

The effect of entrepreneurial identity on entrepreneurs' decision making regarding the use of innovative technologies

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ABSTRACT,

To find out what influences entrepreneurs' decisions and in which areas their decisions differ the most, we conducted a qualitative study in the form of interviews among Spanish winegrowers. We found that entrepreneurial identity plays a major part in entrepreneurial decision making further investigating its dimensions and elaborating on them.

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Keywords

Entrepreneurial decision making, entrepreneurial identity, esca disease, innovative strategies

1. INTRODUCTION

Due to its enormous size and sensitivity to weather conditions, agriculture is the sector most vulnerable to climate change, having significant economic effects (Malhi et al., 2021). With climate change, pests and diseases from low latitude regions, where they are much more prevalent, may be introduced at higher latitudes due to climate variables, especially temperature, wind, and humidity, which determine the geographic distribution of pests (*Chapter Twenty-Four PREDICTED EFFECTS OF CLIMATE CHANGE ON AGRICULTURE: A Comparison of Temperate and Tropical Regions*, n.d.). All climate models predict more extreme weather in the future as a result of climate change, which will influence when and where plant diseases will occur and will therefore impose serious risks on farmers regarding crop failure and yield (Gautam et al., 2013). Viticulture, much like other sectors of agriculture, is greatly affected by both biotic and abiotic factors such as diseases, which have become a limiting factor for winegrowers in many countries (Fischer & Peighami-Ashnaei, 2019). The most prominent type of diseases that causes problems in the wine sector are trunk diseases, which are considered one of the most relevant challenges for viticulture. These diseases cause damages in vineyards every year and are of rapidly growing concern in a significant amount of winegrowing regions (Fontaine et al., 2016). There are four major grapevine trunk diseases, all caused by different fungi, one of which is Esca disease which is a major problem in Europe (Fontaine et al., 2016). The impact of Esca disease around the world is an issue of great importance due to the negative effects it has on the longevity of the vineyards and the economic consequences attributed to production losses, both of which increase due to the rising number of Esca epidemics in all wine-producing countries (Borgo et al., 2016).

Entrepreneurs work in different contexts and may choose to take advantage of new innovations or stick to conventional methods for a variety of motives and limitations, which are not always related to profit (Ramkumar, 2020). In the case of winegrowers, besides ignoring the risk, winegrowers have multiple ways of dealing with the risk. One of the most favourable and popular ways to protect plants from pests, weeds and fungi like Esca being through the use of pesticides (Kumar et al., 2019). The admission of these pesticides is mainly achieved by spraying large areas of land with vast amounts of these chemicals (Kumar et al., 2019). To make agriculture more sustainable, new admission techniques should be studied and applied because this conventional use of pesticides can pose risks to the environment and to the health of humans (Kaur et al., 2019). But research is improving the availability of new, more sustainable methods for mitigating risks like diseases in a sustainable way (Kumar et al., 2019). One of the innovations on the area of pesticides are biopolymer-based nanocarriers for agrochemicals, which help to make pesticides more targeted and provide a more long-term solution because of their sustained release (Machado et al., 2022). Because of the mentioned developing risks in agri- and

viticulture, there is a significantly growing interest in sustainable ways of managing agrochemicals like pesticides (Arora, 2019). While nano-encapsulation could possibly provide an outcome for winegrowers to prevent and cure¹ Esca disease in the future, there are some negative aspects of nanotechnology that could affect or even prevent the successful commercialization of biopolymer-based nanoformulations, including toxicological risks to human health and the environment as well as unclear regulation, legislation, market acceptance, and acceptance (Machado et al., 2022). As described before, entrepreneurs can have different motives and limitations for choosing to implement an innovation (Ramkumar, 2020). To help entrepreneurs find mitigation strategies for risks like plant diseases, more research is needed on how entrepreneurs make decisions and in what areas their decisions differ the most. In our research we dive into entrepreneurial decision making regarding innovation adoption. We try to find out what their approaches to risk management are and what their attitudes and expectations towards innovative technology are.

One of the factors that might influence entrepreneurial decision making might be entrepreneurial identity. Which has already been proposed by Grabow et al. (in press). This identity theory (Fauchart & Gruber, 2011) was deemed as a possible answer to our research so the needed literature review of it was done to get a good grasp on the concept before the study so we would be able to identify it and we would not have to review it close before the end. Building on this theory was not the goal of our research, but after considering this as an option in the results, we came to a similar conclusion, further investigating its actual role and broadening its definition. Risk management is also a relevant topic our study. It is concerned with how entrepreneurs deal with risks which is what we are focusing our research on which is why it is included in the literature review, in this research. The literature of risk management is also relevant because it highlights how big of a role this topic plays in entrepreneurship in general. Lastly, technology acceptance is reviewed, which is relevant because in this section more information is given on the certain technology that is chosen in the entrepreneurial setting and explains the importance of adopting innovative technologies.

The goal is to establish how the decisions entrepreneurs make differ the most and what influences how those decisions are made. The way we want to find this out is by finding out what factors influences entrepreneurs' expectations and attitudes towards innovative risk mitigation strategies for diseases like esca by sketching an image of the interviewees and then establishing their views on the chosen innovative technology of nano-encapsulation technology. Investigating the entrepreneurs' decision making process. We want to know from their perspective how they are experiencing the esca disease and their preferred method of mitigating it. By doing this we try to find out what motivates them to use either conventional or innovative methods of dealing with esca. We are interested in their risk mitigation strategies, which may add to literature on how

¹ Only the chemical version until now can cure

entrepreneurs deal with risks in general. Our research question is what influences entrepreneurial decision making regarding conventional and innovative approaches for risk mitigation and in which areas do their decisions differ the most? To answer this question we conducted five interviews with Spanish winegrowers to see how their attitudes towards innovative a certain innovative risk mitigation strategy differs. The data collection and the analysis of the data is aimed at understanding how Spanish winegrowers' backgrounds differ in forms like environment, motivations, limitations, and how their approaches to risk management may be affected by these differences.

Firstly we expand literature on entrepreneurs' attitudes towards emerging and disrupting technologies, more specifically nano-technology. The sample used in our research may be representative of how open entrepreneurs in Spanish viticulture are to new innovations. With the results of this research, we gain information about technology acceptance by winegrowers and could be extended from the discussed micro-encapsulation technology to other new technologies. This research contributes to literature on technology acceptance in this way.

We also expand literature on entrepreneurial decision making (Shepherd et al., 2014). An entrepreneur has to also make decisions about exploiting opportunities, like that of exploiting new technology (Shepherd et al., 2014). The attitudes and expectations we find in our research may be roughly translated into decision making as high technology acceptance can be translated in decision habits where entrepreneurs are deeply involved in choosing innovative strategies over conventional ones. We find out what are the actual decisions they make for their attitudes will most likely reflect their current way of solving problems. The data we will collect will add to the data about entrepreneurial decision making in general. What entrepreneurs are deciding, and what.

This research could offer value to businesses not only in the viticulture sector, but businesses in the agricultural sector as a whole. Mostly the innovating suppliers offering pest control solutions can take value in this research for it gives them an indication as to what would potentially be best marketable to their customers. It gives them an insight in their customers identities, who they are and what they want. This helps companies to manage expectations and adjust their product according to what we show is important to Spanish viticulturists. If the results of this research for example show that many Spanish winegrowers prefer to abstain from agrochemicals, then companies can interpret this as a signal to instead market *Trichoderma* based nano-solutions which might become available in the near future (Machado et al., 2022). This research can be interpreted by innovating companies willing to enter the Spanish agricultural and viticultural market to see what is expected of their products and if the viticulturists are willing to accept the new technology.

