

**Influence of Perceived Trends on Strategic Decision-Making
in Small Firms: The case of Dairy Farmers in the
Netherlands**

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Thesis Code: MCB-80433

ECTS: 33

Acknowledgments

My biggest and most sincere gratitude is addressed to my inspiring supervisor Dr. ir. Frans J.H.M. Verhees. He was the most encouraging and supporting supervisor I had in years. I received enormous amounts of motivation and his comments were always so inspiring that made me think in a more critical way. I am definitely grateful that he helped me when I mostly needed help, in this hectic period before graduating and getting married. A huge THANKS for you Frans!

Next to my supervisor, I would like to thank my second reader Andres Trujilo Barrera for his constructive comments that were crucial in order to sharpen the final piece of text.

My wonderful fiancé, parents and big brother are inevitably the people I am mostly thankful to. I got a lot of support, love and encouragement in times when I mostly needed. Their warm and kind words helped me move forward and stay focused. I love you all.

Naturally, my dear friends were there for me when I really needed to take a break from all and relax over a glass of wine. You guys are the best.

I am very proud of what I produced. These last few months were the most intense months of my life; a lot of other personal events took place outside of school and kept me busy. I still managed to roll my sleeves back and carry on with what I had to do in order to finish this thesis and graduate proudly on time. For that I thank all the above for the support they gave me.

Yours,

Monika Pavlovska

Abstract

THE FOLLOWING RESEARCH DEALS WITH STRATEGIC PLANNING IN SMALL FIRMS. THE RELATIONSHIPS BETWEEN THE TRENDS FROM THE ENVIRONMENT AND THE ACTUAL RESPONSE TO IT – STRATEGY WAS INVESTIGATED. THE SAMPLE FOR THIS STUDY WERE DUTCH SMALL DAIRY FARMERS (80) AND THE PERCEPTION AND EFFECT OF TRENDS ON THEIR FARM WAS ANALYSED USING ONE-WAY ANOVA. CLUSTER ANALYSIS REVEALED THREE DIFFERENT GROUPS OF FARMERS WITH DIFFERENT STRATEGIC FOCUS. THE TIMING OF THE EXECUTION OF THIS RESEARCH IS INTERESTING BECAUSE THE RESULT REFLECT TO A GREAT EXTEND THE CHANGES THAT ARE ABOUT TO TAKE PLACE IN THE NEXT 2015 YEAR REGARDING THE ABOLISHMENT OF THE QUOTA SYSTEM ON MILK PRODUCTION.

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Chapter 1

Introduction

Darwinian's "Survival of the Fittest" offers a general framework to help understand both natural and business evolution (Nightingale 2000). The similarity between biological and business evolution is undoubtedly present (Johnson et al. 2012). Darwin's evolutionary principles are not confined to biology only (Hodgson 2008); Darwin's evolutionary principles also can be applied to business development. There are other economists who agree with this (Nightingale 2000; Hodgson & Knudsen 2006; Aldrich et al. 2008).

Darwin defined several core features in his natural selection theory. He describes *hierarchical organizations* where organisms at every level of the hierarchy need to satisfy some conditions required from their environment. Then, he explains *variability* where due to the development of functional features (in each generation over time) some organisms from the same species develop better features than others (Richards 1987; Okasha 2006). Consequently, the organisms that develop better features become superior over others. Due to their successive variability they survive and continue to *replicate* and pass their beneficial mutations to their offspring. The next generations also inherit the functional features; leaving out the inferior members of the species to die out over time. In nature, this process of natural selection happens as a result of the survival instinct where the most functionally advantageous species remain to prosper. Likewise, natural selection eliminates the inferior species (Behe 1996).

This theory can be appropriated to business entities and their survival and that has been recognized by the most prominent economists (Shumpeter 1976; Friedman 1970; Ferguson 2008). Just like in the natural environment, the business environment poses survival and growth challenges to firms too. Over time, the most successful firms grow and survive (business prosper) and the least successful disappear (go bankrupt) from the business environment (Hallberg 2000). Thus the translation of the Darwinian Theory, with respect to business

evolution and its elements are variation, retention, and selection (Johansson & Kask 2013). *Variation* explains the existence of various firms and their diverse features in a business environment. The *selection* phase occurs when the local environment cannot support all business entities. As in nature, firms that developed functional advantage in their strategies are the ones to prosper; leaving the inferior firms to be opted out. From a macro business viewpoint, this is an actual fight amongst competitive firms for survival on the market. If this parallel is discussed from a micro perspective, it certainly poses challenges for firms and their survival.

