Bachelor Thesis Business and Consumer studies
Developing a method to identify agri-entrepreneurs

WAGENINGEN
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Preface

In front of you lies my thesis 'Developing a method to identify agri-entrepreneurs'. This thesis seeks to develop a method to identify agri-entrepreneurs and their corresponding characteristics and needs. This thesis is written as part of obtaining my bachelor's degree for Business and Consumer studies and it was written for the manager of the estate Schlossgut Alt Madlitz in Germany.

Due to complication in this research, the survey could not be conducted in Germany. Instead, the research was conducted in Wageningen. Because of this, the results of this research are not applicable for the estate manager and cannot directly be used. This research did however develop and test the method to identify agri-entrepreneurs. The manager can choose to use this method in Germany himself.

I would like to thank my thesis supervisor Frans Verhees for the good supervision and for his feedback and support during my thesis process. I would also like to thank my fellow students for their feedback during the thesis rings.

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Abstract

The manager of an estate in Germany wants to open up his estate for agri-entrepreneurs and make his estate an agri-entrepreneurial hub. However, the manager does not know what the market looks like and what the characteristics and needs of these agri-entrepreneurs are. This study aims to gain knowledge and insights about entrepreneurs and to develop a method that can be used to identify agri-entrepreneurs.

This study tries to answer the question 'What are the characteristics of the entrepreneurs in the target market for an agri-entrepreneurial hub?'. Entrepreneurship is 'the process of seeking and exploiting opportunities through innovation while managing risk and uncertainty in the hope of profit' and entrepreneurs are people who engage in this entrepreneurial activity.

In this research, a theoretical framework is constructed. This framework is used to set up a quantitative survey. The results of this survey are analyzed in SPSS to discover different clusters. The characteristics and needs are analyzed for each cluster.

The most important result of this study is the development of the method. This method enables the manager to segment the market and identify agri-entrepreneurs and their corresponding characteristics and needs. In the sample of this study, cluster 1 is described as managers, cluster 2 is described as employees and cluster 3 is described as agri-entrepreneurs. Cluster 3 scores high on entrepreneurial concepts and has great knowledge about and interest in agriculture. They need significantly less technical support than the other clusters and significantly more support on marketing than the other clusters. This cluster is predominantly male.

For further research, it is advisable to use other scales to measure the concepts 'will to act and take action', 'need for achievement', and 'internal locus of control'. In addition to this, it would be interesting to add other questions about the needs of the respondents. This will result in a deeper understanding of the clusters.

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1. Introduction

The manager of the estate Schlossgut Alt Madlitz, located 80 kilometers east of Berlin, wants to open up his estate for agri-entrepreneurs. He wants to let multiple agri-entrepreneurs start a business on his estate and make his estate some kind of agri-entrepreneurial hub. There might be business potential by using some kind of model of collective farming and agri-entrepreneurship. With this model, multiple entrepreneurs would cooperate on the estate and make use of testing grounds for start-ups and research projects. The manager thinks the cooperation of the entrepreneurs and the corresponding synergies might yield higher returns. Also, it might strengthen the brand of the estate.

There are a few things that should be done to make sure this idea is worked out effectively. For example, the value that this model will bring should be examined. It might bring value for the entrepreneurs and it might also bring value for the manager of the estate. In addition to this, it should be thought out how exactly this model should take shape. The manager should think of activities that are on the estate and what services the estate offers to the entrepreneurs. How these entrepreneurs interact with each other might also be important, because this can cause cross-pollination between the entrepreneurs (Passaro, Quinto, & Thomas, 2017). Lastly, the entrepreneurs on the estate can work together with shared resources.

Before all this can happen, the manager should get an idea of what the market looks like. He should know what different segments there are in the market and what the characteristics of these segments are. Based on these segments, the manager can choose which segment he wants to target for his agri-entrepreneurial hub and he can adjust his hub to fit the needs of the entrepreneurs.

The research objective is to gain knowledge and insights about entrepreneurs and develop a method to identify agri-entrepreneurs. This will be done by doing a literature review, followed by a survey research.

The relevance of this research is mostly practical. This research is relevant for the manager because he can use the method developed in this research to identify the needs and characteristics of agri-entrepreneurs in Germany. With this method, the manager can segment the market and identify agri-entrepreneurs. Consequently, he can get insights about their support needs and other characteristics. If he does not have this knowledge, it is difficult to find entrepreneurs who want to work on his estate and it is hard to shape the business model. Next to this, the research is also relevant for other estate managers who might want to start an agri-entrepreneurial hub on their estate.

Following the research objective of this paper, the central research question of this research is:

'What are the characteristics of the entrepreneurs in the target market for an agri-entrepreneurial hub?'

To answer this research question, some sub-questions should be answered. First of all, it should be clear what entrepreneurship is. Secondly, it should be clear what entrepreneurs are. Their characteristics, needs, and latent needs should be known. This can help when setting up a survey and when designing the agri-entrepreneurial hub. Lastly, the different segments within the market should be identified by using market segmentation techniques. This will show if the method is useful for identifying agri-entrepreneurs.

2. Theoretical framework

Entrepreneurship

The Lexico dictionary defines entrepreneurship as 'the activity of setting up a business or businesses, taking on financial risks in the hope of profit' (Oxford University press, n.d.). This is a compact description of entrepreneurship. However, in the literature, there are many different schools of thought on entrepreneurship. There are economic, psychological and sociological studies on the topic of entrepreneurship, and all these topics have different ideas about what entrepreneurship is (Cherukara & Manalel, 2011). In the scientific literature there is no general definition of entrepreneurship because of all these different disciplines, so multiple definitions of entrepreneurship coexist (Jantunen, Puumalainen, Saarenketo, & Kyläheiko, 2005).

Even though this does not always have to be the case, entrepreneurship often assumes that people have or take the responsibility for a venture (Cunningham, 1991). The venture and the activities within this venture have a profit motive (Harper, 2002; Knight, 1921). This profit can be generated through uncertainty within the market. The entrepreneur takes a financial risk and engages in uncertainty in the hope of making a profit (Knight, 1921). Next to this, entrepreneurship involves a lot of opportunity seeking. The entrepreneur discovers opportunities and exploits these opportunities to create a profit (Shane & Venkataraman, 2000). This seeking and exploiting of opportunities goes hand in hand with innovation. Therefore, the most important aspect of entrepreneurship is innovation (Cherukara & Manalel, 2011).

As mentioned at the beginning of this section, entrepreneurship often assumes that people have or take the responsibility for a venture. However, this is not always the case. The entrepreneurial activity mentioned above can also occur in large firms and can also be seen as entrepreneurship. In that case, the manager that engages in this entrepreneurial activity is also an entrepreneur.

