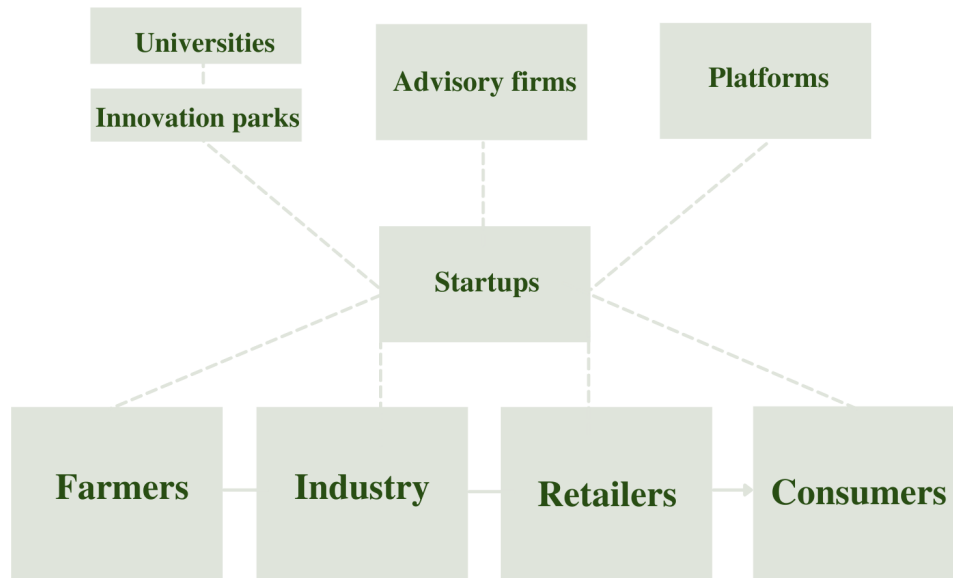


Figure 4.1: Agricultural value chain in Sweden

4.2 Startups

Startups have a vital position in the value chain, considering their contributions to the digital shift. By providing technological knowledge they can develop methods for smart agriculture and keep the agriculture sector updated in line with the digitalization. Presented below are information about the analyzed technological startups from the Swedish agriculture sector (see Table 4.1). Thereafter, findings extracted from the six interviews are presented in the following sections.

Table 4.1: Background information on analyzed startups

Startups	Founding year	Focus	Location	Revenue	No. Employees
BMP Innovation AB (BMP Innovation AB, 2021)	2016	Camera-based infrared technology	Stockholm	30,6 KSEK	5
BoMill AB (BoMill AB, 2021)	2001	Grain sorting	Malmö	57 KSEK	14
Ekobot AB (Ekobot AB, 2021)	2017	Weed management	Västerås	0 KSEK	4
IRRIOT AB (IRRIOT AB, 2021)	2017	Irrigation	Stockholm	302 KSEK	3
Sensefarm AB (Sensefarm AB, 2020)	2013	Sensors	Lund	2702 KSEK	4
Skira AB (Skira AB, 2020)	2016	Digital grain trading platform	Linköping, Västerås & Stockholm	732 KSEK	14

4.2.1 BMP Innovation AB

The interviewee from BMP Innovation AB (interview, 9 April 2021) describes that they automate daily work routines in the agriculture sector, by the camera platform they have developed, including one IR camera and one standard vision camera. With its built-in computer, the camera has the ability to do plenty. For example, the temperature of cows can be measured by applying codes, programming the camera to collect needed information. Another example is programming the camera to measure the size of pigs to confirm they are healthy, growing and moving as they should. The technology is advanced, and in order to program the camera correctly a great technological knowledge base is required.

The company was founded in 2016, and the idea was to integrate high technology into a new market, since it previously was used mainly in advanced industries and the military. The original idea included the development of spectral analysis, looking at light in different subjects to detect mold. However, they had no previous experience of agriculture and after interaction with farmers they understood that even though the idea was interesting, it would not serve a need. The interviewee explains how farmers told them they had to contribute with something proven to work without including a too complex technology. The company chose to target the agriculture market because of its large size, which the interviewee compares with the proportions of the world music industry, and the industry's need for development.

According to the interviewee, the reason for targeting Sweden is that no other country has as many bureaucrats or as high pressure to follow rules and regulations, so if it works in Sweden, it will work everywhere. As well, there is a technology infrastructure in Sweden, and a willingness among farmers to adapt to new technologies. In addition, they work with one company in the Netherlands and one in Denmark, since these markets are quite similar. As well, they have some contacts with a Canadian research institute.

The external connections are not resulting in something revolutionary and even though it is beneficial to listen to different perspectives, it too often results in detailed complaints about for example precision, according to the interviewee. Therefore, BMP Innovation decided to go directly to farmers instead of going through intermediaries, such as Sveriges Lantbruksuniversitet (SLU) and Lantmännen. They started with local farmers from Västervik since it is easier to get statistics by talking to 20 farmers in the local area who are interested, than by trying to hand-pick farmers. The idea is to initially go to individual farmers, getting the solutions adopted, then continuing to larger companies and lastly distributors. Some farms have a visitor center and these are explained to be advantageous to interact with, since they are usually open to new activities. However, these farms might be overly positive and adopt anything, since they want to be in the forefront. Therefore, BMP has used contacts and other third parties to get in contact with farmers not used to visitors, who presumably give a more realistic response.

The acceptance from farmers is, as the interviewee describes, relative. An important factor affecting this is the time horizon, widely varying between investing in a machine, building a barn or planting a forest. As well, the political rules have changed over the years, impacting the acceptance from farmers. Things you once received a fine for, you nowadays can get imprisoned if you do, the interviewee describes. In addition, the farmers do not want new things or new tasks, they want to eliminate or simplify the tasks. The interviewee brings up drones as an example, and suggests those are excellent for a forest farmer, since they simplify work by removing the need to walk around to track the area. On the other hand, for a crop farmer it is enough to throw an eye at the field, since they do not usually walk around inspecting the entire field in detail. The interviewee explains that in this case a drone would add on, in terms of learning the technique and extra costs, causing the farmers to lose interest.

Professors, as well as others from universities, regularly sell new technical solutions attempting to save the world, but too often not in line with farmers' needs. The interviewee

mentions an anecdote about how to think and react when approaching farmers, trying to understand their reaction to new solutions. The anecdote is about a company wanting to understand farmers' problem with keeping a desired level of grains in their silos. If the silo is filled too early the cost rises due to extra deliveries, and if it is filled too late it risks getting emptied. The problem has for many centuries been solved by using a wooden stick to strike the silo and estimating the level of grains through the sound. Yet, the company tried to develop a measuring machine for the roof instead. However, this was expensive and farmers did not want to pay for it, since they could use the cheap wooden stick. The interviewee explains that if you want your solution to be accepted, you can not exceed the existing prices too much.

There are no laws or regulations hindering the development of BMP Innovation's technology according to the interviewee, however farmers have lots of rules and regulations to comply with, such as everyday inspection of pigs. These rules can be interpreted in different ways and therefore the interviewee describes that BMP Innovation adapts to the farmers' way of relating to the rules. However, all regulations and new ideas faced by farmers have made them resistant and the interviewee says they have learned not to listen to it all. Therefore, it is important for an outside company, such as BMP Innovation, to learn from the experts, namely the farmers. The interviewee acknowledges that they do not try to be professionals in the agriculture area, instead they are honest with their non-expertise, ready to listen and learn. Eventually, farmers understand that BMP Innovation wants to create a working solution, consequently they gain trust and a good reputation, the interviewee explains. In other words, they try to be on the farmers' side by seeing things from their perspective.

Gaining farmers' acceptance is complex, and the solutions welcomed by some, are not accepted by others. The interviewee explains that some farmers resist because they think what they are doing is completely unique. Another anecdote the interviewee mentions is about a man from Kansas, who had studied at the University where he observed the process of plowing. He saw the process was based on farmers' conservatism, doing what they always have done. Specifically, they were feeling when the ground was soft enough and kept track of their neighbors. Though, this was not the optimal solution and therefore he calculated the best time to plow, but everyone was against him. Finally, one farm was willing to try his method which increased their return by three percent. This proved that centuries of tradition needed to be revised, since modern equipment enabled the work to be done at any time, not

just when the soil was soft enough. When the farmers understood this, they went from being against the solution, to approving it in only a year or two. Though, the interviewee explains he understands the resistance in this sector, since farms often are managed by the same family through generations, making it a lifetime of investments where bringing new solutions clearly is a risk. In addition, the interviewee describes that by discussing ideas with other companies, new perspectives are gained to facilitate implementation. BMP Innovation participates in some projects, but mainly the discussion consists of criticism and complaints according to the interviewee. However, it is beneficial to be part of the discussions and contacts can be tied for future collaborations. The interviewee confesses that some contacts have already resulted in new ideas being developed, where technological competencies are merged.