Until here, the comparison between natural organisms and firms evolution is clearly evident. However, firms entail a distinctive and unique feature in their business; a unique feature that natural organisms cannot entail. This is called strategic planning and decision. Strategic planning and decision helps firms develop functional advantage in order to reach their goals (Antony 1984). It can also help firms understand their environment by making firms able to perceive and respond to challenges and trends from their environment. Trends are important drivers that influence firm's evolution and growth in the market (Sandvik & Sandvik 2003). *Retention* explains the importance of adopting to vital information from the business environment. This calls for developing strategies that enable firms to perform better than competitors.

The analogy of Darwin's and business evolution is more frequently studied with big scale enterprises (Johansson & Kask 2013). However, it is easier to compare Darwin's business evolution of small firms since the *retention* element is left out from their evolution. Retention is left out because small firms often lack the ability to create and execute strategies as opposed to big firms (Carson 1995). The assumption is based on the inability of small-scale owners to perceive trends and create plans that help a firm evolve and grow. Therefore, it becomes important to educate small scale entrepreneurs to acknowledge the need for strategic planning and decisions and the implementation of strategies in their businesses. It is important because small firms' existence is vital to any country's economy; they make up for almost 50% of the world's total value added (OECD 1997).

Thus, the problem that arises in this research is if small firms actually develop the functional advantage over natural organisms – strategic planning, then what is the influence of trends from the environment on small firms strategic decisions. Therefore, in order understand these research problems the following research questions were formulated:

RQ1: To what extent is small firms' strategic planning influenced by trends in its environment?

In order to fully answer this question, several sub questions were formed. The literature answers the following sub-questions:

- How do small firms develop strategic plans?
- How do small firms decide which trends are important enough to respond to?
- How can small firms in an industry respond?

Examining small firms will provide an overall picture of what different entrepreneurs are doing as a response to trends from the environment. These sub-questions are answered based on empirical data:

- Which changes in the environment do small firms in a specific industry perceive?
- Do small firms in this industry agree about the changes in their environment?
- Which changes in the environment influence small firms?
- Do small firms in a specific industry agree about the influence of trends on their business?
- What strategic directions do farmers in this industry choose?

Structure

This paper is divided into chapters. Chapter 2 gives an overview of the literature. It starts with small firms. Then the views on small firms and strategic planning and decision are discussed. First, the findings that go against the relationship between small firms and strategic planning and decisions are presented. After that, the findings that go for the relationship between small firms and strategic planning and decisions is shown. Chapter 3 explains the model used. Chapter 4 presents the material and methods used for data collection. Chapter 5 consists off the results section. Analysing the data together with discussion on the findings is presented. Lastly, suggestions for managerial implications and recommendations for future research will close this paper.

Chapter 2

Literature Review

The literature is divided into several topics. First a short description on **small firms** is presented. A short description on the **overview on strategic planning and decision-making** for small firms follows right after. Then the topic on small firms and strategic planning and decision is divided into two views from the literature. First, evidence and reasons suggesting that **small firms have strategic planning and decision-making** is presented. The next section presents the literature that found no evidence that small firms **have strategic planning and decisions** and the gives reasons why not.

Small firms

First and foremost, small firms differ from big firms not only based on the size and number of employees, but on many other aspect of business too. Micro firms consist of up to 10 employees. Small and medium sized enterprises (SME-s) consist of not more than 250 employees, according to the European standards and by the EU law (EU Commission 2003). In this study however, when referring to small firms it is meant microforms in terms of the number of employees.

Small firms make up the majority of all businesses in developed and well established economies (OECD 2002). They are also seen as very important for creating new employments (Vertinsky & Dongshou 2003) and developing rural economies (Baregheh et al. 2012); even though small firms demonstrate poor strategic planning and lack of formal decision-making processes (Laverty 2004; McAdam, 2000; O'Regan & Ghobadian, 2004; Hudson-Smith & Smith 2007). Although small businesses are recognized as vital and important for the growth of the economy (Enterprise Directorate 2003) little attention has been paid to their development (Fuller 2003).

Due to their size, small businesses are seen as very adaptable and flexible to economic changes (OECD 2002; Stockdale and Standing 2004). However, not all small firms demonstrate quick adaptability and flexibility. The nature of their business is also a big determining factor that determines the degree of small firms' adaptability and flexibility. For instance, small farm producers are not always able to be as quick to market changes because farmers often have a lot of fixed costs. The fixed costs put farmers in a position where they cannot easily adapt to market changes (Just & Zilberman 1983). Moreover, the ongoing day-to-day issues and responsibilities often take most of the small farm owners' time leaving the longer run planning to slip away from their agenda (Jennings & Beaver 1997).