According to the previous section, in this paper we will define entrepreneurship as 'the process of seeking and exploiting opportunities through innovation while managing risk and uncertainty in the hope of profit'.

Entrepreneur

Because of the great scientific interest in the field of entrepreneurship, a lot of research has been done on the entrepreneur, the person that engages in entrepreneurial activity. At first, research on entrepreneurship was done by economists to understand economic development. Later on, social scientists started to do research to understand the entrepreneur as a person (Filion, 1997). The first scientist that paid attention to the entrepreneur was Richard Cantillon (1755). He was first to introduce the concept of the entrepreneur. He defines an entrepreneur as someone who participates in arbitrage. They did this for the potential profit they could make when buying at one price and selling at another. However, the buying price was certain and the selling price was uncertain. This made the entrepreneur a risk bearer. Because the entrepreneur participates in arbitrage, he does not have to be innovative, only alert and forward-looking (van Praag, 1999). Since Cantillon, numerous other researchers have defined the entrepreneur.

There has been a lot of discussion on whether an entrepreneur is born or made. Some scientists believe that certain people are born with specific entrepreneurial characteristics, also called traits, and that these are the people who can become successful entrepreneurs. Fisher and Koch (2008), for example, believe that some people are born entrepreneurs and define confidence and willingness to

take risk as essential traits. Other traits that are often linked to entrepreneurs are need for achievement, innovativeness, proactive personality, generalized self-efficacy, stress tolerance, need for autonomy and internal locus of control (Rauch & Frese, 2007). In contrast to this, other scientists argue that people are not born to be an entrepreneur but can be taught to be one. One of the arguments for this is that people are able to gain entrepreneurial knowledge or skills. Also, determinants of successful entrepreneurship like knowledge of how the market functions, marketing skills, manufacturing knowledge and business management skills (Casson, 1982), can be learned through education. In this paper, we will use both personality traits and taught characteristics to define the entrepreneur.

Ultimately, regardless of whether an entrepreneur is born or made, an entrepreneur is a risk-taker who tolerates financial risks that come with uncertainty (Casson, 1982; Cherukara & Manalel, 2011; Fisher & Koch, 2008; Hébert & Link, 1989; Knight, 1921). He is innovative (Bird, 1989; Casson, 1982; Tibbits, 1979). He has a will to act and take action (Bird, 1989; Tibbits, 1979). He has a nose for business and good business knowledge (Caird, 1988; Casson, 1982). He has a great need for achievement (McClelland, 1961; Rauch & Frese, 2007; Stewart & Roth, 2001). He has internal locus of control (Rauch & Frese, 2007; Rotter, 1966). He is extraverted (Zhao & Seibert, 2006; Zhao, Seibert, & Lumpkin, 2010). This means he has an energetic approach toward the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality (enthusiastic, spunky) (Oliver P John, Naumann, & Soto, 2008).

The average age of successful entrepreneurs is 45 (Azoulay, Jones, Kim, & Miranda, 2018). Sixty percent of new entrepreneurs in the United States are male and forty percent are female (Fairlie, Reedy, Morelix, & Russel, 2016). Company founders are often well educated, with more than 95.1% having a bachelor's degree or higher (Salkever, Holly, Aggarwal, & Wadhwa, 2009).

Agri-entrepreneurs

Within agriculture, farming is generally a family business (Gasson & Errington, 1993). This concept provides little space for entrepreneurial activity, because family farms are not driven by growth and profit maximization (Lans, Seuneke, & Klerkx, 2017). This is because family farms prioritize survival, family heritage and passing on a healthy farm to the next generation (Jervell, 2011). However, within all farmers, one can make the distinction between producer-farmers and entrepreneur-farmers. The producer farmer seeks to achieve profitability within the accepted ways of operating a farm. The entrepreneur-farmer disregards the social norms and institutional environment and seeks to become the biggest and the best (Stenholm & Hytti, 2014). These are the type of farmers that can be classified as agri-entrepreneurs. Smaller farmers or business owners in the agribusiness can also be classified as agri-entrepreneurs, as long as they engage in entrepreneurial activity (e.g. Innovating, taking risks, exploiting opportunities) (Chan, Sipes, & Lee, 2017).

An agri-entrepreneur is an innovative change agent. He looks for opportunities to use land and its resources for specialized, value-added food and agriculture-based businesses. Just like any other entrepreneur, an agri-entrepreneur does this in the hope of profit (Chan et al., 2017). This looking for and identifying of opportunities is a fundamental aspect of agri-entrepreneurship, just like it is for entrepreneurship (Lans et al., 2017; Shane & Venkataraman, 2000). Many other characteristics of entrepreneurship and entrepreneurs that are mentioned above and in the literature also apply to agri-entrepreneurs. Agri-entrepreneurs are visionary, curious, proactive and persistent and they have management and organizational skills. In addition to this, they are creative problem solvers and good

multi-taskers, and they are willing to accept the risk that comes with innovative ideas (Bairwa, Kushwaha, & Sen, 2015).

Agri-entrepreneurs have a lot of the same characteristics and skills as normal entrepreneurs. The difference is in their knowledge. As mentioned before, entrepreneurs often have good knowledge of business and manufacturing. This is also the case for agri-entrepreneurs. Agri-entrepreneurs have knowledge about agriculture and about business in agriculture. They are knowledgeable about agricultural production and can combine this knowledge with their entrepreneurial characteristics and traits. In this way they can be entrepreneurs in the agriculture industry.

Needs and latent needs

In marketing, needs are defined as 'basic human requirements such as for air, food, water, clothing, and shelter.' If these needs are directed towards something that might satisfy the need, it becomes a want (Kotler & Keller, 2016). In business, it is the purpose of marketeers to serve these needs of consumers. Needs can be defined further and categorized as explicit needs and latent needs. Explicit needs are needs that the customer is aware of and that the customer can communicate to the supplier. Latent needs are needs that the customer is not aware of and that are difficult to communicate to the supplier (Ahola, 2006). If a company can accurately serve the latent needs of consumers, this gives them a strong competitive advantage (Ipsos, 2012).

We can use this definition of needs for the situation of entrepreneurs. Needs for entrepreneurs are 'basic entrepreneurial requirements for successful entrepreneurship'. What these specific needs are will be discussed in the next section.