In addition to answering the interview questions, the interviewee emphasizes several interesting perspectives in need of further examination. First, he mentions the value chain and its money flow. There is an imbalance where actors such as industries and retailers make a huge amount of money, while farmers have to apply for subsidies since they do not earn enough. The interviewee argues that further understanding of the unfair money flow is necessary, and the fact that those owning the production earn the least needs to be examined. Second, the agriculture sector has to gain interest for investments, because if companies would invest more money, development would be possible. Greenwashing is common in this area and companies invest money because it looks good. If the agriculture sector allowed more freedom and flexibility, technological companies would dare to try new solutions even with the risk of failure, which the interviewee claims would be beneficial. To conclude, a changed attitude towards development is required in the area. The interviewee continues by explaining that big companies need to be more risk averse and flexible in trying new innovative ideas since there are considerable gains.

4.2.2 BoMill AB

The interviewee from BoMill AB (interview, 14 April 2021) describes that they have developed a unique quality technique for sorting grains. Previous techniques only inspect the outside of the grain, while BoMill's advanced technology allows sorting on an industrial scale based on inside qualities. Some techniques for inside inspections exist, however these processes only result in average conclusions since the technique only handles sample tests. With BoMill's technology the sorting can be done with higher precision. The company is based in Sweden, but they identify themselves as an international company. The interviewee

describes that historically companies start small before they expand. He explains that usually a Swedish company develops their business in Sweden, then targets Scandinavia, then northern Europe and so on. In contrast, BoMill's focus is on the global market, starting with Europe and North America.

BoMill's founder saw a need for homogeneity in the sorting process due to his work in the brewery industry. In other words, he perceived a gap in the market which he acted upon right before retirement. The gap is explained to be a result of existing regulations regarding limits on certain toxins in grains for industry use. If the amount of toxic substances exceeds the limit it is instead sold as animal food, resulting in a lower income for the farmer. The lack of precision in measuring the amount of toxins was what drove the realization of the idea. The founder's previous work, having contact with factories and industries regarding grain supply for productions in the brewery sector, was in close connection with the agriculture sector and grain sorting. Additional connections in agriculture have also been made along the way, the interviewee mentions.

The connection with customers is explained as a combination of direct sales through BoMill's own sales departments and distributors. When reaching out to customers, the interviewee acknowledges that their solution meets both acceptance and resistance. The interviewee explains that in terms of toxins, the customer gets true advantages with BoMill's solution. Acceptance is reached by understanding the customers needs, or sometimes even the needs of their customers customer, since it is a long chain of stakeholders in crop production. The interviewee explains that farmers could benefit from the possibility to sell larger amounts of grains to a higher price, due to lower toxins levels, and the distributor could benefit from the possibility of selling to a higher price to their customers. Likewise, the interviewee explains that resistance is met due to the long line, and the fact that BoMill's customer is an intermediary and not the one experiencing the problem. It is a new complexity. BoMill is in contact with a variety of other companies to discuss the complex issue and cooperate with organizations to spread the word about their solution. As an example they interact with a German company, having a strong position in the brewing industry. The interviewee describes that they work together and do various tests to gain new knowledge in order to strengthen BoMill's selling points.

4.2.3 Ekobot AB

Ekobot AB is a technical company using robotics to develop the agriculture sector. The interviewee (interview, 20 April 2021) specifies that their focus is on row cultivated vegetables for food consumption. Ekobot is a Swedish company focused on the Swedish market, but the domestic market for vegetable cultivation is too small, hence they intend to enter the Dutch market as well.

The idea began with one of the founders wanting to act for the younger generations, in terms of ensuring access to healthier and more sustainable food. With a background within IT and electronics, the work with robotics and autonomous technology became self-evident. The interviewee also explains that early contacts were made with specialists within cultivation to understand arising problems in the agriculture sector. Additionally, the interviewee describes that a successful entrepreneur helped with the idea creation. In a later stage, Ekobot reached out to Research Institutes of Sweden (RISE), SLU and Hushållningssällskapet. The interviewee illustrates how these parties worked together in the creation process and that the project later on received funding from Jordbruksverket as well. Additionally, the interviewee mentions further information about agriculture is gained from both SLU and an employee with expert knowledge in onions. Regarding external factors, such as rules and regulations, the interviewee explains that there has been a shift in the use of pesticides due to introduced bans. This imposes a need for other ways of controlling weed and the interviewee implies that this is where Ekobot's solution becomes relevant. However, the interviewee also mentions that there are some regulations regarding autonomous vehicles that could hinder their solution. In addition, covid-19 is mentioned as a driving factor, since precision work needs to be done without the help from seasonal workers, which is what Ekobot does.

To get in contact with customers, the interviewee explains that Ekobot works with direct sales for the coming two years. However, from 2023 they will search for sales partners and already from 2022 they will have partners for support and installation. The interviewee explains that Ekobot's closest customers perceive their solution as a new way of solving a serious problem. It may not be the cheapest, but it simplifies farmers' work with pesticides. Additionally, the interviewee mentions that Ekobot wishes to solve farmers' problematic combination of producing more on the same area with less inputs, by doing the work autonomously with higher precision. No resistance has yet been met, but the interviewee acknowledges that in order for farmers to accept Ekobot's solution a courage to make the technological shift is

crucial. The interviewee describes that Ekobot continuously discusses their solution with the initially formed community, to gain new insights. As well, they have an ongoing project with a Dutch research institute where technological solutions are discussed. The interviewee also describes that as a listed company they get questions daily regarding their position and financial status. Lastly, the interviewee describes that Ekobot has an energy project, which Energimyndigheten in Sweden finances, where their technology is compared with existing to measure how many carbon dioxide equivalents one saves with Ekobot's solution.

4.2.4 IRRIOT AB

IRRIOT is a company working with irrigation systems, which the interviewee from IRRIOT AB (interview, 14 April 2021) explains. Every farmer has some sort of irrigation infrastructure, consisting of hoses, valves and other water sources. The interviewee describes that IRRIOT connects smart technology to the irrigation system, connecting it to sensors. The company was founded in 2018, and during 2020 they began selling their solution, focusing on Sweden. During 2021 the interviewee explains that they expanded their horizon by looking into Germany, France, Spain and Italy as well. Later on, during 2022, they intend to expand to Eastern Europe and Northern Africa before reaching globally.

The interviewee describes how the idea came about when one of the founders was going abroad. He experienced a problem regarding the ability to water his plants while being away from home and a first prototype was built. The prototype turned out successful and he contacted a friend to start the company. However, none of them were experienced entrepreneurs, thus they searched for someone with previous entrepreneurial experience and through mutual connections the interviewee explains he was contacted and asked to join the company. Still, they lacked knowledge in the agriculture sector. However, through the journey they have gained three to four years of experience and the interviewee explains that from the beginning they have been in close contact with farmers. The interviewee adds that other contacts have been crucial as well. First, capital needed to be raised, thus business angels were reached through pitches and grants were collected from Almi, Vinnova and Jordbruksverket to mention a few. Second, the prototype creation, including tests and close dialogs with farmers to find out advantages and disadvantages. Third, product development, where the technical solution was done in-house, but a design bureau was contacted for the industrial design. Two of IRRIOT's founders are Russian and through their network a Russian company was hired, since the Swedish alternatives were too expensive according to

the interviewee. Thereafter, the production phase started and contacts were made with manufacturers for printed circuit boards, additional hardware and covers, while the assembling was done manually until the beginning of 2021, when a Lithuanian company was hired to do this. Luckily, the interviewee explains that no laws or regulations, other than GDPR, have affected their product development. However, he acknowledges that some countries have stronger doubts, since IRRIOT's solution includes radio communication which some regimes have prohibited.

Even though some regimes raise more suspicions, the interviewee explains that they most frequently get positive reactions. To demonstrate the product, they planned to be at various exhibitions, however the interviewee explains that most of these have been canceled and the plans changed. Consequently, IRRIOT does marketing campaigns along with pitches directly to farmers instead. The interviewee describes they have competitors in the market, however their solutions are not wireless as IRRIOT's. Competing solutions consist of cables underground, greatly inconvenient when damaged, hence IRRIOT's wireless solution comprises great advantages appreciated by farmers. Nonetheless, the interviewee acknowledges that they also meet skepticism among farmers. Most farmers are not used to this technology since a majority are born in the 40s or 50s, and also the younger generations raise concerns regarding this new technology. However, the interviewee describes that if someone else seems to appreciate the solution, farmers buy it. For example, when their solution was sold to a plant nursery in Ängelholm and they were pleased, IRRIOT soon received orders from others nearby. Apart from these contacts, the interviewee mentions that they have been accepted to various startup accelerators to discuss their solution, but according to him these have not been as beneficial as hoped.