The structure of this paper is as follows. First we present the theoretical framework. Where we review relevant literature. Second, in the methods section, we explain more about the context the research was performed in. We explain the research design and the methods used. After this, the results are presented in section four. In section four, we explain our findings regarding entrepreneurs' different approaches. Finally we present the discussion and conclusion section where the findings get linked to the research question and an answer to it is sought. In this last section, the limitations and practical implications are presented next to future research suggestions.

2. LITERATURE REVIEW

2.1 Entrepreneurial identity

Entrepreneurial identity builds on an array of many different theories with among those identity theory (Stryker, 1968), role identity theory (McCall & Simmons, 1978), social identity theory (Tajfel, 1982), narrative identity theory (Ricoeur, 2012), and identity work (Snow & Anderson, 1987; Sveningsson & Alvesson, 2003) (Radu-Lefebvre et al., 2021) (Grabow et al., in press).

Fauchart and Gruber (2011) categorize entrepreneurial identity into three types: Darwinians, communitarians, and missionaries. Darwinians focus their attention mainly on producing strong and profitable firms. They often start their businesses with the primary motive of making profits and accumulating personal wealth. Communitarians more often start their businesses out of an already existing passion for the domain they operate in. They identify strongly with the community and that is where the name comes from. Communitarians are more concerned with quality and care more for their customers. The third type identified by Fauchart and Gruber is the missionary identity. Missionary entrepreneurs believe that firms can be powerful agents of change in a society. Their main reason of starting a business is said to be to create a platform from which they can advance specific causes, usually of a social or environmental nature, and pursue their political visions (Fauchart & Gruber, 2011).

Several studies have already been conducted to explore the link between entrepreneurial identity and entrepreneurial behavior. According to Sveningsson and Alvesson (2003), at the individual level, identity is central to meaning, motivation, decision-making, and other activities that can be seen as critical for entrepreneurial action (Donnellon et al., 2014). Also, many theories argue that identity construction is an important part of creating entrepreneurs and those with a stronger entrepreneurial identity are more likely to engage in entrepreneurial activities (Donnellon et al., 2014). Those who have a strong entrepreneurial intention also view themselves more like an entrepreneur, this entrepreneurial intention is influenced by multiple factors such as entrepreneurial experience, which directly influences anyone's intention to launch a new business, as do national culture of a country and the entrepreneur's intention, perception of feasibility, and desirability (Sajjad & Dad, 2012).

Entrepreneurship education and training are also of much impact on entrepreneurial identity. Numerous empirical studies have demonstrated that two key factors influencing students' decisions to pursue an entrepreneurial career are the availability of entrepreneurship training courses in academic programs and a favourable perception of entrepreneurs on college campuses (Autio et al. 1997; Johannisson 1991) (Fayolle & Gailly, 2015).

The identity of the individual entrepreneur, consisting of their own personality traits, greatly affects how they make decisions in their venture and deal with risks (Rauch & Frese, 2007). According to Rauch and Frese (2007), entrepreneurs who exhibit high levels of extraversion and openness to experience are more likely to engage in innovative and risky behaviour.

2.2 Technology acceptance

In many industries, technological innovation is the main force behind competitive success, it can help offer new, differentiated features and product innovations help to make the manufacturing process more efficient (Schilling, 2004). One of the innovations in the space of viticulture is nano-encapsulation which, as Machado et al. (2022) describe in their research paper, can provide many benefits to agriculture. This innovation provides a seemingly perfect fitting solution to the problem of fungal

diseases in grapevine trunk diseases. It is a form of targeted drug delivery where plants can essentially be cured and protected from diseases such as esca on a long term by sustained release of certain agrochemicals (J. Fischer et al., 2019). Before this innovation, there has not been any curative treatment for esca disease and the only measure of risk mitigation towards esca disease farmers could do was preventive spraying of fungicides several times per year, which can reduce the danger of infection, but is also detrimental for the environment and uneconomical (J. Fischer et al., 2019). Only 30–40% of the 1-2.5 million metric tons of active ingredients applied each year reach the intended crops because of various factors like rainfall and degradation (Arias-Estévez et al., 2008).

Nano-encapsulation technology provides many benefits, but it also poses some potential risks or drawbacks of their use, such as funding problems and poor knowledge about toxicological risks which may harm the adoption of the technology (Machado et al., 2022). Innovations can make a radical change and be the perfect solution to the consumer, but the consumers need is still often the key to success, the process of which may be slow and typically follows an S-curve (Dunphy & Herbig, 1995). The adoption of an innovation may not be as straightforward as it seems and apart from technical risks and drawbacks, many personal factors like perceived usefulness, personal innovativeness, peers, and social network, affect innovation adoption at an individual level (Talukder, 2014).

While there is an urgent need for action in agriculture to implement novel solutions for coping with current trends (Machado et al., 2022), a study by Duong et al. (2019) suggests only seven percent of agriculturists use new-technology adoption as a risk-mitigation strategy. Because of this need for implementing novel solutions, research on novel technology acceptance in Agri- and viticulture is needed. In our research we will use these aspects as well to build an image of the entrepreneurial identities. Fauchart and Gruber (2011) pose different entrepreneurial identity types that each may react differently to disrupting innovations, some may be more reluctant to adopt rising technologies than others.

2.3 Risk management

Part of being an entrepreneur involves dealing with risks and risk management is a critical aspect of entrepreneurial success. In their research, Falkner and Hiebl (2015) highlight the importance of risk management practices on success of small and medium enterprises. Nevertheless, the risk management process consists of many activities such as risk identification, risk analysis, selection of techniques, strategy implementation, and control (Falkner & Hiebl, 2015).

Another important aspect of risk management is risk perception. Farmers' perceptions of the risk have an impact on how they manage that risk (Mankad, 2016). Farmers' risk perceptions vary depending on their socioeconomic backgrounds (age, education, culture, religion, farming practice, income, peer pressure, and community values), which has an impact on their economic behaviours and decision-making (Duong et al., 2019). Thus entrepreneurial identity may influence winegrowers' risk perception.

Scholars have identified climate change can lead to productivity and profitability problems among viticulturists (Sgroi & Sciancalepore, 2022). Aside from ignoring the risks, entrepreneurs can deal with these problems in conventional ways like insurance (Sgroi & Sciancalepore, 2022) and synthetic pesticides, or through innovative ways like new technologies (Kumar et al., 2019). Our research dives into risk management and further explores the factors that influence it.

2.4 Entrepreneurial decision making

In literature, different types of entrepreneurial decisions have been identified like opportunity assessment, entrepreneurial career, and funding decisions which are all influenced by various factors (Shepherd & Patzelt, 2017).

Cognitive biases are an important factor that influences an entrepreneurs decisions. Ahmad et al. (2020) show the presence of behavioural biases that prevent entrepreneurs from making rational decisions thus can impact the entrepreneurial decision making process in a negative way. Related to cognitive bias are personality traits. Personality traits also influence the entrepreneurial decision making process as described in literature and is interdependent with cognitive bias and entrepreneurial decision making (Han, 2022). When trying to understand the factors that influence an entrepreneurs' decisions it is imperative to take these two into account as they have already been found to be of great influence on an entrepreneurs' decisions.