Needs and latent needs of entrepreneurs

Entrepreneurs have two important needs: need for capital and need for information. Classic authors in entrepreneurship literature mention capital as an important determinant for successful entrepreneurship (Van Praag, 1999). This makes sense, because you almost inevitably need money to start and run a business. For agriculture, the average investment in land and machinery is $600.000 (USDA-NASS, 2002). This is significantly higher than the costs for starting up a non-farm business (Richards & Bulkley, 2007). Next to need for capital, entrepreneurs have a need for business information. Business information are valuable business assets for entrepreneurs who know how to use this information. This information can help an entrepreneur to make informed business decisions (e.g. identifying business opportunities, determining market trends, financing) (Kassim, 2010). These needs for business information are called 'information needs'.

One of the most important needs of entrepreneurs is a personal network. Entrepreneurs put a lot of time and effort into building this network and maintaining it (Dodd, 1997). In her research, Dodd found that entrepreneurs spend 40% of their time on making external contacts. These networks (e.g. clients, colleagues, suppliers) provide important sources of information for entrepreneurs (Compas Inc., 2001). Potential entrepreneurs also have a high need for support in preparing a business plan. Furthermore, there is a need for information on services provided by the government, planning of cash flows, business opportunities, marketing and finance (Ahmad Kassim, Zahrah Buyong, & B. Kasmarini, 2014). This is supported by another research, in which information on how to prepare a business plan, plan cash flow, examine business opportunities, and profit planning were found to be the most important information needs (Kassim, 2010). This research also showed that this

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information was primarily obtained by talking to other entrepreneurs and discussing with friends and relatives. This confirms the importance of the personal network of the entrepreneur.

The needs mentioned above primarily apply to potential entrepreneurs. They know that these are needs, and they can communicate this to people. But what about the needs of entrepreneurs that they don't know they have or can't communicate; their latent needs.

To discover the latent needs of entrepreneurs, one can look at success factors for entrepreneurship and problems that entrepreneurs encounter during and right after the startup phase of a venture. Success factors for entrepreneurship are hard to establish. This is because the success or failure of a business depends on a lot of interrelated factors (Stanworth & Gray, 1992). However, there are some factors that increase the probability of success. Experience in the same sector as the startup business increases the probability of success and survival (Bosma, Van Praag, & De Wit, 2000). Moreover, experience as an employee and experience with self-employment have a positive influence on the success of entrepreneurship (Bosma et al., 2000; Van Praag, 1999). Social capital, like networks and support from the spouse also improve the amount of employment created, profitability and duration of the firm respectively (Bosma et al., 2000).

It is also interesting to look at the problems entrepreneurs encounter when starting up a business. Entrepreneurs might not know that they will face these problems, so help or support when facing these problems might be a latent need. Entrepreneurs often face problems in the areas of marketing and finance (Cromie, 1991; Smalibone, 1990). However, this is also pointed out by potential entrepreneurs as mentioned above, so it is not really a latent need. Next to this, entrepreneurs face problems with the workload and loneliness when starting a business (Cromie, 1991; Fielden, Davidson, & Makin, 2000) A stable and supportive family can help an entrepreneur to cope with these problems (Cromie, 1991).

Market segmentation

Businesses can not satisfy all customers every time. Customers all have different needs and preferences, so one product will not satisfy all customers. Because of this, marketers use market segmentation, targeting and positioning (STP model) (Camilleri, 2018). A market segment is a group of customers that have similar needs and wants (Kotler & Keller, 2016). Market segmentation has the goal to identify a group of customers that are similar to each other respecting their needs, wants, preferences, demographic characteristics, and psychographic characteristics. If this group is identified, a company knows that if it satisfies one customer within this group, it will also satisfy the rest of the group (Iacobucci, 2017).

After market segmentation, a company has an overview of the different segments that are in the market. The company can then decide which segment it wants to target. After they target an appropriate segment, the company can position itself within the market and the mind of the consumer. The marketing program that follows will be more efficient and more finely-tuned because of the systematic approach (Camilleri, 2018).

Summary

In this paper, we will define entrepreneurship as 'the process of seeking and exploiting opportunities through innovation while managing risk and uncertainty in the hope of profit'. An entrepreneur is a

risk-taker who bears financial risks that come with uncertainty. He is innovative, he has the will to act and take action, he has a nose for business and good business knowledge, he has great need for achievement, he has internal locus of control and he is extraverted.

Agri-entrepreneurs are very similar to entrepreneurs in terms of characteristics and traits. The only difference is that agri-entrepreneurs have knowledge about and are interested in agriculture. They have knowledge about agriculture itself, business in agriculture and the manufacturing process of agriculture products. This distinguishes them from 'regular' entrepreneurs.

Entrepreneurs have capital needs and information needs. The need for capital is self-explanatory; an entrepreneur needs capital to start a business. The need for information has multiple aspects. First of all, the entrepreneur needs a personal network, which can support him and provide him with useful business information. In addition to this, entrepreneurs need information on preparing a business plan, services provided by the government, planning of cash flows, business opportunities, marketing, finance, and profit planning. The latent needs of entrepreneurs are harder to identify. But when comparing the needs of entrepreneurs with the success factors and problems encountered when starting up a business, there were some latent needs. Experience in the sector, experience as an employee, and experience with self-employment have a positive influence on the success of a business. Support from the spouse of the entrepreneur also had a positive influence. Entrepreneurs often have trouble with the workload and loneliness when starting a business. A stable and supportive family can help with this trouble.

3. Method

Approach and sample description

This study aims to segment the market and identify agri-entrepreneurs. This was done by sending out a quantitative survey. The survey was distributed to students of Wageningen University. The students were either studying Business and Consumer studies or Agrotechnology. The business students were targeted because these students might have entrepreneurial intention or interest in entrepreneurship. The students of agrotechnology were targeted because these students learn about agriculture and might have agri-entrepreneurial intentions. The survey was distributed via WhatsApp groups and via e-mail.

In total 150 respondents participated in the survey. However, of these 150 respondents, 58 respondents did not finish the survey. These respondents were excluded from the dataset. Because of this, the total number of respondents is 92. Of these 92 respondents, 63% was male and 37% was female. This might be because agrotechnology students are predominantly male. The average age of the respondents was 21 and 92,4% of the respondents are highly-educated (university bachelor and university master). This makes sense since the survey was sent out to students of Wageningen University. This sample is not very large and it is not a representation of the Dutch society. However, this sample can still be used to test the method to identify agri-entrepreneurs.