4.2.5 Sensefarm AB

The interviewee from Sensefarm AB (interview, 14 April 2021) describes their business idea as the development of visualization systems with sensor data, mainly for agriculture and sugar producers. As the interviewee describes, they started as a consulting firm creating technical innovations, such as apps to measure the temperature in outdoor storage of sugar beets. The business idea was a solution for beet placement, keeping them from freezing and getting stuck since that releases enzymes causing cells to break down and rot rather quickly. In turn, this results in an undesired kind of sugar, imposing a need for filters in the factory. The process continued with experiments on a consulting basis with measuring equipment,

however the product idea was not desired to be further developed by the consulting firm. In other words, they supported the idea, but wished it to be developed by another company, and so Sensefarm AB was founded in Skåne in 2013, starting as a global company. Sensefarm is based in Lund at Ideon Science Park, a hub around innovations and entrepreneurship, which the interviewee describes as a unique environment. The interviewee explains that he is described as a serial entrepreneur with great experience of starting companies and already at an early age securing valuable contacts. It was his previous experience in venture creation and development of technological solutions that led to Sensefarm, however he acknowledges he was lacking experience in the agriculture sector.

Originating with no experience in agriculture, the interviewee explains he had to learn that agriculture is not one market, but around 30 different. Therefore, Sensefarm's business idea will work in some sectors, but not in others. As an example the interviewee describes that if a farmer has either a leasehold, or fields at a distance, the sensor assists the monitoring, but if the fields are situated right by the house it is not as attractive. Thus, the farmers' situation affects the acceptance. Fortunately, the interviewee explains that no laws or regulations affect their business yet. However, they are aware that extremely many laws exist in the agriculture sector which farmers need to adjust to, such as regulations regarding automation of reporting. The interviewee explains that Sensefarm has not reviewed these any further, since it is impossible for a small company to be the driver of any bigger changes.

In order for the company to gain contacts and spread their business idea, the interviewee explains they have participated in Borgeby field days and other fairs in both Germany and Denmark, interacting and discussing with colleagues and potential partners. However, due to a lack of experience, the interviewee has faced some barriers creating this network. An example he gives was a contact who questioned if he even had agriculture in his DNA. Nonetheless, the interviewee mentions that Sensefarm is invited to Hushållningssällskapets meetings where they can discuss possibilities with sensors, how they work and what benefits they bring. According to the interviewee, these meetings are beneficial due to the developed understanding of problems farmers face and how the product can be promoted. The interviewee continues by telling that they are a part of both LRF and a few Facebook groups for farmers where they listen and try to understand the discussion and their vocabulary. Lastly, the interviewee adds that Sensefarm also is part of networks regarding technology, where web-systems and backend-systems are discussed.

Understanding of the agriculture sector is extremely important, especially when facing resistance from farmers. The interviewee describes that solutions are often developed by a researcher, or student, believing their solution is needed in the sector, however too expensive and time-consuming to implement. Often resistance is built on previous failures the farmer has experienced when trying out new technology. The interviewee indicates that the majority wants to have their neighbor vouch for the solution in order to easier adapt oneself. In other words, if something is proven to work, positive word-of-mouth is spread. Unfortunately all benefits are not easily observable due to external factors, such as the weather, impacting the results. For example, the interviewee describes that if one year it is highly profitable to harvest potatoes, the next year everyone grows potatoes. Additionally, the interviewee points out that other mechanisms control the profitability of the harvest from year to year, but adds that Sensefarm's sensor can contribute with some percentages helping the farmer make the best decisions. However, it is difficult to calculate how much one can earn from using Sensefarm's solution. The interviewee adds that the machines used in agriculture move automatically nowadays and that startups have to consider which solutions farmers would accept. If the solution adds tasks and at the same time requires more money, it will not be adopted. Nonetheless, the interviewee describes that Sensefarm gets positive feedback as well, mostly from those used to working digitally for example with Excel sheets. In other words, the ones already using data will benefit from applying more factors to create more accurate calculations.

Even though the sensors can be used in agriculture, the interviewee mentions that the largest market may turn out to be smart cities. The same type of sensors are used to measure moisture, vegetation and equivalent. Additionally, smart cities often have better finances, thus are able to count on it differently. Therefore, the interviewee describes that Sensefarm most probably will focus on these gardens, which can be influenced more easily.

4.2.6 Skira AB

Skira AB is described as a digital trading place for grains by the interviewee (interview, 8 April 2021). The platform is used to help farmers get better paid, and to help buyers pay less through transparency and optimization of transportation. The customers are described by the interviewee as grain farmers, mills, cultivation factories and animal farms. In other words, they reach out to both farms and industries. The interviewee explains that Skira has a focus on the entire Swedish market for grains, oilseeds and legumes.

The idea started as a project outside agriculture. However, the interviewee describes that he grew up around farmers and has numerous childhood friends with farms, consequently identified a transparency problem in the sector. Farmers are clueless about neighboring farms' payments, resulting in difficulties when they try to streamline their business towards the buyers. This was, according to the interviewee, the start of Skira's idea. Furthermore, the interviewee mentions an interest in investigating and developing things, in other words a willingness to make a change. The interviewee explains he was studying at the time, thus started to develop the idea on evenings and weekends, having a mindset and goal of changing the grain trade market by creating higher profitability and higher sustainability.

Except being surrounded by friends in the sector, presenting initial knowledge, the interviewee explains Skira brought in additional actors to gain valuable information which these friends could not assist with. The interviewee estimates he called about 30 different actors, such as traders and buyers in the market, to investigate the need for this solution. However, everyone was against it, so the interviewee explains he had to understand why the market was not ready for it. Thereafter, Skira received help from LiU Innovation and other incubators, such as Create in Västerås, and the way became more straightforward. In addition, contacts through networks, with companies targeting the same customer segment, were made to discuss shared issues. As well, Skira is a part of an accelerator to discuss food tech. These contacts are very important according to the interviewee. Not only does Skira gain valuable information, others can get help from them as well. As an example, the interviewee explains one person contacted Skira in order to get help building a website for construction services. Even though they had a completely different target group, their platforms are somewhat alike. A platform, like Skira's, is not impacted by any rules or regulations according to the interviewee. However, the interviewee acknowledges that GDPR may have facilitated the creation, since data is more easily available. Though, he emphasizes more rules regarding sustainability would be beneficial for food production as well.

Food production and the farmers involved are described to be highly traditional by the interviewee, who adds that due to this the contact has been done in several ways. In order to get in contact, Skira has called, emailed and texted. They have tried almost everything to interact. However, Skira has now employed grain brokers who perform the everyday calls. Furthermore, they have ongoing partnerships with advisory firms, in order to keep valuable contacts and share information between different actors, not only regarding sales. The

interviewee explains everyone is overly positive to their solution. Though, he is aware that customer reactions highly depend on which group they choose to target. The interviewee explains they are focusing on the early majority, the first group explained in the theory of crossing the chasm. Nevertheless, everything is about the price, because if Skira can offer farmers more money, the farmers will save time and their work will be easier. As well, the interviewee explains farmers already are used to auction sites, and as an example he mentions Klaravik where one can sell and buy machines. Even though the behavior is easily accessible for farmers, resistance is met on the buying side, according to the interviewee, since the buyers are more used to interacting directly. The anonymous sales are a big change for them.

5. Analysis

In this chapter an analysis of submitted data on the startups is presented, with the literature review as support. The data is contextualized in four aspects, namely business, institutional, spatial and social. Additionally, the degree of embeddedness is analyzed in this chapter along with a discussion on the value delivery process. Thereafter, a summary is made including the analytical framework.

5.1 Business context

The individuals involved in the business context are shaped by the specific economic features differentiating countries and by managerial practices characterizing organizations, therefore this context is interesting to analyze (Griffin, 2007). As well, contrarily, the individuals shape the business context, hence the organizational context can be perceived as an outcome of behavior (Mowday & Sutton, 1993). This was the case for Ekobot, where working with robotics and autonomous technology became obvious due to a background within IT and electronics. Likewise, the interviewee from Sensefarm described that he can be portrayed as a serial entrepreneur with great knowledge about starting companies. He added previous behavior and experience was what led to the establishment of Sensefarm. Also, the interviewee from Skira expressed that his personal interest in investigation and development in order to make a change was an essential component in the idea development.