Bastian & Zucchella (2022) explore the role of metacognition in the decision-making process of nascent entrepreneurs and find that nascent entrepreneurs heavily rely on the input of others and consider alternatives outside their start-up, which supports their decision-making processes. Metacognition refers to the understanding of one's own thought process (*Metacognition*, n.d.).

Furthermore, the ability of entrepreneurs to make strategic decisions has been deemed crucial for the performance of their ventures (Feng et al., 2022). A study conducted by Feng et al. (2022) identified five factors that affect an entrepreneurs ability to make strategic decisions: attention, memory, thinking, emotion and sentiment. Understanding and improving on these factors can enhance strategic decision making abilities and improve a venture's performance (Feng et al., 2022).

One research by Grabow et al. (in press), suggests entrepreneurial identity can also have an effect on the entrepreneurial decision making process. In their research, Grabow et al. (in press) presented multiple dimensions of entrepreneurial identity which supposedly influences an entrepreneurs decision making process regarding adoption of innovative risk mitigation strategies: risk awareness, risk approach, risk-reduction requirements and reputational risk management.

In this paper, we try to add to the literature of entrepreneurial decision making as it is somewhat under researched in its broader terms. We want to find more factors that influence entrepreneurial decision making.

3. METHOD

To answer our research question, 'what influences entrepreneurial decision making regarding conventional and innovative approaches for risk mitigation and in which areas do their decisions differ the most?', we have performed a qualitative research in the form of interviews. We have invited more than 150 winegrowers and winegrowers associations for an interview. Ideally we select some that are part of a winegrowers association, some that are biological, and some that do not match any of these criteria. The research was conducted from a grounded approach and in an inductive method. Although considering multiple factors that might influence an entrepreneurs decision making process like entrepreneurial identity. We found from the beginning that a more open approach was more fitting and we decided the process should be more open towards different results. We did not set out to prove or elaborate entrepreneurial identity theory, but with our inductive approach we found that, after conducting some interviews and reviewing the work of Grabow et al. (in press) again, a pattern seemed to be apparent

and maybe it would be possible to classify the participants through entrepreneurial identity, thus we chose to further investigate include this theory as a part of our research. To be able to compare results with the research of Grabow et al. (in press), some of the same questions were asked in the interviews when found relevant for the winegrower.

3.1 Empirical setting

There are four major grapevine trunk diseases, all caused by different fungi, one of which is Esca disease which is a major problem in Europe (Fontaine et al., 2016). As one of the oldest known vine diseases, esca disease, which is currently wreaking havoc on Europe's grapevines, is complex and poorly understood, but it is known to be brought on by multiple pathogenic fungi infecting the vasculature at the same time (Valtaud et al., 2009). Chronic esca includes symptoms inside the trunk and larger branches, on the shoots and smaller branches, on the leaves, and on the berries. On adult plants (8 to 10 years and older), the most prevalent internal symptom is white rot, which gradually transforms the hard wood into a soft, friable, spongy mass (Mugnai et al., 1999). On plants that are younger than 8 to 10 years old, a limited wood discoloration inside the trunk is frequently linked to the external leaf and berry symptoms of esca (see below) (Mugnai et al., 1999). Light green or chlorotic, rounded or irregular spots between the veins or along the leaf margins are the main symptoms on leaves, and they typically spread outward to the distal parts of the shoots (Mugnai et al., 1999).

Innovation is producing new ways for entrepreneurs to deal with grapevine trunk diseases like esca. One of these being biopolymer-based nano-encapsulation, which could offer entrepreneurs a new delivery method for fungicides (Machado et al., 2022). This is the technology we choose to keep in mind in our research as from the technical aspect, it offers a fitting solution to many entrepreneurs. This is a technology that allows sustained release of agrochemicals such as pesticides which has many benefits (Machado et al., 2022). Among these benefits are long-term protection of the plant, lowering of toxic threat, lowering of pesticide dispersion, and a decrease in crop failure (Kumar et al., 2019). This technology can essentially make grapevines immune to esca disease and thus can help viticulturists mitigate the risk of esca infection (Machado et al., 2022). We will keep to ways in which this technology can help viticulturists in mind. Nano-encapsulation can aid the sustained release of pesticidal chemicals, but can also aid the sustained release of Trichoderma spores, a myco-pesticide, which can also be effective against fungal pathogens (Machado et al., 2022) (Naher et al., 2014). Rules that are used to define organic farming in the EU limit the use of synthetic fertilisers and pesticides to almost nothing (*EUR-Lex - 31991R2092 - EN - EUR-Lex*, n.d.). It is therefore important that we also consider the Trichoderma option in our research for we will most probably come into contact with winegrowers who are not open to using synthetic pesticides.

3.2 Selection

In our study we have focused on Spanish winegrowers from all regions. As the time was limited, we contacted as much winegrowers in Spain as possible. The goal was theoretical saturation which would mean we would not gain new insights from conducting more data collection (Hennink et al., 2016). Due to the limited time that was available, we took it upon ourselves to conduct interviews with all of the wine farmers that were able to participate in the month of May 2023 and the first week of

June. These winegrowers should be from different backgrounds to be able to make a good comparison between them. These aspects included region, vineyard size, organic certification, and whether they use biodynamic, partially biodynamic, or non-biodynamic farming methods. The farming methods used to produce biodynamic wine treat the farm or vineyard as a single, functioning organism, with each area of the ecosystem contributing to the operation of the next. The idea is to create a self-sustaining system, using natural materials, soils, and composts to sustain the vineyard. (Denig, 2021). These growers were contacted by e-mail to reach a considerable amount of winegrowers time-efficiently and sometimes by phone if no response was received to make it more personal and thus be more likely to get a quick response. The selected person did not always have to be the owner of the company. As better information might be gained by interviewing an employee of the research and development department. It can be said the situation is heterogenous for all winegrowers because their situation will never be fully the same. Although the strategy differed, removing and burning infected plants was the most common choice.

Region	Organic certification	Biodynamic	Size of winery (in ha)	Strategy
Ribera del Duero	No, only one specific wine is certified	Fully	28	Copper and Sulphur for attacks, Cleaning of equipment, omega grafting, creating feeding ground for trichoderma
Sierra de Gredos	None	Not at all ²	0.5	None
Castilla La-Mancha	All wines	Partially	39	Azufre de Cal, ovidices,
Rioja	None	Not at all	300	Copper mastic, Trichoderma, Tessior,
Ribera del Duero	None ³	Not at all	80	Polyazufre y Cal, hydrogen peroxide, bacterial treatment, Copper has been used as well but not regularly

Table 1 list of participants in this study. For strategy, separating and burning plants was not considered as this was a general approach

3.3 Data collection

As a data collection method, semi-structured interviews were conducted in Spanish and English via the online platform Zoom. The way of questioning was kept flexible and was adapted according to results from previous interviews following an

² This farmer is not biodynamic but claims to not use any chemicals at all. No pesticides, herbicides, fertilizers etc.

³ This farmer is transitioning to organic in 2024

inductive approach. Some recurring themes were among current mitigation techniques, risk perception and important characteristics of crop protection products as well as some themes that fit the participant. Although often asked to give quite exact information like minimum efficacy rate and the financial loss of esca, it became apparent that many entrepreneurs were not able to answer question precisely.