Measures

The first step in the segmentation was to segment the market and find agri-entrepreneurs. This was measured with help of the theoretical framework. In total there are nine concepts to measure if someone is an agri-entrepreneur: 1) Risk-taker & bearer, 2) Innovative, 3) Will to act and take action, 4) Nose for business, business knowledge, 5) Need for achievement, 6) Internal locus of control, 7) Extraverted, 8) Interest in agriculture, 9) knowledgeable about agriculture. The first seven concepts measure if someone is an entrepreneur. The remaining concepts measure interest and knowledge about agriculture. By measuring all these concepts, it is possible to discover if someone is an agri-entrepreneur. These concepts were measured with the help of statements. Respondents were asked to rate the statements on a 5 points Likert scale, ranging from strongly disagree to strongly agree. Concept 1, 2, 3, 5, 6 and 7 were measured by using statements from other questionnaires and scales (Appendix 1) (Bolton & Lane, 2012; Donnellan, Oswald, Baird, & Lucas, 2006; Faver, 1982; Lumpkin, 1985). To measure concept 4, 8, and 9, multi-item measures were composed (Appendix 2). To obtain unbiased answers, the concepts were randomized. The statements in the questions that measure the concepts were also randomized.

The second step in the segmentation was to discover the needs for the different segments. These needs were measured by asking the respondents to rate different types of business information on a 5 points Likert scale, ranging from not important to very important. These types of business information were taken from another research (Kassim, 2010). In this research, the respondents had to rate the importance of 35 different statements. For this segmentation, only the highest rated fifteen types of information were used. This was done to keep the survey compact. The types of business information in this question were also randomized.

At the end of the survey, respondents were asked about their demographic characteristics such as age, gender, level of education, employment and geographical location. These questions are last,

because they are personal and the respondents might feel uncomfortable answering them, which could lead to the respondents not finishing the survey.

Factor analysis

For every concept, a factor score and a mean score were computed. Factor scores and mean scores are a person's standing on a certain factor. Both kinds of scores can be used as basis in the cluster analysis. However, factor scores are standardized scores, while mean scores are not. Because factor scores are standardized, their mean is 0 and their standard deviation is 1. This makes factor scores more difficult to interpret. Mean scores, on the other hand, are unstandardized and are on the same 5 points scale as our input variables, which makes them easier to interpret. In this research, the factor scores were used. This is because the factor scores take the weight of an item to a factor (factor loadings) into account while the mean scores do not. In addition to this, the factor scores take into account the correlation among the observed variables and the correlation among oblique factors. Because of this, this procedure maximizes the validity of the estimates (DiStefano, Zhu & Mindrila, 2009).

Cluster analysis

A cluster analysis was performed to try and group respondents who are familiar to each other into clusters. For this cluster analysis, the factor scores were used as variables. To decide on the number of clusters, the agglomeration schedule was used. This schedule shows the process of assigning each respondent to a cluster. At stage one, every respondent is in its own cluster. After that, two respondents that are the most similar will be put together into a cluster. This continues until at the last stage every respondent is in the same cluster. The table contains an agglomeration coefficient for each stage of the clustering. The agglomeration coefficient shows the dissimilarity of an object to the first cluster it joins, divided by the dissimilarity of the final merger in the cluster analysis. By calculating the percental change in the agglomeration coefficient per stage of the clustering, the number of clusters can be decided. The agglomeration coefficients usually do not differ very much in the early stages, thus the percentage change is low, and the percentage change does not show a big gap. However, at the later stages, the difference between the agglomeration coefficients becomes bigger. When the percentage change suddenly makes a big jump, a lot of information is lost. The clustering process should stop at this point. After the initial cluster analysis, a quick cluster analysis was done. This is a non-hierarchical cluster analysis. With this analysis, the clusters were formed. Multiple analyses were done to look at the difference in characteristics and the needs of the clusters. Figure 1 displays a flowchart for the method and the analysis.
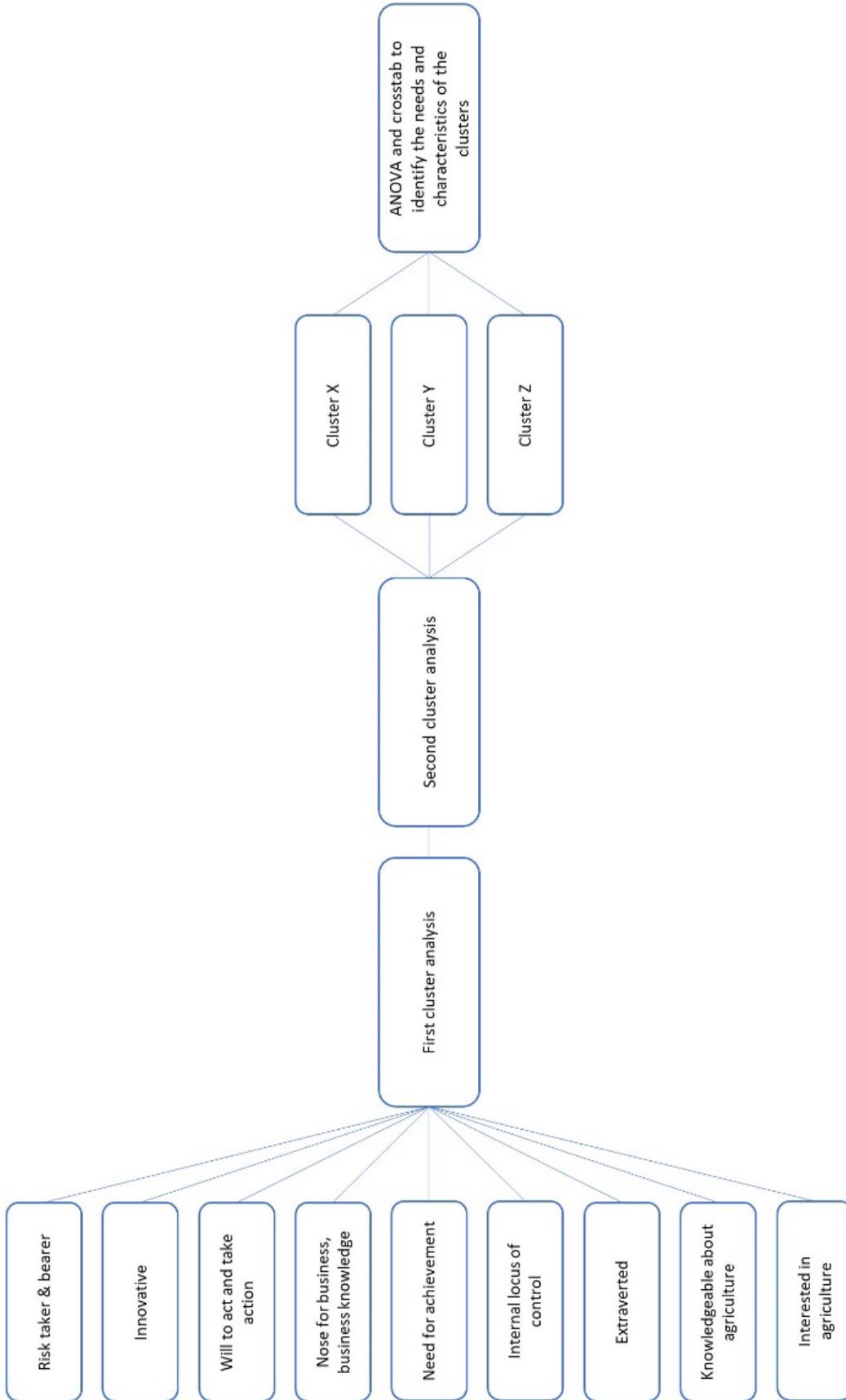
Figure 1. Flowchart for the method and the analysis.