An organizations' business context can also be interpreted through the organizational culture. As Daft, Murphy and Willmott (2017) explain, culture guides everyday work, integrates members and helps the organization adapt to their external environment. The interviewee from BMP Innovation described their initial idea, regarding mold detection through smart technology, was not needed by the farmers. In other words, farmers' culture did not approve the proposed solution as part of their day-to-day work. Culture however is an ambiguous phenomenon, unique to each organization (Smith, 2010), and it can be described as the values, norms and guiding beliefs shared among the organization's members (Daft, Murphy & Willmott, 2017). Thus, in order to collaborate it might be helpful to understand partners' culture to create a common ground. However, this is sometimes difficult, which the interviewee from Skira highlighted. Growing up among farmers he identified a transparency

problem in the agriculture sector, where farmers lack knowledge about one another resulting in difficulties when trying to make the businesses more effective.

Nonetheless, depending on the organization's focus, different cultural designs could be suitable. The "right" culture is especially important in terms of innovation, since some are more supportive than others, which Smith (2010) emphasizes. In this regard, he argues the most important aspect is the level of supportiveness of creativity. In line with this, Daft, Murphy and Willmott (2017) describe that Adaptability Culture and Clan Culture suit changing organizations. Thus, due to the ongoing technological revolution in agriculture, there is a need for flexible cultures. The interviewee from BMP Innovation mentioned there is a willingness among Swedish farmers to adapt new technologies. However, he also mentioned farmers clearly have stated organizations need to provide something with a rather simple technology, proven to work, in order to become successful. This indicates an inflexibility, in terms of readiness for a technological shift, among farmers not consistent with the needed cultural design.

When analyzing organizational culture, management has a crucial role in deciding the "right" values, that is determining the corporate culture (Daft, Murphy & Willmott, 2017). The interviewee from Sensefarm said their development process was iterative, thus indicating a supportive flexible culture. However, the idea was not desired by their original consulting firm, in other words the culture did not contain the right values. Likewise, a too strong culture might be destructive, making it difficult for the organization to adapt to a changing environment (Daft, Murphy & Willmott, 2017). The interviewee from Skira described farmers as highly traditional, so did the interviewee from BMP Innovation. The anecdote he told about the wooden stick, stating the importance of understanding farmers' attitude towards new solutions, implied farmers are conventional and not eager to try new things. Thus, corresponding to the fact that a set culture might be damaging.

Apart from deciding organizational culture, management is responsible for the coordination of organizational activities and provision of goals and purpose (Daft, Murphy & Willmott, 2017; Smith, 2010). The interviewee from BMP Innovation described they work to automate daily routines by developing a camera platform with immense abilities. This can be interpreted as a goal set by their top management, while the description of their work with external connections are related to pre-decided activities. For BoMill, the goal can be understood as improving precision in grain sorting, since the interviewee explained that they

have developed a unique technique for the task. BoMill's activities on the other hand, are described as connection building, as they work both with partners and with farmers through direct sales. Ekobot's activities are described correspondingly, however their goal is different since they aim to simplify vegetable production by using robotics. Moreover, IRRIOT's goal can be understood as implementing smart technology in irrigation in order to streamline the use of such systems. Regarding activities, these have been altered and re-considered by the management. Likewise, the interviewee from Sensefarm explained they had to re-think their plan, since the consultancy firm they worked for did not want to establish their solution. Their goal can be interpreted as developing visualization systems for agriculture and simplifying the work by using sensor data. In order to spread their idea, they have participated in various fairs to interact and discuss, which can be understood as the organization's activities. Interaction is also mentioned by the interviewee from Skira, as part of their solution, and their goal can be understood as providing a transparent digital trading place for grains. As well, the interviewee mentioned contact through various media and information sharing through advisory firms, which can be interpreted as their activities.

Even though management decides the goals and activities of the organization, they often lack competencies. The interviewee from IRRIOT explained the founders lacked entrepreneurial experience, however after realizing they decided to bring him in. The ability to listen to one's surroundings can also make it easier to overcome barriers (Bryant & Sharper, 2021). In line with this, the interviewee from Skira acknowledged he had to understand why the market did not want their solution. Therefore, he listened to the potential customers. As well, active listening can facilitate opportunity recognition, which is the case for BoMill as previously explained.

Lastly, organizations' technological advancement should be investigated when discussing the business context. Digitalization influences all businesses, and as discussed by Birner, Daum and Pray (2021) it can cause the next revolution in agriculture. However, it is dependent on an active digital infrastructure, which the interviewee from BMP Innovation mentioned already exists in Sweden. Thus it should not be too troublesome. As well, the interviewee from Sensefarm acknowledged machines in agriculture move automatically and added that those already used to working with data will benefit from extended use. Likewise, the interviewee from Skira explained farmers already are used to online auction sites, however the industrial buyers are not. Thus concerns have been raised regarding that new technology

introduces new work tasks, corresponding to the discussion by Rübcke von Veltheim and Heise (2020). Several interviewees mentioned they meet resistance and concerns when introducing their solutions. The interviewee from IRRIoT explained they meet resistance both among younger and older generations, and the interviewee from BMP Innovation acknowledged resistance most likely exists due to farms being managed through generations, creating a long line of traditions. However, the anecdote he told about Kansas clarified farmers trust modern solutions if they are proven to work. Correspondingly, the interviewee from Sensefarm indicated the majority trust a solution if their neighbor vouch for it. Though he added other mechanisms control the profitability of the yearly harvest as well, making it difficult to calculate the earnings in the sector. The interviewee from Skira also discussed the question of farmers earnings, and recognized they need to offer higher profits to farmers in order to succeed.

Factors such as type of farm, structure and location also impact the adoption of new technologies. In line with this, the interviewees from BMP Innovation and Sensefarm discussed differences between farms, regarding farms with visitor centers respectively farms with remote fields. Conclusively, acceptance is complex and acknowledgment of the solution is uncertain. In order to deal with uncertainty, complexity and creativity, Smith (2010) argues managers have to plan and make future forecasts to be able to stabilize the innovation process and to reach desired outcomes. This kind of planning was mentioned by the interviewee from BMP Innovation, who stated they act upon farmers' request for new innovations. As the interviewee explained, forest farmers have a need for drones while crop farmers do not. This indicates the importance of planning in order to target the right customer with the right solution, hence lowering the acceptance uncertainty.

To conclude, the startups' business context (see Table 5.1) is related to several parts of the value chain being outlined in the stakeholder mapping. In other words, the development of new solutions is not only influenced by the business context of the specific startup. The business context has been both facilitating and hindering the development of the startups involved in this study, and the general agreement is that an understanding of existing problems in the sector is of utmost importance to succeed .

Table 5.1: Startups' business context

	BMP Innovation AB	BoMill AB	Ekobot AB	IRRIOT AB	Sensefarm AB	Skira AB
Business context	Listening to surroundings to understand needs	Previous experience, listening to surroundings	Previous experience in IT	Lack of entrepreneurial experience, but retrieved	Serial entrepreneur, iterative and flexible work	Personal interest in making a change

5.2 Institutional context

The stakeholder mapping indicates startups need to relate to multiple actors in today's business environment, and as Welter and Smallbone (2011) argue, this imposes a need to consider the institutional context. Institutions can be divided into formal and informal aspects, together describing the rules to follow (Welter, 2011). Formal institutions include both political and economy-related rules (Welter, 2011). All interviewees argue no formal institutions have hindered their innovations from being introduced to the market. Still, rules can act as guidance when establishing business ideas. The interviewee from BoMill described their idea was formed thanks to existing regulations regarding toxins. The same applies to Ekobot, where the interviewee explained bans on pesticides imposes a new need which their solution satisfies. However, he acknowledges regulations on autonomous vehicles might be hindering. Likewise, prohibitions on radio communication established by some regimes could interrupt IRRIOT's process. Though, no other laws or regulations, except GDPR, have affected their development to a greater extent as the interviewee explained. As well, the interviewee from Skira mentioned the influence of GDPR, however as helpful, adding no other rules or regulations have impacted their process. In addition, the interviewee from BMP Innovation did not mention any impact of rules or regulations either, nor did the interviewee from Sensefarm. However, both acknowledged farmers have lots of regulations to comply with. Additionally, the interviewee from BMP Innovation declared they have had to adapt to farmers' way of relating to these rules, since interpretation can be done in several ways.