Our research followed grounded theory (Noble & Mitchell, 2016) and an inductive approach (Caulfield, 2022). Which meant we based some of our theory on data already collected. Based on the results of the data we were able to figure out what could be left out or what should be added in the next interview considering our research question as well.

3.4 Data analysis

All interviews were recorded and were semi-intelligent verbatim transcribed (Technologies, 2021). Due to the language barrier between Spanish and English that was sometimes present and the vagueness arising from filler words, this approach was chosen. To analyse this data the Gioia method was chosen (Gioia et al., 2012). We wanted to analyse the data simultaneously as we were collecting the data, that is by gaining more insight in the thought process of entrepreneurs and adapting our research to gain more insights. We found a pattern in the data that suggested entrepreneurial id

Two rounds of first order analysis were performed. A combination of coding techniques was applied (Grad Coach, 2021). After the first round of coding, general concepts arose that were capable of explaining what some of the concepts handled in the interviews were, but were not deemed useful enough to analyse and move to the second order concepts. Because of that, a second round of first order coding was done. Which retrieved a long list of useful codes. And the second order concepts were formed. In doing this, it is important that we do not keep only hard data in our mind but also the expressions and emotions shown by the interviewee. In reviewing and grouping the first order concepts some codes were adapted and some were added, based on the expressions made that were not explicitly present in the recordings. The first order concepts were listed in excel and subsequently further categorized in second order concepts. 24 second order concepts got realized which were further integrated into aggregate dimensions (Gioia et al., 2012). The gioia tables can be found in the appendix.

4. RESULTS AND DISCUSSION

Although there was some form of consensus among winegrowers on the subject of risk perception. Their approaches to risk and attitudes towards innovative risk mitigation techniques still differed. All winegrowers described a current situation of low risk regarding esca disease, with the bigger problem being more direct effects of climate change like drought and change of timing. Nevertheless they mentioned that because the spread of esca has already changed before, in the form of region but also in the form of which plants are effected the most, their problems with esca might very possibly become bigger in the future. Although some interviewees described they were not directly seeing the problems caused by climate change, they could still see the problems in the big picture. Almost every vineyard had a history with esca and has been familiar with it for some time, knowing how to detect esca and having established mitigation strategies. Although reporting low stock failure, most vineyards are taking esca very seriously by removing infected plants and burning them, if they do not make a quick recovery. All vineyards seem to be aware that removing the plants is important. Another thing that was quite prevalent is the move to sustainability. The research seems to indicate that, while having

different motives, organic farming is becoming more popular and will keep becoming somewhat more popular with one interviewee saying “In some municipalities of Canada or Sweden they are looking just for organic wines so we think that in the future organic wine should not be an option. It’s necessary”. While this research was conducted we realized different winegrowers want different things from innovating technology. For some economic efficiency and ease was the most important. Others indicated the need for treatments to be biological based or non-synthetic while being as effective as their synthetic counterparts. The age of the vines is, in general quite old, which was described to lower the risk of esca, but also means the costs of replanting is high per plant. Problems with esca are very well known in the Spanish wine community, but they are in general not considered problematic which is sometimes attributed by the current climate and the grape varieties. One treatment that was mentioned the most often among the interviews was based on Limestone and Sulphur, e.g. Azufre de Cal, Polyazufre y Cal. The use of copper after pruning was also mentioned multiple times. The intensity of treatment usage can be considered quite low for most farmers. Which most likely can be attributed to a low-risk situation that was expressed by every interviewee. All interviewees expressed that although Esca might be a problem somewhere else, it doesn’t produce a high risk for them.

During the data analysis process, considering the previous work on entrepreneurial identity Grabow et al. (in press), It became apparent that entrepreneurial identity might be the biggest influence on entrepreneurial decision making. This theory proposed by Fauchart and Gruber (2011) included three identity types that could be observed in the sample. Although theory on this already exists, other factors seemed to also be important. A difference in context could also be observed, whereas Grabow et al. (in press) seemed to observe a high stake situation, it can be said that the risk was much less apparent in our sample.

4.1 Founder identity based findings

One of the most important factors that seemed to contribute to entrepreneurial decision making was founder identity. On the hand of business function a pattern was recognized. Three main business motives were detected. Quality, culture and tradition retention, and conduction of a message. It seemed that all of these different business motives had some form of consensus among them, whereas other identities seemed to have largely different opinions regarding risk management of disease and risk management of adopting new technologies. Some farmers were moving towards organic operations, but according to the function their business has, other reasoning for this was given. All winegrowers seemed to agree on the fact that the treatment should be applied by themselves.

These three business motives, having an enormous impact on their attitudes throughout the whole decision making process, can be linked to the three founder identities proposed by Fauchart and Gruber (2011). These three identities being Darwinians, Communitarians, and Missionaries. In this research 1 Missionary, 1 Communitarian and 2 Darwinians can be identified. 1 winegrower had a hybrid identity, functioning both as a Communitarian and a Missionary. The Darwinians and the Missionary had particularly strong identities while the communitarians may have displayed characteristics of Darwinians. When exclusively categorizing on business motive though, the communitarian can still be classified as such. In the end, the current approaches did not differ significantly between the identities, except for the full Missionary. Through further analysis though, it was found their reasonings for those approaches did significantly differ.

The clearest identity was Darwinians. These businesses shared one common motive which was value creation. The Darwinians claimed to aim most of their treatments on protecting their quality. Although environment was also considered, value creation went above all else. Quality was mostly pursued to increase the value of the product. The Darwinians were not organically certified but one of the two was on their way to receive an organic certification in 2024, the reason for the certification was explained to be yet again, value creation. They explained that to reach a broader audience in Scandinavia and Canada, the certification was needed. Their size can be considered relatively big. The main concern Darwinians have regarding innovation adoption was the maintaining of quality.

One clear Missionary could be identified in the sample. This vineyard had a very radical approach and a message to give to the world. Although very small and being classified as a “micro-vineyard”. This identity was very clearly recognized and had little overlap with other identities. They described that they give a good example of the possibilities in all natural farming. They expressed low stock failure of esca and little other comparable problems. The motive of this business was identified to be teaching consumers and other farmers their view and showing their way of working. This identity can be said to have strong opinions, in this case about treatments with pesticides and fertilizers. They claimed nature should be left alone and treatments cause unnecessary harm to the environment. They expressed climate change and degradation of the soil should be considered more by society. Something interesting about this winegrower was that although believing in an all-natural working method they were not organically certified. They expressed that organic growers should not have to pay to get organically certified, but the polluters should pay. Product transparency was high.

The third recognized identity was Communitarians. The most important thing to them was maintaining culture and tradition. They were quite good at estimating the financial loss due to esca. And had a long history with the disease. They were ready to use treatments and had some form of image of what worked for them and what didn't. What characterized the communitarian is that they feel strongly that wine is part of their culture and they are part of the wine making community. The full communitarian was a family business and had a history of multiple generations. They showed an incline to the try and see approach regarding customer opinion. The most important factors of a new treatment to them was ease of use.

The hybrid identity of communitarian and missionary was categorized this way because they portrayed a strong sense of belonging to the winemaking community and importance of culture: “I feel strongly that wine is part of our culture and our cultural heritage” but also expressed they have a responsibility towards the environment: “we have a very big responsibility and we must always think about how we can limit our impact on all that”.