4. Results

Reliability of concepts

In the survey, 9 concepts were measured. These concepts were measured by using scales that consist of three or four questions. To test the validity and reliability of these scales, a factor analysis and reliability analysis was done for every concept. The results are presented in Table 1. The latent root of the second component should be below 1 to be acceptable. The variance accounted for should at least be 60% to be acceptable. The lowest item loading should at least be 0.6 to be acceptable. Finally, Cronbach's alpha should at least be 0.7 to be reliable. This means that the items that measure the same construct have a high inter-correlations and that the items measure the same thing. The table shows a few results that are not acceptable. For 'will to act and take action', the variance accounted for is too low. The lowest item loading is also too low. The Cronbach's alpha for this concept is also not sufficient. This value could be improved by removing one question. However, this would increase the alpha to 0.53, which is still not high enough. For the 'need for achievement' concept, the latent root of the second component is too high. The variance accounted for, the lowest item loading and Cronbach's alpha are all too low for this concept. For 'internal locus of control', the variance accounted for is too low, the lowest item loading is too low and the Cronbach's alpha is also too low.

Table 1
Concept scale properties

Concept	Number of items	Latent root second component	Variance accounted for	Lowest item loading	Cronbach's alpha
Risk-taking & bearing	3	0.71	67%	0.67	0.75
Innovative	3	0.61	68%	0.79	0.77
Will to act and take action	3	0.98	**48%**	**0.47**	**0.44**
Nose for business, business knowledge	4	0.70	60%	0.68	0.76
Need for achievement	3	**1.00**	**39%**	**0.48**	**0.16**
Internal locus of control	3	0.99	**43%**	**0.27**	**0.27**
Extraverted	4	0.64	67%	0.75	0.83
Knowledgeable about agriculture	3	0.27	83%	0.90	0.90
Interest in agriculture	3	0.18	90%	0.94	0.95
Knowledgeable about and interested in agriculture*	6	0.48	80%	0.81	0.85

*Knowledgeable about agriculture and interested in agriculture were merged into one component
Bold = Unacceptable values

Because of the unacceptable results on the 'will to act', 'need for achievement' and 'internal locus of control' concepts, these scales are not valid. Because these scales are not valid, it is not certain that these scales measure what they are supposed to measure. In addition to this, the Cronbach alpha for these concepts is not high enough, which indicates low reliability of the scales. This means that the scales will not measure the same thing when they are repeated. Because of the low validity and reliability of these scales, the concepts cannot be used to measure agri-entrepreneurship. These concepts were abandoned and not used in the segmentation.

Components

Table 2 shows the results of a principal component analysis with oblimin rotation. An oblimin rotation was used because the concepts are expected to correlate with each other. The questions that measure a concept should all have a high loading for one particular component. As can be seen in Table 2, this is not completely true. The table shows 5 components, while there are 6 concepts measured. This is because 'knowledgeable about agriculture' and 'interest in agriculture' both load high onto component 1. Apparently, when a person scores high on 'knowledgeable about agriculture', this person also scores high on 'interest in agriculture'. Because these two concepts load high onto component 1, the concepts are merged.

Component 1: Knowledgeable about and interested in agriculture: The last six items, which are all about agriculture have a high score for this component. The 'knowledgeable about agriculture' and 'interest in agriculture' concepts are merged into one component. This new component was also tested on the reliability, which is shown in Table 1.

Component 2: Extraverted: The items about extraversion clearly score high onto this component. Two of the items have a negative score because these questions were reverse scored.

Component 3: Innovative: The items about innovativeness all score high on component three. Thus component 3 represents innovativeness.

Component 4: Nose for business, business knowledge: The items about business knowledge score high onto this component. The item 'I have business experience' is a bit low. Apparently, this item does not measure business knowledge as well as the other three items.

Component 5: Risk-taking & bearing: The items that are about risk-taking and risk-bearing all score high onto this component. Therefore component 5 represents risk-taking & bearing.

After this factor analysis, five separate factor analysis were done for each of the five components. With help of these factor analyses, the factor scores were computed for each component. These factor scores were used as basis in the cluster analysis.

Table 2

Factor loadings for the components

Items	Components				
	1	2	3	4	5
I like to take bold action by venturing into the unknown	-0.02	0.14	0.20	0.03	**-0.77**
I am willing to invest a lot of time and/or money on something that might yield a high return	0.02	-0.03	-0.06	-0.05	**-0.73**
I tend to act "boldly" in situations where risk is involved	0.08	-0.02	0.10	0.10	**-0.77**
In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before	0.22	0.12	**0.72**	0.11	0.13
I prefer to try my own unique way when learning new things rather than doing it like everyone else does	-0.02	-0.11	**0.76**	-0.10	-0.23
I favor experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems	-0.05	0.03	**0.89**	0.01	-0.08
I am the life of the party	0.06	**0.70**	-0.10	0.17	-0.01
I don't talk a lot	0.03	**-0.88**	0.01	0.18	0.00
I talk to a lot of different people at parties	0.05	**0.80**	0.09	0.08	0.10
keep in the background	0.10	**-0.85**	-0.03	0.00	0.14
I am knowledgeable about marketing	-0.32	0.01	0.07	**0.76**	0.09
I am knowledgeable about finance	0.18	-0.01	-0.17	**0.82**	-0.07
I have managerial and organizational skills	-0.08	0.02	0.13	**0.81**	0.08
I have business experience	0.05	0.12	0.03	**0.57**	-0.29
I want a career in agriculture	**0.89**	-0.02	0.14	0.00	0.04
I enjoy learning about agriculture	**0.91**	0.00	-0.09	-0.06	0.00
I think agriculture is exciting	**0.91**	0.00	0.12	-0.04	0.07
I have studied agriculture	**0.86**	0.03	-0.04	-0.02	-0.06
I am knowledgeable about agricultural production	**0.84**	0.01	-0.09	0.10	-0.12
I have experience in agriculture	**0.88**	-0.05	0.08	-0.05	-0.02

Clusters

The analysis that was used is a two-step cluster analysis. First, a hierarchical cluster analysis was performed with the factor scores of the components, using Wards method. Table 3 shows an agglomeration schedule with the percentage change. Based on this agglomeration schedule, it was chosen to work with 3 clusters. This was done because the percentage change suddenly makes a big jump when going from three to two clusters. This means that when going from three to two clusters, a lot of information is lost, so it is better to keep three clusters.