Moreover, the interviewee from IRRIOT described that due to the formal institutions in some countries, farmers in these locations raise more suspicions. In other words, informal institutions are affecting the acceptance of their irrigation solution as well. Informal institutions are described as societal norms and attitudes (Welter, 2011), affecting whether entrepreneurial actions are accepted or not (Welter & Smallbone, 2011). According to the

interviewee from BMP Innovation they target the Swedish market since there is a compelling need to follow rules and regulations. This can be interpreted as Swedish norms being favorable for innovative solutions working in accordance with current laws.

However, the interviewee from BMP Innovation acknowledged that over the years there has been a shift in the political rules, for instance increased penalties, which has impacted farmers' acceptance of new solutions. This corresponds to Welter and Smallbone (2011), discussing how changes in the institutional context might create entrepreneurial opportunities. In line with this, the interviewee from Skira also discussed the importance of changed rules in food production. He emphasized more strict regulations on sustainability would be highly beneficial for the market. Welter and Smallbone (2011) argue such institutional changes could emerge from entrepreneurial behavior, however the interviewee from Sensefarm experienced smaller companies struggle driving any bigger changes.

Conclusively, all interviewed startups admit their institutional context (see Table 5.2) has impacted their value creation, either direct or indirect. Some institutions have facilitated the development, others have hindered, and the experience differs between the startups. However, the general agreement is that rules and regulations influenced the development process positively.

Table 5.2: Startups' institutional context

	BMP Innovation AB	BoMill AB	Ekobot AB	IRRIOT AB	Sensefarm AB	Skira AB
Institutional context	No impact, but awareness	Facilitated discovery of gap in the market	Facilitating, but could be hindering as well	Somewhat hindering	No impact, but awareness	Somewhat assisting

5.3 Spatial context

The certain location of an organization gives access to key resources, as well as valuable connections with other organizations (Zahra, Wright & Abdelgawad, 2014), hence this is an important factor for successful development. BMP Innovation is based in Stockholm, focusing on the Swedish market because of the amount of rules farmers in Sweden have to adapt to, thus if it works here it will be feasible anywhere. In addition, the interviewee described that BMP Innovation has connections with companies in similar markets outside of Sweden to discuss their businesses. One company in the Netherlands, one in Denmark and a

Canadian research center. This can be connected to the discussion by Zahra, Wright and Abdelgawad (2014) about how the community of a spatial context often is intertwined with social, cognitive, culture and shared meanings.

However, the specific location is not as important any more as information technologies allow interaction and coordination at a distance. This is the reality for BoMill, since the company is established in Malmö, but focused on the global market having interactions and community building mostly outside of Sweden. On the contrary, IRRIoT with its headquarter in Stockholm, started to focus on the Swedish market before expanding globally in the future. Likewise, Ekobot builds strong relations in Sweden, more specifically Västerås. However, their solution can not be used in the same width locally, as in countries focusing on vegetables, so they will enter the Dutch market as well. Already, they have an ongoing project with a research institute there, discussing technological solutions. Furthermore, the interviewee from Sensefarm described they are part of Facebook-groups for farmers, where they listen and try to understand the ongoing discussion, which also can be interpreted as interacting through information technologies.

The locations and key actors where the organizations are located, can create clusters (Zahra, Wright & Abdelgawad, 2014). One example is Ideon Science Park in Lund where Sensefarm is located. The interviewee described it as a hub around entrepreneurship and innovations, and according to the value chain outlined in the stakeholder mapping, this can be interpreted as an Innovation Park. As Zahra, Wright and Abdelgawad (2014) further mention, cooperative clusters between local industries and regional institutions work as a support for new ventures. In other words, their unique environment gives access to key resources and valuable connections. Also the interviewee from Skira described how they utilized local Innovation Parks to help realize their idea, namely LiU Innovation in Linköping and Create in Västerås.

To conclude, the different locations have supported the startups in different ways (see Table 5.3). For some, the specific spatial context helped turn their idea into reality by the cooperation and close contact with local incubators. However, increased digitalization allows coordination at a distance, hence it simplifies interaction between actors regardless of location. Thus, the specific geographical location is no longer as crucial for support.

Table 5.3: Startups' spatial context

	BMP Innovation AB	BoMill AB	Ekobot AB	IRRIOT AB	Sensefarm AB	Skira AB
Spatial context	Base: Stockholm Market: Sweden	Base: Malmö Market: Global	Base: Västerås Market: Sweden & Holland	Base: Stockholm Market: Sweden, global in future	Base: Lund Market: Global	Base: Linköping, Västerås & Stockholm Market: Sweden

5.4 Social context

The context can be both supportive and prohibitive (Welter, 2011), and in order to overcome liabilities of a context social ties may work as important resources. This corresponds to what the interviewee from BMP Innovation explained about their first business idea, which was to develop a spectral analysis. After interaction with farmers, they understood the idea would not serve a need. In other words, social interaction with both farmers and other companies gave them a new perspective, crucial for their survival. This can also be connected to Baron (2006), explaining the social network as an assistance for entrepreneurs to determine whether new ideas are feasible, in terms of being practical and valuable, rather than simply fascinating. Though, participating in projects can result in criticism and complaints, thus the interviewee from BMP Innovation explained they do not go through intermediaries as SLU and Lantmännen. Moreover, he explained they are in contact with companies outside of Sweden with similar markets to discuss homogenous problems.

All startups in the study agreed social interactions work as an important resource. According to the interviewee from BoMill, cooperation with other organizations can facilitate the understanding of complex issues since it opens up for discussions. He explained they have contact with actors in the agriculture sector, and other industries, regarding grain supply for brewery productions. In other words, BoMill is part of a social network. The social network can be described as a constellation of relationships among individuals in a social system which foster the creation, growth and success of new ventures (Zahra, Wright & Abdelgawad, 2014). This corresponds to what the interviewee from Ekobot explained about their connections. Early in their development process, Ekobot made contacts with specialists in order to understand arising problems with their idea. They continued to interact with different actors, such as RISE, SLU, and Hushållningssällskapet, as well they had contact with Jordbruksverket, who they received funding from. Social networks can, according to Welter (2011), not only provide financial capital, but also information for opportunity

recognition, which is why Ekobot continuously discusses with their community to gain new insights.

Financial gathering through the network is however further discussed by the interviewee from IRRIOT, who claimed that business angels were reached and grants from Almi, Vinnova and Jordbruksverket were collected. Besides the network providing finance and information, it can supply potential employees (Welter, 2011). This is the case for the interviewee from IRRIOT who, through mutual connections, was contacted and asked to join the company. Also in the development process they made use of their social network. When developing the product, IRRIOT saw that the Swedish alternatives for designing their solution were too expensive, why the founders Russian background opened up for contacts in Russia instead. Without this contact the solution may not have evolved, and as Sarasvathy (2001) explains, entrepreneurs contact their social network in order to work on a solution. However, the interviewee explained discussions in various accelerators have not been as beneficial as hoped. A contradicting experience was described by the interviewee from Skira, who argued participation in several incubators have helped them develop their business. In addition, he explained Skira engages in networks with companies targeting the same customers to further discuss shared issues. As well, the interviewee emphasized that community building is important to gain valuable information, corresponding to Welter (2011) who states that networks can encourage knowledge spillover between ventures.

Network building can however be challenging, which the interviewee from Sensefarm experienced. He explained that he faced barriers creating his network, having people questioning his experience in agriculture. However, he acknowledged the participation in Hushållningssällskapet and LRF have been beneficial due to the developed understanding of farmers' needs. Similarly, the interviewee from BMP Innovation explained the benefits with listening to different perspectives, however he declared the external connections often result in detailed complaints rather than something revolutionary.

A valuable source when building networks is information and communication technology (Lubell & McRoberts, 2018), and the way actors in the agriculture sector build social connections to access information has changed due to the technological revolution. The interviewee from Sensefarm explained they participate in Facebook groups for farmers, studying the agriculture sector and learning their vocabulary by observing discussions, in order to better understand how to reach out. However, if the Facebook groups do not include

a sufficiently large selection, the information is difficult to generalize. In addition, there is a technology gap between stakeholders', such as startups and farmers, due to differences in the use of information and communication technology, where the acceptance of these social networks is an uncertainty factor (Lubell & McRoberts, 2018).

The social context indicates recursive links (Welter, 2011). More specifically, the context affects the entrepreneur and influences individual actions. Meaning, the way startups interact to reach farmers can affect the social context. IRRIOT for example, sold their solution to a plant nursery in Ängelholm and when they were pleased, IRRIOT received orders from others nearby. In line with this, the interviewee from Sensefarm also mentioned the majority want to have their neighbor vouch for the solution in order to easier adapt oneself. In other words, positive word-of-mouth is spread when something is proven to work.