4.2 Brand image

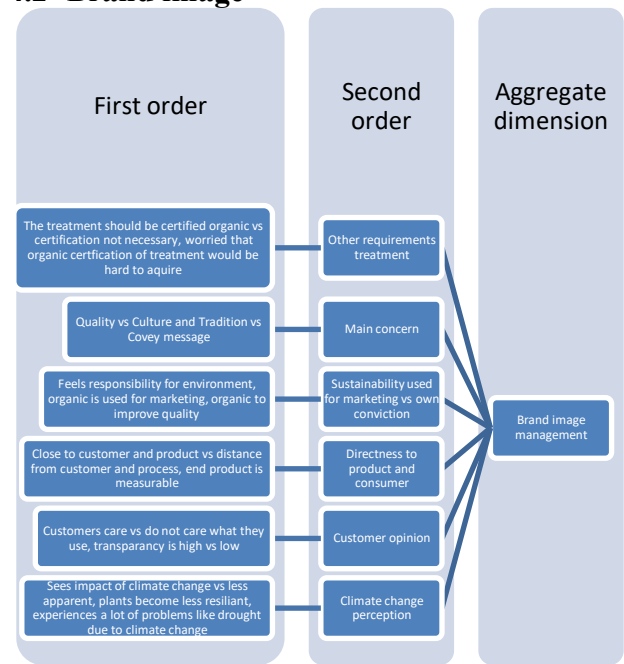


Figure 1 Gioia table of brand image, responsibility was also derived from a similar path

All different winegrowers had a different reputation to hold up and different agendas regarding customer treatment. The Darwinians had to hold up their product value, the Missionary their identity of being radical environmentalists, and the communitarian the traditionality of their product. The level of transparency seemed to be the highest for the missionary, where the most important goal was to show their radical image. All identities wanted to keep up their reputation, but the structure of their reputation was the factor that seemed to influence their decision making. Although it can be said, every identity is very keen on maintaining their reputation, they have different reputations to hold up which influences the distribution of flexibility. Grabow et al. (in press) defined this element as reputational risk management, but due to the fact we consider requirements for brand image consistency we chose to give it the name “Brand Image Management”

In general, the Darwinians can be considered as less worried about customer perception of operations. In this research, it seemed that the Darwinians had a less direct contact with their customers compared to the other identity types. The way this showed in their expectations towards innovative risk mitigation strategies was the need for official validation. When asked about whether customers would have worries about adopting a new mitigation strategy like this, one stated the following: “Using nano-technology products might worry customers because with the products we use now it's stated that there's no problems with them”. It became apparent that Darwinians displayed less customer transparency compared to the others with the emphasis on the end product. They expressed that their customers are less bothered by the use of pesticides as long as the necessary certifications were present.

The communitarian(s) showed the most product flexibility, suggesting a new line of products where the treatment is used and if customers show problems the line is cancelled. Certifications were still required but mostly from a technical perspective, where the certification seemed more important than the actual working method.

The missionary showed the least flexibility in changing operations. Although stating that they are flexible in their product, “maybe the nature of the wine and the taste and quality of wine will change but that’s okay. I don’t have a trademark that has to be the same for every year”. They expressed that they had a reputation among their clients of being extremely radical as to using no products in their wine production which was the central point where the business was built around. They explained that natural wine is poorly defined due to lack of legislation thus products like sulphite are allowed for use. Nevertheless, this identity chooses high transparency towards customers. A missionary explained keeping up this radical brand is very limited in some sense and could sometimes benefit from sulphite use. Yet, they were less open to innovation usage saying it would be a waste of their philosophy

4.3 Responsibility

One minor dimension which was less apparent but still worthwhile to highlight is responsibility which is tightly linked to brand image. Although this dimension has not been proposed by Grabow et al. (in press), it could be an effective addition to the concept of entrepreneurial identity. Responsibility is a concept that may be used in all contexts of entrepreneurship. This dimension is deemed minor because it might not be very apparent at first. It could still be an important factor though, for we suggest it might influence the decision making process of an entrepreneur. And influences reasoning for a move towards sustainability.

The main thing the Darwinians felt a responsibility to was quality and consistency. They seemed to express that for them, it was important to keep making qualitative and consistent wines with economic efficiency. Although Darwinians seem to express some concern for the environment, the main goal is still economic efficiency. They feel the most responsibility towards value creation.

Communitarians felt more of a responsibility towards tradition and culture but also somewhat to the environment. They were more open to using treatments to prevent crop failure but showed a closer contact with their direct environment and customers. The customer experience is central and the whole process of winemaking, not just the end product is considered. One statement made was “We feel very strongly that wine is part of our culture and our cultural heritage”. Communitarians feel the most responsibility to customer experience and tradition which transparency is a part of. Also having a substantial offer of winery and vineyard tours.

Missionaries can be perceived to feel the most responsibility towards the environment. Expressing the most worries about chemical treatments and willingness to accept crop failure. “I am very concerned about the environment in general, there’s far too many chemicals being used in the environment”. Missionaries have been observed to feel the most responsibility towards their philosophy.

4.4 Risk approach

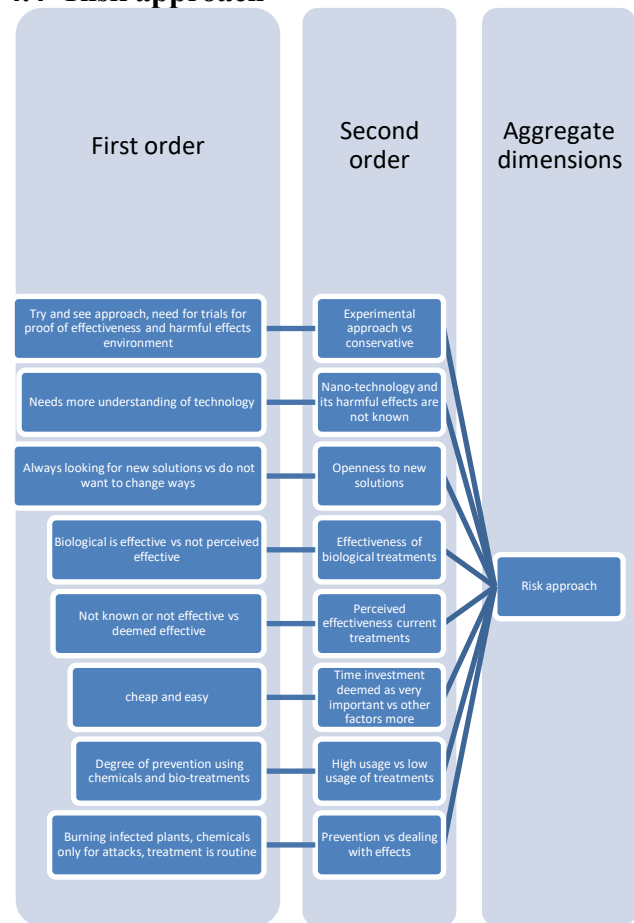


Figure 2 Gioia table of risk approach

It seems that all identities seem to prefer the biological solution which can possibly be attributed to the low-stake situation where a bio treatment could be used to increase revenue with an organic certification, and effectiveness was not needed as much as for a situation where esca is more prevalent. Regarding risk mitigation approaches, Darwinians have more of an experimental approach but valued institutional approval. The two Darwinians in our sample were very open to try the innovative technology, even if the need was perceived as low. They showed the most openness to try the innovative technology and then see the effects.. Whereas the Communitarians are more conservative, an openness towards innovation was displayed, but more proof was needed for them. Expressing a willingness to try out the technology in a new line of products. The hybrid identity is more sceptical, asking for more trials to be done and needing proof that the product is not harmful to the environment and does not affect their plants. They expressed that we should be careful bringing new things in the environment no matter what it is, because it’s effects are not known. The full Missionary is even more worried about the possible effect new innovations might have on the environment. Saying there should be strict controls on synthetic treatments. From what has been perceived, the missionary identity can be said to need a strong understanding before adopting a new treatment. Both the hybrid and the full missionary indicated a strong need for better understanding of innovative technologies before the use of them.