Table 3
Agglomeration schedule

Clusters	Agglomeration coefficient	% Change
15	101.738	8.461932
14	110.347	7.805378
13	118.96	7.329354
12	127.679	7.331668
11	137.04	6.996497
10	146.628	7.266006
9	157.282	7.522158
8	169.113	9.50607
7	185.189	9.651221
6	203.062	11.94512
5	227.318	11.421
4	253.28	12.86916
3	285.875	24.40962
2	355.656	27.93261
1	455	

After this, the mean scores for the clusters were computed. These means were used as starting values for the second non-hierarchical cluster analysis. Table 4 shows how the three different clusters score on the concepts after the second cluster analysis.

Cluster 1 scores slightly above average on 'risk-taking & bearing' and 'innovative', which is significantly higher than cluster 2. Cluster 1 scores a bit high on extraverted. This is significantly different compared to cluster 2, but not significantly different from cluster 3. Cluster 1 scores high on business knowledge, which is significantly different from both cluster 1 and 2. Finally, cluster 1 scores low on 'knowledgeable about and interested in agriculture'. This is a significant difference compared to cluster 1 and 2. Because cluster 1 has good business knowledge, but does not score very high on the other entrepreneurial concepts, this cluster can be labelled "business managers".

Cluster 2 scores low on 'risk-taking & bearing', 'innovative', and 'extraverted'. This cluster also scores low on the last two concepts, 'nose for business and business knowledge' and 'knowledgeable about and interested in agriculture'. The difference between cluster 2 and cluster 1 and 3 is significant for all concepts. Because this cluster scores low on the entrepreneurial concepts and because they do not have much business knowledge, this cluster can be labelled "employees".

Cluster 3 scores high on risk-taking. The difference with cluster 2 is significant, however, the difference with cluster 1 is not. Cluster 3 also scores high on innovativeness. This is significantly different to cluster 1 and 2. It scores slightly above average on 'extraverted'. This differs significantly from cluster 2, not from cluster 1. Cluster 3 scores slightly below average on 'nose for business, business knowledge'. This is significantly different compared to the other clusters. Lastly, cluster 3 scores high on 'knowledgeable about and interested in agriculture'. This also differs significantly from cluster 1 and 2. Because this cluster scores high on the entrepreneurial concepts and has a lot of interest in and knowledge about agriculture, this cluster can be labelled "agricultural entrepreneurs".

Table 4
Concept scores per cluster

Concept		Cluster		
		1	**2**	**3**
	N	34	24	34
Risk-taking & bearing		0.20	-1.05	0.54
Innovative		0.06	-0.89	0.57
Extraverted		0.27	-0.60	0.15
Nose for business, business knowledge		0.60	-0.82	-0.02
Knowledgeable about and interested in agriculture		-0.80	-0.42	1.09

Support needs

A one-way ANOVA was done to look at the differences in support needs per cluster. Table 5 shows the mean score for each type of support per cluster. The question about the support needs was on a 5 point Likert scale, so the means are also on this scale.

Cluster 1 has no support needs that are significantly higher or lower compared to the other clusters. It does need quite a lot of support on 'technical courses' and 'support on latest technology'. Apparently this cluster is not very technical.

Cluster 2 needs also needs quite a lot of support on 'technical courses' and 'support on latest technology'. Cluster 2 needs significantly more support on 'methods to apply loan' than the other clusters. In addition to this, cluster 2 needs significantly more support on 'course on entrepreneurship' than the other clusters. Finally, cluster 2 needs significantly more support on communication with clients than the other clusters. This makes sense, because cluster 2 is less extraverted than both cluster 1 and 3.

Cluster 3 needs significantly less support on technical courses than the other clusters. Cluster 3 also needs significantly less support on latest technology than the other clusters. This indicates that cluster 3 is quite technical compared to the other clusters. Finally, cluster 3 needs significantly more support on marketing than the other clusters.

Table 5
Means scores for types of support per cluster

Type of support	Cluster			
	1	**2**	**3**	Total
Technical courses	3.94	3.75	3.03~	3.55
Support on latest technology	3.59	3.71	2.88~	3.36
Identification of quality vendors	3.15	3.5	3.03	3.2
Support on finance	2.91	3.29	3.18	3.11
How to plan cash flow	3.21	3.29	2.82	3.09
Support on profit planning	3.12	3.17	2.97	3.08
Methods to apply loan	2.74	3.50*	2.94	3.01
Course on entrepreneurship	2.74	3.58*	2.59	2.9
Identification of strengths and weaknesses of competitors	2.79	2.92	2.97	2.89
Identification of business opportunities	2.74	3	2.79	2.83
Identification of marketing trends	2.68	3	2.85	2.83
How to prepare a business plan	2.47	3.04	2.94	2.79
Support on marketing	2.26	2.63	3.09*	2.66
Support on creativeness and innovativeness in business	2.29	2.92	2.56	2.55
Support on communication with clients	2.18	2.88*	2.62	2.52

*Significantly higher compared to other clusters.

~Significantly lower compared to other clusters.

Media use

A one-way ANOVA was done to look at the differences in media use per cluster. Table 6 shows the media use per cluster. The numbers are number of hours per day. Cluster 3 uses significantly more newspaper and radio than the other clusters. Cluster 3 also uses significantly less Instagram compared to the other clusters. Another significant difference was found in the use of Snapchat. Cluster 1 spends significantly more hours per day on Snapchat than cluster 2 and 3.

Table 6
Media use per cluster in hours per day

Media source	Cluster		
	1	**2**	**3**
Newspaper	0.20	0.18	0.51*
Radio	0.25	0.32	0.72*
Television	0.49	0.65	0.75
Facebook	0.61	0.37	0.46
Instagram	1.00	0.91	0.60~
Snapchat	0.80*	0.39	0.41
YouTube	1.39	1.11	1.15

**Significantly higher compared to other clusters.

~Significantly lower compared to other clusters.