In conclusion, all startups described the social context (see Table 5.4) as valuable during the development process, however in different ways. The general agreement is that one's social network is invaluable for gaining insights and further understanding of complex issues. However, some startups acknowledged gaining social connections can be difficult.

Table 5.4: Startups' social context

	BMP Innovation AB	BoMill AB	Ekobot AB	IRRIOT AB	Sensefarm AB	Skira AB
Social context	Crucial for survival <i>Farmers, not intermediaries</i>	Facilitating understanding of complex issues <i>Agriculture sector & industries</i>	Gaining insights, fundings <i>RISE, SLU, Hushållningssällskapet & Jordbruksverket</i>	Finance, information, employees, solutions to develop <i>Almi, Vinnova, Jordbruksverket & Russia</i>	Facilitating awareness of needs, hindered by non-experience <i>Hushållningssällskapet & LRF</i>	Facilitating development, gaining information <i>LiUInnovation, Create Västerås</i>

5.5 Agricultural embeddedness

Being embedded is described by Aggestam and Wigren-Kristoferson (2017) as a comfort zone where the entrepreneur's relations are vital, and this embeddedness can be an important factor for identifying opportunities. In line with this, the interviewee from Skira explained he was raised close to the agriculture sector and nowadays has friends with farms, which helped him become embedded. However, having competence from other contexts, such as technology knowledge, can be beneficial to avoid being over-embedded. As Aggestam and Wigren-Kristoferson (2017) argue, being too embedded might restrain a creative mind, thus causing one to miss business opportunities. The interviewee from Skira described his friends' agricultural competence was helpful initially to become embedded. However, to gain more

perspectives, other actors were reached. Without knowledge from both inside and outside agriculture, the transparency problem might not have been recognized and Skira might not have been developed. An equal scenario was described by the interviewee from BoMill, where the founder's previous work in close connection to the agriculture sector facilitated the identification of an opportunity. In addition, the interviewee mentioned additional connections in the agriculture sector were made along the way to become further embedded in order to enhance the understanding of farmers' needs.

However, not all startups describe previous connections in the agriculture sector. This, an entrepreneur who is outside the comfort zone, is described by Aggestam and Wigren-Kristoferson (2017) as being dis-embedded, hence lacking specific resources. Ekobot, with a background in IT, did not have any prior experience in agriculture, but valuable information was gained along the way, both from an employee in possession of expert knowledge and from actors as SLU. In order to move from being dis-embedded to being embedded, the entrepreneur has to build social relations, local networks and gain valuable resources (Aggestam & Wigren-Kristoferson, 2017). In line with this, Ekobot made use of social relations to become embedded in agriculture. Likewise, the interviewee from IRRIoT explained they initially lacked knowledge in agriculture. However, they were also in close contact with farmers and have now gained several years of experience. Thus they have become embedded.

The building of local networks is important when moving from the sphere of being dis-embedded (Aggestam & Wigren-Kristoferson, 2017). However the interviewee from Sensefarm described he faced barriers, trying to create a network, due to a lack of agricultural experience. In order to overcome these barriers, Sensefarm became part of Facebook groups with farmers, not to interact, but to listen and gain valuable insights of farmers' needs. Furthermore, Sensefarm discusses with actors in the agriculture sector to understand the biggest problems faced by farmers and how to promote their solution. In other words, getting more embedded in the sector. They are also a part of networks regarding web-systems and backend-systems, to continue being embedded in the technology sector.

By being dis-embedded, the entrepreneur misses entrepreneurial opportunities (Aggestam & Wigren-Kristoferson, 2017). However, being too embedded also generates this risk. The first business idea developed by BMP Innovation, with a spectral analysis, did not serve a need as the interviewee described. Conclusively, it is troublesome to only be embedded in the

technological sector, hence lacking knowledge of how agriculture can utilize the solution. This is closely related to the business context, where perceived knowledge boundaries are explained to exist due to differences in for example how work is done, how knowledge is transferred or the organizational culture (Boshkoska et al, 2019). However, BMP Innovation is well aware of their lack of experience in agriculture, and they do not pretend to be experts. They make use of being dis-embedded to learn by those who are embedded, namely farmers. By building social relations, BMP Innovation gains trust, and the interviewee explained they want to simplify the work for farmers, not add additional tasks. They try to be on farmers' side and see things from their perspective, at the same time as they offer things from the sector they are embedded in. In other words, offering technological solutions. Offering embedded knowledge was also described by the interviewee from Skira, who explained they were contacted by another company, wanting to build a similar platform as theirs. In this case, Skira's agricultural experience did not matter, instead it was their technological competence that was applied in another sector.

Conclusively, the startups' degree of embeddedness varies (see Table 5.5). By being embedded in one sector, technology, and dis-embedded in another sector, agriculture, new perspectives can be gained. However, in order to be embedded in both sectors, all the technological startups acknowledged that social networks have to be built in order to understand the different needs. Thus, both being embedded and being dis-embedded can bring positive effects as well as negative.

Table 5.5: Startups' embeddedness in agriculture

	BMP Innovation AB	BoMill AB	Ekobot AB	IRRIOT AB	Sensefarm AB	Skira AB
Embedded in agriculture	Utilized dis-embeddedness to become embedded	Initially embedded, additional contacts for further embeddedness	Initially dis-embedded, moved to embedded	Initially dis-embedded, years of experience made them embedded	Initially dis-embedded, getting more embedded	Initially embedded

5.6 Value delivery

There is no general agreement on what is considered to be valuable, hence value delivery is a complex and interesting phenomenon to analyze. The numerous actors in the agriculture sector, outlined in the stakeholder mapping, have different opinions, sometimes even contradicting. The interviewee from BoMill acknowledged the complexity of the value chain, both in terms of acceptance and resistance. For instance he explained BoMill reaches

acceptance by understanding their customers' needs, or the needs of their customer's customer.

What is considered valuable depends on the willingness to pay for the relative amount of value being subjectively realized by the targeted user (Lepak, Smith & Taylor, 2007). This subjectiveness corresponds to what the interviewee from BMP Innovation told about farms desiring different solutions depending on their focus. For example, farms with visitor centers being more positive to new ways of solving problems. Additionally, he implied there is a price sensitivity among farmers, since prices on new solutions can not exceed existing ones too much. In line with this, the interviewee from Skira mentioned their success is dependent on the ability to offer farmers more money and to make their work easier. As well, the interviewee from Sensefarm discussed the price sensitivity, naming professors from universities often do not consider this factor's importance. However, it is clear Sensefarm has examined this aspect, since the interviewee described they have chosen to target easily influenced gardens in smart cities instead of agriculture. Even though the solution would be useful for both customer segments, Sensefarm considered the financial aspect and determined gardens have a higher willingness to pay. In contrast, the interviewee from Ekobot explained their solution has been accepted even though not being the cheapest. This highlights the importance of developing a useful solution farmers' are willing to change for.

In order to develop valuable innovations, the CVMI framework can work as a guide (Peralta, Echeveste, Lermen et al., 2020). Even though none of the interviewed startups actively use the framework, their activities in the development process can be interpreted through it. First, *Ideation*, involving gaining an understanding of customer needs, was observable in the interview with BMP Innovation, where the interviewee described the importance of understanding farmers and not trying to act as professionals in the area. He added that by observing agriculture from farmers' perspective, they have gained both trust and a good reputation. Likewise, the interviewee from IRRIoT acknowledged they have been in close contact with farmers from the beginning, also indicating this phase. Additionally, this phase was recognized when the interviewee from Skira mentioned being surrounded by friends in agriculture and involving external actors to gain additional information. Second, *Value prospection*, containing the collection of knowledge on how to develop, was detected in the interview with BMP Innovation, when the interviewee explained they, for example, needed to understand anatomical differences between animals in order to develop their solution.

Additionally, the interviewee from IRRIOT discussed they gained an understanding of disadvantages with existing solutions before developing their own, hence indicating this phase. Third, *Requirements*, concerning specification of technical components, was observed in several interviews, where interviewees mentioned the importance of developing easily implemented solutions. For instance, the interviewee from BMP Innovation highlighted farmers had told them not to develop something overly expensive or complex. Lastly, *Value delivery*, involving an evaluation of potential value, was detected in the interview with BMP Innovation, where the interviewee mentioned differences in perceived value among farmers depending on the farm's focus. Thus, he implied that value is a relative phenomenon.