4.4.1 Perceived usefulness

One factor that might possibly be related to risk approach is perceived usefulness of the current treatments and the perceived usefulness of the proposed treatment. Regarding the perceived

usefulness of the current treatments, Communitarians seem to be the most satisfied with their current usage of the sulfur treatment. Although open to trying new treatments, they seem to have already found a treatment that seems to work for them with few gaps to be filled even though this treatment is said to be more general (African Pegmatite, 2019). The Darwinians however, were more skeptical about the effectiveness of their current treatment. One describing the treatment works well for them but also experimenting with a variety of other treatments some being quite innovative. The other Darwinian mentioned he didn't even know the effectiveness of one of the bio- treatments used: "... we don't see more disease but not less too". They also remarked that they were very satisfied with Arsenite, but had to cancel it because of its toxicity, they seemed to easily switch over to other treatments if the current one was not perceived to be effective.. The hybrid- missionary was more convinced that other ways of preventing the disease by for example a special way of grafting would also be effective enough. The full missionary was perceived to be absolutely convinced by their working method, natural theory.

4.5 Risk reduction requirements

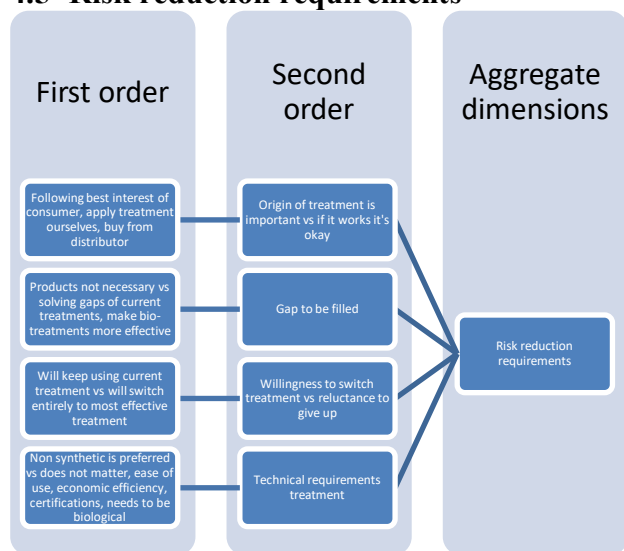


Figure 3 Gioia table of risk reduction requirements

Also mentioned by Grabow et al. (in press). We have observed this aspect in entrepreneurial identity in the degree of how much risk reduction was required but also in the ways of how this should be achieved.

They considered the negative environmental effects of treatments as low and wanted to see for themselves what the product could do for them. Organizational approval however, was deemed as important by them. The need for organic certification was communicated by one Darwinian with the reasoning mentioned before of brand image. To get their organic certification to enter more markets, the treatment would also need the organic certification. The approval that got requested by the Darwinians generally involved some kind of proof of effectiveness. Some points expressed by the Darwinians about the functions of the treatment were ease of use, efficacy and cost. Although the risk of esca was perceived as low, Darwinians still explained some gaps where the treatment could possibly be used for and even though not effected by esca very much, were still open to use the treatment to fill those gaps.

Communitarians also were observed to take on more of a try and see approach but suggested that it would be an idea to make a separate product line out if it. The requirements communitarians mostly had were effectiveness and ease of use.

The missionary identity is found to have the most concerns. They expressed that they were more worried about the environmental effects of innovative technology. Although the other identities did not mention many worries about the technology's impact on the environment, the missionaries talked a lot about the risk of bringing something new into nature which could cause a lot of harm according to them, especially chemicals. Missionaries seem to care less about institutional approval, they would rather do research themselves and feel the need to understand the technologies on a deeper level.

4.5.1 Distribution of trust

Darwinians have been perceived to greatly value institutional approval from both independent organizations and the organizations supplying the treatment. Darwinians have high trust in these organizations and if these parties say the treatment is effective, doesn't affect their products etc. they would be confident in trying the product although they would still perform their own trials in the way of "if the treatment doesn't solve the problem, we will discontinue its usage". If a product meets official standards and has the necessary verifications, Darwinians are quick to make use of them, but due to their high regard of economic efficiency, they will also be the first to lose faith in the treatment when it shows that it is ineffective. One Darwinian also indicated that while official approval is important, product understanding is also important because it will make it easier to convince customers of the effectiveness. "if the treatment is new and the effectiveness is relatively unknown in practice, maybe you need to explain how it works. Then they can imagine what the product does and they feel as if the effects are possible".

Communitarians are less interested in official verification apart from the certifications that are necessary to keep them in their market position e.g. organic certification. They also apply more of a try and see approach which for them is the most important validator. Given that the price of the treatment is not too high, and thus the financial risk of the treatment is reduced, Communitarians will try the product themselves and will be their own judge on whether the treatment is effective or not. Thus a good way to market to this entrepreneurial identity would be to offer sample treatments after which the Communitarian will decide whether the product is worth the financial cost and the effort of applying it.

Missionaries are the most reluctant to a try and see approach saying it might cause problems in the environment which have not yet appeared because the product is not present in nature as of now. Missionaries also value their own opinion more than that of institutions. The most important factor to consider for gaining a Missionaries trust is their need for understanding. Just like Communitarians, Missionaries want to be their own judge regarding innovative treatments. But not in retrospect. Missionaries first want to understand the nature and function of products after which they decide whether they would try the innovation. The chance of them trying is relatively low, but products that have been around for long and their effects are very clearly understood, even by non-experts, are more likely to be accepted by Missionaries. Their harmlessness has then been sufficiently proven in practice and trust can be built upon that.

4.6 Risk perception and acceptance

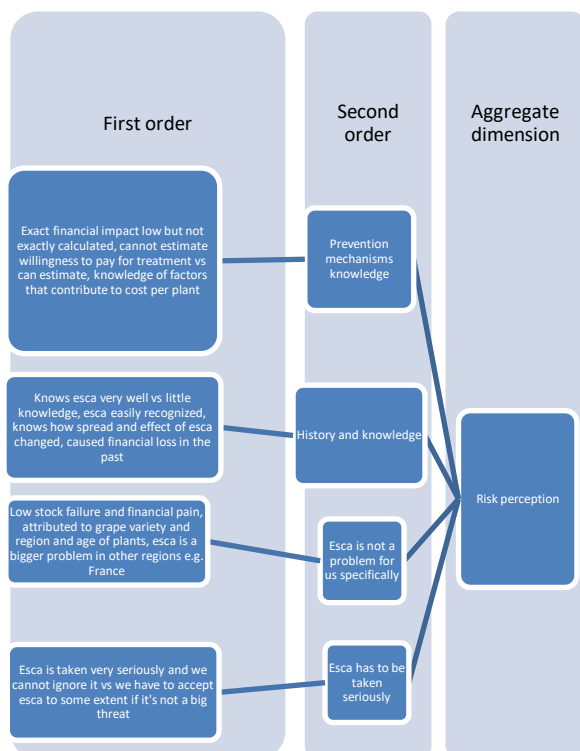


Figure 4 Gioia table of risk perception

Although a low risk situation was perceived. Differences could be observed in how ready different identity types were to accepting the risk. All identity types saw the risk of esca as low but differences were still present.