Demographical characteristics

For the gender and age variables, a crosstab was computed. Table 7 shows these demographical characteristics for the different clusters. As mentioned before in the sample description, the male/female ratio is not very good. Note that cluster 2 has more females than expected and cluster 3 has more males than expected. Also, the sample was not very well distributed for the age variable, so there is not much of a difference for the average age for each cluster. Because the survey was distributed under students of Wageningen University, the crosstab for the education variable does not show anything interesting. This crosstab can be found in Appendix 3.

Table 7
Demographical characteristics per cluster

Crosstab					
			Cluster		**Total**
		1	**2**	**3**	
Male	Count	20	9	29	58
	Expected Count	21.43	15.13	21.43	58
	Adjusted Residual	-0.64	-3.02	3.39	
Female	Count	14	15	5	34
	Expected Count	12.57	8.87	12.57	34
	Adjusted Residual	0.64	3.02	-3.39	
Total	Count	34	24	34	92
Average age		21.06	20.04	22.56	21.35

5. Conclusion

This study tried to answer the question: 'What are the characteristics of the entrepreneurs in the target market for an agri-entrepreneurial hub?'. Entrepreneurship is the process of seeking and exploiting opportunities through innovation while managing risk and uncertainty in the hope of profit. People who engage in this entrepreneurial activity are called entrepreneurs. An entrepreneur is a risk-taker who bears financial risks that come with uncertainty. He is innovative, he has the will to act and take action, he has a nose for business and good business knowledge, he has great need for achievement, he has internal locus of control and he is extraverted. Entrepreneurs have capital needs and information needs. These information needs consist of need for information on preparing a business plan, services provided by the government, planning of cash flows, business opportunities, marketing, finance, and profit planning. Furthermore, entrepreneurs have a need for an entrepreneurial network.

The results show that cluster 1 consists of people who have good business knowledge and are a little risk-taking and innovative. They have no knowledge about or interest in agriculture. This cluster is not very technical, as they would need support on latest technology and technical courses. This cluster uses significantly more Snapchat than the other two clusters. Because this cluster is not very entrepreneurial, but it does have good business knowledge, this cluster can be described as managers. Cluster 2 consists of people who do not have good business knowledge. They are also not entrepreneurial, as they do not like to take risks and they are not very innovative and extraverted. This cluster is also not very knowledgeable about and interested in agriculture. This cluster needs a few different types of support. They need significantly more support on 'methods to apply loan', 'course on entrepreneurship', and 'communication with clients' than the other clusters. This cluster is predominantly female. This cluster can be described as employees. Cluster 3 consists of people who are risk-takers and are significantly more innovative than cluster 1 and 2. They are also a bit extraverted. They are less extraverted than cluster 1, but significantly more extraverted than cluster 2. They have better business knowledge than cluster 2 but worse business knowledge than cluster 1. This cluster is very knowledgeable about and interested in agriculture. They need support on marketing and they use significantly more newspaper and radio than cluster 1 and 2. They use significantly less Instagram than cluster 1 and 2. This cluster is predominantly male. Since this cluster consists of risk-takers and innovators who have knowledge about and interest in agriculture, this cluster can be described as agri-entrepreneurs. Consequently, cluster 3 is the target market for the agri-entrepreneurial hub.

6. Discussion

This research started with the aim to provide help to the manager of the estate Schlosgut Alt Madlitz. Consequently, it is important to establish managerial implications, so the manager can make use of this research as good as possible. This research developed a method to segment the market and identify agri-entrepreneurs. The manager can use this research method in Germany and segment the German market. This will provide him with useful information that he can use for his agri-entrepreneurial hub. For example, if he finds that German agri-entrepreneurs also need support on marketing, he can choose to assist the entrepreneurs on his estate with the marketing of their products. It would be advisable to work with a larger and better-distributed sample when this research is replicated in Germany.

The scientific relevance of this research lies in the development of the method. This research developed and tested the method to identify agri-entrepreneurs. This method can be used in different regions or countries and it will help the researcher to identify agri-entrepreneurs and the characteristics and needs of these agri-entrepreneurs.

This research also has limitations. One of these limitations has to do with the sample used for the analysis. This sample was gathered by sending out the survey to students of Wageningen University. This resulted in the sample being quite young and highly-educated. Also, because Wageningen University has agricultural students, it was easy to find people who are interested in agriculture or have knowledge about agriculture. In another sample this will most likely not be the case. Even though the sample used in this research was good enough to test the method, for further research the sample must be larger and more diverse. Another limitation of this research were the unreliable scales that could not be used in the analysis and had to be abandoned. These scales were taken from other study's, but did not show to be valid and reliable in this research. Apparently these scales are not appropriate to measure the corresponding concepts. From the nine concepts that were chosen to measure agri-entrepreneurship, only six could be used. This compromised the validity of this research.

For future research it would be advisable to use other scales to measure the concepts 'will to act and take action', 'need for achievement', and 'internal locus of control'. If these concepts would have more valid and reliable scales, they could be used in the analysis. In future research it could also be interesting to ask the respondents other questions about their needs and preferences. If this is done, the cluster could be analyzed more on basis of their needs and preferences, which would give a deeper understanding of the clusters.

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Appendix

Appendix 1
Scales for measuring concepts 1, 2, 3, 5, 6,

Reference	Concept	Questions
(Bolton & Lane, 2012)	Risk taking & bearing	- I like to take bold action by venturing into the unknown. - I am willing to invest a lot of time and/or money on something that might yield a high return. - I tend to act "boldly" in situations where risk is involved.
(Bolton & Lane, 2012)	Innovative	- In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before. - I prefer to try my own unique way when learning new things rather than doing it like everyone else does. - I favor experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems.
(Bolton & Lane, 2012)	Will to act and take action	- I usually act in anticipation of future problems, needs or changes. - I tend to plan ahead on projects. - I prefer to "step-up" and get things going on projects rather than sit and wait for someone else to do it.
(Faver, 1982)	Need for achievement	- I am able to do things as well as most other people. - There is not much use for me to plan ahead because something always makes me change my plans. (R) - When I do a job, I do it well.
(Lumpkin, 1985)	Internal locus of control	- When I make plans, I am almost certain that I make them work. - Getting people to do the right things depends upon ability; luck has nothing to do with it. - What happens to me is my own doing.
(Donnellan et al., 2006)	Extraverted	- I am the life of the party. - I don't talk a lot. (R) - I talk to a lot of different people at parties. - I keep in the background. (R)

Appendix 2
Scales for measuring concepts 4, 8, 9

Concept	Questions
Nose for business, business knowledge	- I am knowledgeable about marketing. - I am knowledgeable about finance. - I have managerial and organizational skills. - I have business experience.
Interest in agriculture	- I want a career in agriculture. - I enjoy learning about agriculture. - I think agriculture is exciting
Knowledgeable about agriculture.	- I have studied agriculture. - I am knowledgeable about agricultural production. - I have experience in agriculture.