The ideation step is considered one of the most important for mitigating uncertainties and updating the initial idea (Peralta, Echeveste, Martins et al., 2020), something being frequently mentioned among the interviewed startups. For instance, the interviewee from BMP Innovation explained their idea originated from discussions with farmers. From the beginning BMP Innovation had an ambitious idea about a complicated system, however by interacting with farmers they understood this was not asked for. In other words, they made a thorough investigation of their target segment in order to understand what is valued by different farmers. For example, differences between a forest farmer and a crop farmer. As well, the interviewee from Sensefarm mentioned that farmers' situation and location affects their acceptance, thus they investigate their segment to gain this understanding. In addition, the interviewee from Skira acknowledged everyone was against their initial idea, imposing a need to understand why in order to revise it.

The CVMI framework can facilitate both idea generation and demand identification, however the value proposition is most crucial to innovation because of its close connection to customer satisfaction (Peralta, Echeveste, Lermen et al., 2020). In other words, customer satisfaction is dependent on the proposed solution being valued. This was discussed by the interviewee from IRRIOT, who explained their solution is perceived as advantageous compared to competing ones. However, satisfaction was not easily accessed, since the majority is not used to the technology, thus indifferent to the value. Value is created when finalized products match customer needs, hence listening to customers to collect feedback is of great importance (Onyemah, Rivera Pesquera & Ali, 2013). Correspondingly, the interviewee from BMP Innovation discussed how they have contact with farmers to understand the acceptance, hence avoiding resistance. The anecdote about the man from

Kansas also demonstrated farmers' request for proof in order to consider a solution valuable. Likewise, the interviewee from Sensefarm argued the majority wants to have neighbors vouch for the solutions before adopting, presumably since resistance often is built upon previous failures the farmer has experienced.

Gaining knowledge about targeted customers can reduce the risk of developing a nonessential solution (Peralta, Echeveste, Lermen et al., 2020), since the market for a solution is dependent on customers' demand. In turn, this is influenced by numerous factors such as public pressure (Birner, Daum & Pray, 2021), which several interviewees discussed. For instance, the interviewee from IRRIoT acknowledged the impact of societal values, creating doubts among some farmers. Additionally, the interviewee from BMP Innovation described farmers' acceptance as dependent on a number of factors, such as changes in political rules and the time horizon of investments. To reduce the risk of resistance, the interviewee explained they adapt to farmers' perspective on these factors. The impact of rules and regulations was additionally mentioned by the interviewee from Ekobot, who added other factors, such as covid-19, positively influenced their market introduction due to changes in demand. Likewise, external factors impacting demand were mentioned by the interviewee from Sensefarm, who emphasized the importance of external mechanisms, such as the weather.

In conclusion, all interviewed startups have reached farmers acceptance, hence delivered a solution valued by the market (see Table 5.6). However, some have faced more barriers on the way. Value delivery is a complex phenomenon, where gaining customer knowledge is of utmost importance. The startups in this study have obtained this knowledge, therefore created possibilities to deliver value to the agriculture sector.

Table 5.6 : Startups' value delivery

	BMP Innovation AB	BoMill AB	Ekobot AB	IRRIOT AB	Sensefarm AB	Skira AB
Value delivery	Initially not, but changed plans led to acceptance	Accepted by most	Accepted	Accepted by most	Accepted by most	Initially not, but changed plans led to acceptance

5.7 Summary

To summarize, the four contexts are combined with the embeddedness perspective to create an understanding of how the startups are influenced by these factors in their value delivery

process (see Table 5.7). Depending on their business background, the startups are affected in different ways making them react to specific factors in the environment.

All technological startups have their base in Sweden, but their different spatial contexts make them use different markets. Each market allows for different social networks, yet all startups agree these are crucial to gain valuable information. All the startups have different connections depending on their background. For instance, startups with no prior experience in the sector, attempt to understand farmers by listening and building networks with agricultural actors. In contrast, startups with prior experience, knows what problems farmers face, thus builds valuable networks for entrepreneurial guidance instead. Regardless of their degree of embeddedness, all startups declared that they are aware of the rules affecting farmers, though some see it as hindering, while others find it facilitating.

As described, agriculture is a traditional sector, but with a willingness to adapt to new solutions if these makes the daily work easier. In this study, all technological startups successfully deliver value to the agriculture sector, however experience different adoption times.

Table 5.7: The combined framework with startups

	BMP Innovation AB	BoMill AB	Ekobot AB	IRRIOT AB	Sensefarm AB	Skira AB
Business context	Listening to surroundings to understand need	Previous work experience, listening to surroundings	Previous experience in IT	Lack of entrepreneurial experience, but retrieved	Serial entrepreneur, iterative and flexible work	Personal interest in making a change
Institutional context	No impact, but awareness	Facilitated discovery of gap in the market	Facilitating, but could be hindering as well	Somewhat hindering	No impact, but awareness	Somewhat assisting
Spatial context	Base: Stockholm Market: Sweden	Base: Malmö Market: Global	Base: Västerås Market: Sweden & Holland	Base: Stockholm Market: Sweden, global in future	Base: Lund Market: Global	Base: Linköping, Västerås & Stockholm Market: Sweden
Social context	Crucial for survival <i>Farmers, not intermediaries</i>	Facilitating understanding of complex issues <i>Agriculture sector & industries</i>	Gaining insights, fundings <i>RISE, SLU, Hushållningssällskapet & Jordbruksverket</i>	Finance, information, employees, solutions to develop <i>Almi, Vinnova, Jordbruksverket & Russia</i>	Facilitating awareness of needs, hindered by non-experience <i>Hushållningssällskapet & LRF</i>	Facilitating development, gaining information <i>LiUInnovation, Create Västerås</i>
Embedded in agriculture	Utilized dis-embeddedness to become embedded	Initially embedded, additional contacts for further embeddedness	Initially dis-embedded, moved to embedded	Initially dis-embedded, years of experience made them embedded	Initially dis-embedded, getting more embedded	Initially embedded
Value delivery	Initially not, but changed plans led to acceptance	Accepted by most	Accepted	Accepted by most	Accepted by most	Initially not, but changed plans led to acceptance

6. Conclusion and discussion

In this chapter a conclusion from the analysis is drawn and the study's contributions are presented, both practical and theoretical. Lastly, a suggestion for further research is outlined.

6.1 Concluding remarks

In this study, contextual impact on technological startups in the agriculture sector have been examined, since no prior research has focused on this perspective. By using the contextualized view to investigate different startups', the influence of the operating environment is determined. The aim of this study was to examine technological startups in the agriculture sector, where the following question was asked to fulfill the purpose:

How are technological startups in the agriculture sector influenced by their context in the process of value delivery?

Through the analysis of data, it is concluded that the business context influences startups in the agriculture sector significantly, however differently. Business context relates to several parts of the value chain, hence startups' development process is influenced by manifold contexts relating to different actors. For instance, opportunity recognition is influenced by previous experience and personal interests, in turn closely connected to organizational culture and management. The startups' culture is generally interpreted as highly flexible and experimental, hence beneficial for innovative development. On the contrary, farmers' culture has hindered the success, since it is observed as conservative, thus disadvantageous for implementation of technological change. Additional factors, such as type of farm and locational structure, also impact startups' success in the agriculture sector. Consequently, the general agreement is that it is of utmost importance to gain an understanding of existing problems in the sector in order to succeed. In other words, listen to the surroundings to develop necessary solutions, with straightforward technology that meets farmers' needs.

Moreover, the conclusion is that in order to meet farmers' needs, it is important for startups to adjust to rules and regulations affecting farmers. In other words, complying with the institutional context. By examining the institutional context through the interviews, it is confirmed that it influences the development process both direct and indirect. Informal

institutions affect farmers' willingness to change, thus indirectly impacting startups' success, while formal institutions have a more direct impact. However, no formal institutions have hindered the process, instead guided idea generation. Thus the overall agreement is that rules and regulations have a positive impact on value delivery. In addition, the conclusion is that changes in institutional rules facilitates opportunity recognition by offering new possibilities.

Furthermore, it is determined that various locations offer various possibilities. When investigating the spatial contexts it is concluded that all startups utilize their location in different ways. Some are part of communities close to their base, others build communities at distance because of increased remote interaction. However, the general agreement is that communities are valuable in order to gain insights from competitors and to develop solutions corresponding to farmers' needs. The spatial context is often intertwined with the social context, which works as an important resource. Nevertheless, building a social network can be challenging, since not all relationships are supportive. However, networks help to gain important insights and valuable resources, such as finances and employees. Most importantly, the social network helps to understand farmers' needs, which in turn facilitates value delivery.