4.6.1 Risk awareness

Darwinians were perceived to understand the threat of esca very well, they indicated to have a long history with esca, namely the practical side of it, understanding how to get rid of it. They have run through a variety of different mitigation methods for esca in the past and they seem to agree that chemical methods are often more effective. They mentioned calculating relevant key figures would be possible for them but as they perceive the risk of esca Darwinians know that esca is a low risk to them, but perceive to still have gaps in their current treatment and recognize the spread of the disease might change and the disease may become a problem for them at some point, for which they have to get ready. They perceive natural solutions like competing fungus as subject to many problems or low effectiveness. Although Darwinians perceive the stakes as low, they still seem to accept innovations as a way to fill the gaps of their current treatments. They have been perceived as open towards methods of curing plants to further reduce their already low crop failure. They perceived their current approach to have some problems that should be solved. Darwinians are perceived as striving towards the least financial loss possible. This identity type recognized low crop failure but still expressed a willingness to adopt innovative technology to further reduce crop failure. A typical quote is “Finally, if the cost of the treatment is less than the cost of replantation, then you can do a treatment but it’s always an economical thing”.

Communitarians have some history with esca as well and their knowledge stems mostly from family history or personal history. Although they do not calculate key figures very specifically, they are somewhat aware of what works for them. They expressed esca to be a low risk for them, which is attributed to their current treatment. They seem to express less worries on the future of

esca. Esca is perceived as a low risk now, and in the future. Due to their current treatment.

The hybrid-missionary had a lot of knowledge and history on esca but also perceived it as a low risk and easy to prevent through cleaning and special grafting methods. The full missionary had very little knowledge of esca and plant diseases in general and preferred to not use any chemical product to mitigate the disease. The missionaries were observed to accept crop loss as a part of life. Even less gaps were found to be filled and the risk was accepted. They found that the risks associated with introducing new technology into nature outweighed the usefulness of them. Still they seemed to indicate, finding a bio-solution was plausible if that meant a reduction in chemical usage.

4.6.2 Risk acceptance

Although it might sound somewhat strange to accept crop failure, one dimension of risk perception involved risk acceptance. After the first interview the topic of accepting limited crop failure as a part of life already arose along with the risk acceptance of innovative technology. This aspect is important to take into consideration because a pattern could be identified in the distribution of risk acceptance which could add to the picture of entrepreneurial identity.

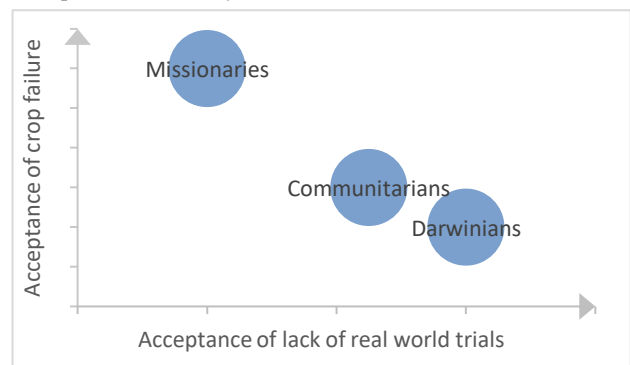


Figure 5 Risk acceptance of different identities

Darwinians showed a lot of acceptance towards the possible risks of innovative technology. As said earlier, they have more of a try and see approach and did not express much concern about the risks of innovative technology. It was said that as long as the technology is formally approved there was not much concern about it. Darwinians however, displayed less acceptance towards stock failure. A typical statement would be: “if the problem can be solved than why not solve it?”.

Communitarians share some of this view. They are more accepting towards stock failure but are also accepting of the personal unknowingness regarding environmental impact of innovative technologies. However they were somewhat more worried about the effects of the technology on their product, which should remain quite consistent. Communitarians are open to trying, but as said before, propose a new line of products where nano-technology is used. But the worries on the environment and health, caused by for example introducing something new into nature, were not very present.

Missionaries were more concerned about the negative effects of innovative technology than the negative effects of Esca disease. They said the possible negative effects of a treatment outweighs the stock failure. Although stock failure is of course not preferred. They were more acceptant to that than to the possible harmful effects of, as described by some winegrowers, “introducing new technology on environment and health”. A typical statement by Missionaries that indicates more acceptance to esca is “We have a tendency as human beings that we would

like to eradicate stuff, but maybe sometimes, you should learn to live with it as well". After this statement the interviewee described, if a treatment would allow the plant to continue production, maybe not 100% but on a lower percentage, it would already be worth using a treatment if it doesn't cause other harm.

What this means is that Darwinians prefer effectiveness over environment and are more likely to use the chemical version while Missionaries are more likely to prefer the bio-treatment even when the effectiveness is lower out of concern for the environment. The requirements given on the innovative technology seemed to indicate a difference distribution of risk acceptance. Missionaries required the technology to have the least possible impact on the environment, looking for trials to prove the technology is not harmful to the environment while permitting lower efficacy rate. Darwinians were found to desire a higher efficacy rate over environmental protection which is similar to the Communitarians opinion.

5. CONCLUSION

5.1 Conclusion

As an answer to the research question we found that entrepreneurial decision making is significantly affected by the background of the entrepreneurs. Even in a low-risk situation. To better structure these backgrounds and gain a clearer understanding of them, they can be classified according to the entrepreneurial identity proposed by Fauchart and Gruber (2011). The theory that entrepreneurial identity has an effect on entrepreneurial decision making has already been posed by Grabow et al. (in press) in a high-stake situation. Although coming to a very similar conclusion, it can be said our research has been performed in a different context where all farmers described Esca to just be a small risk. We recognized a need for organic certifications and trials as a way of proving the effectiveness of the innovative technology and testing for possible environmental problems. We added to different dimensions of entrepreneurial identity and further constructed them.

The ones most interested in innovative technologies and having the least worries about them were the Darwinians. Darwinians have been identified to be geared towards value creation and are often perceived to run very successful and large businesses. Communitarians are more driven by community relationships, tradition, and culture. And Missionaries are more focused on the environment. Responsibility was added to the picture, explaining that different identities feel different responsibilities. Risk was also perceived differently by entrepreneurs and they had different risk reduction requirements.

This research further contributes to one specific element also observed by Grabow et al. (in press) named risk approach. We add to this dimension by adding perceived usefulness of the current treatment as a considerable aspect e.g. communitarians perceived current treatment as very useful compared to Darwinians.

5.2 Limitations

Due to our limited time, only a small sample of 5 winegrowers could be interviewed. Although we received useful information to find a pattern. The identity of Communitarian seems to be a bit less apparent and should be further investigated. Also, relatively many conclusions were made from relatively few data. Which is why I would suggest this research could be extended to include more participants. Preferably in more regions. Spain is a large country and as seen in the map, not the whole country has been researched in this paper. Although many farmers mentioned Spain in general has been less bothered by the esca disease.