Appendix 3
Demographical characteristics of the sample

Age	21.53
Gender:	
• Male	63%
• Female	37%
Education:	
• No education	0%
• Primary school	0%
• Secondary school	3.3%
• Vocational school	3.3%
• University of applied sciences	1.1%
• University bachelor	78.3%
• University master	14.1%
• Other	0%

Appendix 4
Education level per cluster

Crosstab

		Cluster			Total
		1	**2**	**3**	
Education level					
Secondary school	Count	2	1	0	3
	Expected Count	1.1	0.8	1.1	3
	Adjusted Residual	1.1	0.3	-1.3	
Vocational school	Count	0	0	3	3
	Expected Count	1.1	0.8	1.1	3
	Adjusted Residual	-1.3	-1	2.3	
University of applied sciences	Count	1	0	0	1
	Expected Count	0.4	0.3	0.4	1
	Adjusted Residual	1.3	-0.6	-0.8	
Univesity bachelor	Count	26	20	26	72
	Expected Count	26.6	18.8	26.6	72
	Adjusted Residual	-0.3	0.7	-0.3	
University master	Count	5	3	5	13
	Expected Count	4.8	3.4	4.8	13
	Adjusted Residual	0.1	-0.3	0.1	
Total	Count	34	24	34	92

Appendix 5
Survey

1. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) I like to take bold action by venturing into the unknown.
   2) I am willing to invest a lot of time and/or money on something that might yield a high return.
   3) I tend to act "boldly" in situations where risk is involved.

2. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before.
   2) I prefer to try my own unique way when learning new things rather than doing it like everyone else does.
   3) I favor experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems.

3. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) I usually act in anticipation of future problems, needs or changes.
   2) I tend to plan ahead on projects.
   3) I prefer to "step-up" and get things going on projects rather than sit and wait for someone else to do it.

4. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) I am able to do things as well as most other people.
   2) There is not much use for me to plan ahead because something always makes me change my plans. (R)
   3) When I do a job, I do it well.

5. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) When I make plans, I am almost certain that I make them work.
   2) Getting people to do the right things depends upon ability; luck has nothing to do with it.
   3) What happens to me is my own doing.

6. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) I am the life of the party.
   2) I don't talk a lot. (R)
   3) I talk to a lot of different people at parties.
   4) I keep in the background. (R)

7. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) I am knowledgeable about marketing.
   2) I am knowledgeable about finance.
   3) I have managerial and organizational skills.
   4) I have business experience.

8. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) I want a career in agriculture.
   2) I enjoy learning about agriculture.
   3) I think agriculture is exciting

9. Please rate the following statements. (5 points Likert scale, strongly disagree – strongly agree):
   1) I have studied agriculture.
   2) I am knowledgeable about manufacturing in agriculture.
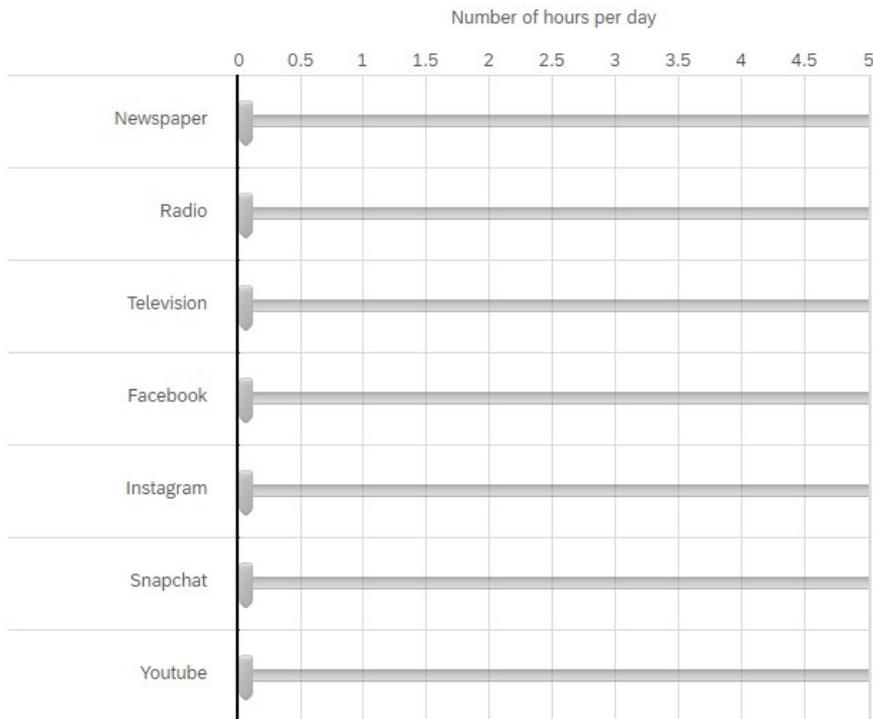   3) I have experience in agriculture.

R = Reversed score

10. Imagine you are an entrepreneur and you are starting up a business. What kind of support would you like to receive? (5 points Likert scale, No support needed – A great deal of support needed):
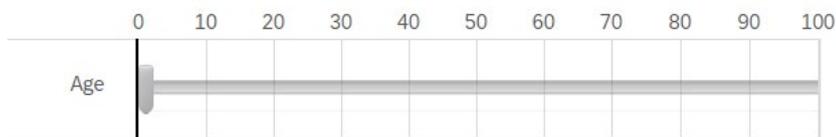
    Information on:
    1) How to plan cash flow
    2) How to prepare a business plan
    3) Support on profit planning
    4) Support on communications with clients
    5) Identification of business opportunities
    6) Course on entrepreneurship
    7) Support on creativeness and innovativeness in business
    8) Support on marketing
    9) Support on latest technology
    10) Support on finance
    11) Identification of strengths and weaknesses of competitors
    12) Identification of quality vendors
    13) Identification of marketing trends
    14) Technical courses
    15) Methods to apply loan

11. How many hours per day do you use the following media channels?

Number of hours per day

	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
Newspaper											
Radio											
Television											
Facebook											
Instagram											
Snapchat											
Youtube											

12. How old are you?

	0	10	20	30	40	50	60	70	80	90	100
Age											

13. What is your gender?
   o   Male
   o   Female

14. What is your highest level of education (or where are you currently enrolled?

   o   No education
   o   Primary school
   o   Secondary school
   o   Vocational school
   o   University of applied sciences
   o   University bachelor
   o   University master
   o   Other:

15. What is your postal code?