Previous experience in the agriculture sector is also an important factor in the value delivery process. Startups with no prior experience, namely dis-embedded, managed this in different ways. Some make use of their non-experience by developing their product to fit the needs of farmers, while others proceed from their solution and target different sectors to find the right customer. On the other hand, startups being embedded from the start, make use of valuable contacts to become even more embedded and gain new perspectives to deliver value to farmers. For instance, by gaining the knowledge that farmers rather have things improved to save time and money instead of new tasks, startups can develop requested solutions. In other words, by being more embedded, a complete understanding of farmers' needs can be obtained, hence value delivery can be perfected.

To summarize, the study answers the research question by establishing the numerous contextual factors impacting technological startups in the agriculture sector today. The startups analyzed in this study are influenced by their context in different ways, for instance location and previous experience is determined to be crucial for some, but not for others. In addition, the degree of embeddedness affects recognition of business opportunities, since different insights create different perspectives. Nonetheless, a higher degree of embeddedness

is determined to be important for further understanding of customer needs. Thus, the conclusion is that context is an ambiguous phenomenon with significant impact on startups' value delivery.

6.2 Contributions

6.2.1 Practical contributions

Prior research discusses how the agriculture sector lags behind in embracing advanced technology and needs to develop. When the tractor was invented the work tasks decreased tremendously for farmers, but even though the sector has gone through changes, the increased food demand requires an increased efficiency. In the development of creative technological solutions, startups can be perceived as the main driver. Thus, our study contributes with important knowledge on how startups can utilize context and deliver value to the agriculture sector. Additionally, the combined framework works as a valuable resource where included organizations, in this study startups, can gain an understanding of how context influences them, and what differentiates the implementation of solutions, in this study smart agriculture. As the acceptance of smart agriculture depends on the context, startups may create ways by utilizing contextual factors to deliver value also to those with a bigger resistance.

In this study, the importance of innovations is emphasized and barriers faced by startups when developing new solutions are discussed. One barrier is related to the low investment rate in the sector, which needs to increase in order for development to continue. Increased investments are crucial in order for startups to proceed with the creation of new technologies to increase competition on the market, which in turn enables farmers to afford the solutions. Thus, it is important that companies see the concrete problems in the agriculture sector, and the development potential therein to stop the greenwashing. This study enables investors to realize how startups utilize different contexts in the process of delivering value, in order to determine potential investments to continue the technological development of the agriculture sector.

6.2.2 Theoretical contributions

This study contributes to the research on entrepreneurship by providing a new theoretical perspective, focusing on startups' point of view. Prior research emphasizes how customer

acceptance in the agriculture sector is reached, but not the influence of context. This study changes the perspective by analyzing startups' connection with the agriculture sector to advance the understanding of contextual influences. By investigating technological startups' approach to the agriculture sector, the importance of external influences in the value delivery process is highlighted. Through the combined framework, essential knowledge is gained and technological startups' role in the agriculture sector can be understood. Additionally, the framework can be applied in other sectors to gain knowledge of value delivery, since the concept of contextualization is well-established in general.

Lastly, this study exemplifies technological startups' work with innovative product development for the digitalization of agriculture. This knowledge can be used to extend the research on technological development in the agriculture sector, likewise how smart agriculture can be further developed.

6.3 Suggestions for further research

This study provides a new perspective on contextualization in entrepreneurial research, but additional knowledge in the area is valuable for further understanding of the concept. In combination with this study's view, it would be beneficial to analyze farmers' perspective, since the understanding of contextual influences on value delivery would be enhanced. Likewise, adding an economic perspective to the analysis of technological startups' would increase the understanding of contextual impact, since it would increase the transparency by presenting startups' sales results, hence indicating actual value delivery. In addition, research on national differences between technological startups would be beneficial to gain a complete understanding of the contextual impact. For instance, examining initial embeddedness along with other important differences, such as level of acceptance rate. However, a combined study with an extensive examination, would require extended resources. Nonetheless, this could expand the knowledge of the contextual influences and the conclusions on startups value delivery could be improved.

Furthermore, some interesting perspectives and real-life problems in need of further examination were proposed in the interviews. First, the cash flow in the value chain is imbalanced, since industries and retailers make lots of money, while farmers do not. Further understanding of the unfair money flow is necessary, since the cost concern related to

farmers' acceptance is a common problem mentioned by the startups. If farmers do not earn enough money, they can not afford to take risks implementing new innovations. Thus, it would be of interest to examine the reasons behind this cost concern, and try to find ways to change it in order to increase startups' possibilities of delivering value. Second, the whole agriculture sector would benefit by having companies investing. If the interest to invest in the agriculture sector increases, the sector would have additional possibilities to develop technological skills. In other words, the agriculture sector requires a changed attitude towards development in order to diffuse innovative ideas. Therefore, it would be valuable to analyze which factors affect the interest, and how the interest can be increased.

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Appendices

Appendix A

Interview questions in Swedish

1. Kan ni kort beskriva vad ni arbetar med idag?
 - 1.1. Vilken marknad (region, land) vänder ni er till?
2. Hur fick ni er idé till att arbeta med den innovation ni gör idag?
 - 2.1. Hade ni någon hjälp av andra vid idéskapande och uppstart?
Exempelvis vänner och bekanta eller aktörer inom lantbruket
 - 2.2. Har ni tidigare erfarenhet av lantbruksbranschen?
 - 2.3. Är det några yttre omständigheter, i forma av nya lagar eller ökat socialt engagemang, som bidragit till att idén uppstått?
3. Hur har ni arbetat med framtagningen av era produkter/service?
 - 3.1. Finns det några särskilda regler eller förhållningssätt som ni varit tvungna att anpassa er till?
4. Hur arbetar ni idag för att komma i kontakt med kunder och/eller lantbrukare?
Sker kontakten exempelvis direkt till kund eller genom någon mellanhand?
5. Hur tas era lösningar emot av lantbrukare?
 - 5.1. Vad anser ni lantbrukarna verkar mest positivt inställda till gällande ny teknik?
 - 5.2. Vad anser ni lantbrukarna verkar mest negativt inställda till gällande ny teknik?
6. Är ni med i någon form av community eller forum där ni kan diskutera era lösningar med andra inom eller utanför ert område?

Interview questions translated into English

1. Can you give a short description of your work?
 - 1.1. Which market (region, country) do you operate in?
2. How did you come up with the idea of the innovation you are working with today?
 - 2.1. Did you receive any help from others with the idea creation? For instance, friends or actors within agriculture
 - 2.2. Do you have any previous experience in the agriculture sector?
 - 2.3. Are there any external factors, in terms of regulations or increased societal pressure, contributing to the idea?
3. How have you worked with the development of your products/services?
 - 3.1. Are there any specific rules or regulations you have had to adapt to?
4. How do you work today to get in contact with customers/farmers? Is the contact for example directly to customers or through any intermediary?
5. How are your solutions accepted by farmers?
 - 5.1. What do you think farmers are most positive about in terms of new technology?
 - 5.2. What do you think farmers are most negative about in terms of new technology?
6. Do you participate in any communities or forums, where you can discuss your solutions with other actors inside or outside your area of expertise?

Appendix B

Interpretation of interview questions

1. Can you give a short description of your work?
 - 1.1. Which market (region, country) do you operate in?
Theoretical concept: Spatial context
2. How did you come up with the idea of the innovation you are working with today?
 - 2.1. Did you receive any help from others with the idea creation? For instance, friends or actors within agriculture
Theoretical concept: Social context and Value creation, if in contact with farmers
 - 2.2. Do you have any previous experience in the agriculture sector?
Theoretical concept: Embeddedness
 - 2.3. Are there any external factors, in terms of regulations or increased societal pressure, contributing to the idea?
Theoretical concept: Institutional context
3. How have you worked with the development of your products/services?
Theoretical concept: Business context
 - 3.1. Are there any specific rules or regulations you have had to adapt to?
Theoretical concept: Institutional context
4. How do you work today to get in contact with customers/farmers? Is the contact for example directly to customers or through any intermediary?
Theoretical concept: Business context, in terms of connections with other actors in the value chain
5. How are your solutions accepted by farmers?
 - 5.1. What do you think farmers are most positive about in terms of new technology?
Theoretical concept: Organizational environment and technological advancement

5.2. What do you think farmers are most negative about in terms of new technology?

Theoretical concept: Organizational environment and technological advancement

6. Do you participate in any communities or forums, where you can discuss your solutions with other actors inside or outside your area of expertise?

Theoretical concept: Spatial context