5.3 Future research

As many winegrowers expressed, this research was performed in a low-stake environment. This could be caused by multiple reasons, commonly named reasons were grape variety, climate, and the age of plants. Suggestions for further research were already given by interviewees of this study. They suggested that due to the factors that cause them not to be bothered much by esca, it would be beneficial to perform this study as well in higher risk regions. A similar research was already performed in the south-west of Germany by Grabow et al. (in press). Germany was not mentioned by the participants of our study, but one clear recommendation was given, the south of France. With our own consideration and the thoughts given by the participants, we advise this study to be replicated in regions like Bordeaux. The interviewees explained they knew many colleagues operating in the south of France that were highly effected by Esca. One participant said "I know lots of vineyards in the south of France where it's 30% of the vineyard and it just continues and they don't know what to do, they have a real problem". The reasons given for this were among others that this region in France has a lot of young plants, which seem to be more susceptible to esca, grow qualitative but less resilient grape types and the spread is just more apparent in this region.

I would also suggest research be conducted on innovative ways to reduce the risk of drought. Although few problems with esca, general consensus among the farmers was that drought was becoming more and more of a problem in Spain. This would be a high-risk situation compared to the low-risk situation in my research.

This further research conducted could be less inductive and start with entrepreneurial identity from the beginning. Entrepreneurial identity theory by Fauchart and Gruber (2011), was already found to be of influence on entrepreneurial decision making by Grabow et al. (in press) which has been further elaborated in this paper. But there is much room for new research in this topic. Future research can be done to further elaborate or challenge the dimensions proposed in this paper and that of Grabow et al. (in press) in an attempt to further elaborate the dimensions of entrepreneurial identity which influence entrepreneurial decision making.

5.4 Practical implications

This research has contributed to entrepreneurial identity theory and investigated the attitudes and expectations of Spanish winegrowers on nano-encapsulation technology. The research could help firms on the supplier side of these products and plant disease products in general. Producers entering the Spanish market should adapt their product to match the attitudes and expectations of Spanish winegrowers.

Marketing departments in a business to business context could use this research to classify their customers. When marketing classifies their customers according to entrepreneurial identity theory, they can use different marketing techniques for every identity which would make sense, as the different identities value different things in a product. We have also identified a need for further understanding of nano-technology as a form of risk management. Companies offering risk management products should communicate the use and the implications of the technologies clearly to their customers, especially to identified Darwinians. As one Darwinian in our research explained, if you feel that the function would be possible you would be more convinced of the working, if it's something you can imagine.

This research also highlighted the need for organic certifications. Sellers of risk mitigation technologies should try to get their products organically certified. We have seen that all identity

types can benefit from this. The Darwinians request certification for marketing purposes which would also offer value to Communitarians wanting to work in an organic way. The Missionaries follow organic viticulture more out of their own conviction, which could also benefit from an organic certification. Weirdly enough, they are less interested in the organic certificate compared to Darwinians that are using it as a marketing technique but they have more faith in biological products in general, on which manufacturers should play.

6. ACKNOWLEDGMENTS

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Appendix:

Interview guide B2B study

Note that a lot was differentiated from this interview when seemed fit and adaptations were made on the basis of previous interviews. The ethics form was not conducted every time before the interview and instead an ethics form was sent to the participant by e-mail for them to be signed. The way of questioning was kept flexible and was adapted according to results from previous interviews. Before the interviews, we wanted to sketch an image of the company that would be interviewed. Which is why demographic questions were sent to the participant before the start of the interview along with the ethics and privacy form, to be answered via e-mail by the participant. These question were purely objective, trivial questions which could be answered before the e-mail to have some information available to the interviewer before the interview. In the actual interview, more subjective and open questions were asked. As said before, the interviews were semi-structured. But beyond that aspect, high flexibility was used. When certain questions were proven to be irrelevant, they were adapted to the interviewee, or left out entirely to make room for more relevant questions. This open structure was chosen because although more concrete answers would be easier to analyse, the goal of the interviews was to better understand the perception of the entrepreneur. Their experiences with esca disease and mitigation methods could openly be discussed. This way we tried to create an image of the entrepreneurs' attitudes towards innovative technologies and the possible aspects that may affect those attitudes. Those aspects will be based on different theories like that of Talukder (2014). The semi-structured guide was used, but often in the interviews, some aspects got discussed longer than others.

Disclaimer:

The information given during this interview will only be used for academic purposes in my bachelor thesis. For my research I am investigating what the relationship between entrepreneurs' identities and their attitudes and expectations towards a specific technology that may be used to treat esca disease is. I will explain this technology before we begin the interview. That is why I am interviewing you, I will ask you some questions to obtain information on your way of working and I will ask you some questions to find out your attitudes and expectations.

Do you have any questions about my study and/or did you understand everything? Have I answered all of your questions to satisfaction?

This is a semi-structured interview including open questions. You are not obliged to answer any of the questions and you can withdraw from the interview at any time. You can also withdraw from the research at any time after the interview has been concluded, which means all recordings and other data such as contact information we have regarding you and your company will be deleted, and you will not be involved in my research anymore.

Do you understand that you can refuse to answer my questions and you can withdraw from my research at any time without having to give any reason?

As said in the introduction e-mail, this interview will be recorded for transcribing purposes and will be stored locally on only my computer. The recording will not be shared with anyone and will be deleted once the research is completed. Do you agree with this?

As said before, the information you provide will only be used for academic purposes, do you understand and agree with this?

I will send you this disclaimer along with my contact information to you via e-mail after the interview in case you would want to withdraw from my research or have any other questions, I am glad to help you.

Q: Do you have any questions regarding these terms and conditions?

Part 1

Q1 What is the main concern of your business? And why was the business conceived?

Q2 With regard to which products do you feel a greater trust: Products derived from basic research (university or other public/third-party institution) or from private sector companies?

Q3 Have you come into contact with Esca disease before and if so, how much Esca-related stock failure do you have on average per year (in plants)?

Follow up: How big of a threat do you think Esca is to the existence of your business?

Follow up: Climate change could possibly affect the spread of Esca, do you think climate change poses threats to your business in this form? How big do you perceive this threat to be?

Q4 What measures are you currently taking to prevent Esca disease?

Follow up: Do you use pesticides? Follow up: How do you administrate these pesticides?

Follow up: Do you think there are sufficient solutions on the market at this moment?

Q5 How much (in euros) do you estimate the average loss of a plant that has failed due to ESCA (replacing the plant including the time until it again produces a comparable quality of yield)?

Part 2

Q6 What characteristics does a crop protection product against ESCA need to have in order for you to make a purchase decision? What is the most important characteristic crop protection needs to offer you?

Q7 What do you think the minimum efficacy rate of an Esca treatment should be?

Q8 Would you be willing to treat your vine plants curatively and / or preventively and if so, would you carry out the vaccinations yourself or have them vaccinated by the supplier?

Part 3

Q9 How many Euros would you be willing to pay for one dose for one vine plant if the treatment protects the plant for multiple years?

Q10 Through which channel would you prefer to purchase the treatment?

Q11 Do you have any remaining concerns regarding nano-technology products and if so, what are they? Can you imagine your customers would have any concerns regarding this technology?

Part 4: demographics (filled in before interview via e-mail)

Q12 How many hectares of vineyard belong to your winery?

Q13 Do you grow your wine fully or partially biodynamically?

Q14 Is your winery certified organic?

Q15 Are you part of a winemakers union?

Q16 Did you get formally educated on entrepreneurship through for example a university course?

Q17 Would you be interested in the results of my study?

Q18 Region (to be filled in by interviewer)