Strategic planning and decision-making in small firms

Strategic planning and small firms has brought up discussions and questions amongst authors. Whether strategic planning and decision-making is actually helpful to small firms or not is still rather unclear (Blackburn et al. 2013). Most of the time authors cannot agree whether strategic planning even supports firms' growth (Fletcher and Harris 2002) or not (McLarty 1998; Williams 2008). There is evidence suggesting that small firms that have established good strategy planning were able to perform better than competing firms that lack strategic plans (Porter 1996; Hammel 2006). Small firms that have strategic planning had the possibility to create "market niches" that enabled small firms to be more successfully differentiated from larger firms (Simmons 2007). But also, there is evidence saying smaller firms usually lack the resources, capabilities, and market power which makes them unable to take the time and create strategic plans and take strategic decisions. It fundamentally means that small firm decisions are based on heuristics, rather than relying on a strategic planning and decision-making (Knight 2001).

The literature is somewhat divided and there is no common ground on this issue. The next section shows the different views.

Evidence against small firm's strategic planning and decision-making

The inability of small firms to have strategic planning and decision-making was noted by several authors (Corman and Lussier, 1996; Culkin and Smith, 2000; Miles and Arnold, 1991; Knight 2001; Kotler, 2000; Williams 2008). Several reasons were recognized explaining why these authors did not find supporting evidence.

Reasons small firms do not have strategic planning and decisions:

Firstly, small firms often lack finances. Small firms are financially dependent on outside stakeholders that may explicitly or implicitly affect their strategic planning and decision-making and thus make them unable to execute their plans (Bjerke & Hultman 2002).

Next to that, the owner is usually the central role of all business activities. The degree of the owner's education in small firms was seen as a big limitation, because often the owner does not have the proper education for creating strategic planning and decision-making (Mayer-Haug et al. 2013). Not having the right education brings a lot of disadvantages because education gives the owners the ability to better perceive the business environment and its components. The proper education of the owners in small firms is described as the owner's ability to "successfully discover and exploit an entrepreneurial opportunity" (Ferrante 2005; Unger et al. 2011). In essence, without the right education the owner is not capable of making the right decision, as the degree of education is positively related to a firms' performance (Jo & Lee 1996; Mengistae 2006).

Small firms often face difficulties because of the lack of disciplinary personnel. Because of that small firms face difficulties with becoming a part of a networking system (Lopez-Nicolas & Soto-Acosta 2010). The role of networking systems assists small firms to get connected outside the firms and seek new information, guidance, financial support, other funds and partnerships (Hoang & Antoncic, 2003; Slotte-Kock & Coviello, 2010; Mayer-Haug et al. 2013). Networking enables small firms to improve the owner's knowledge of the market, locate new opportunities and share experiences with other small firms (O'Donnell 2004; Tersvioski 2003). Thus this is a big obstacle for small firms.

Small firms marketing is often not a part of their strategic planning or decision-making either. As mentioned above, since the owner is in the centre of all business activities they usually lack any marketing skills and they are too busy with their daily activities (Rawwas & Iyer 2012).

The limitations small firm are faced with are too much for the owners to be able to perceive trends and actually implement them in their strategies. The next section however, shows evidence that suggest that small firms have strategic planning and decision-making.

Evidence for small firm's strategic planning and decision-making

This section of the literature examined the set of authors saying that small firms' owners actually have strategic planning and decision-making and that is a direct or indirect result of the perceptions of trends from their environment (Smallbone & Wyr 2000; Richbell et al. (2006) Mazzarol et al., 2009). However, there was no clear indication on how small firms observe trends from the environment. These authors believe that small firms' owners in fact take the time to scan their environment and invest time into creating some kind of strategic planning. Eventually that led to executing their strategies that help these small firms to create the functional advantage over other small firms. In this way, some of the small firms evolve and over time grow into bigger firms (Kemp & Verhoeven 2002; Mazzarol et al., 2009). There are several reasons why small firms are able to implement strategies and that is presented in the next sub-section.

Reasons small firms have strategic planning and decisions:

Several cases showed that small firms do respond to trends from the environment in several ways resulting with strategic planning and decision-making for their businesses. For instance strategic marketing and the combination of innovation and the firms "owner capability to learn" has proven to have a positive outcome on small firm's performance (Sok et al 2012). This has been a topic of interest for some authors (Doole et al. 2006; O'Dwyer et al. 2009). However, it is clear that because of budget constraints, small firms do not allocate a lot from their budget on strategic marketing. Small firms' strategic marketing often showed not to be strategic at all, but more intuitive and momentary (Stokes 2002). The owners' marketing

capabilities were greatly influencing decisions (Day 1994). However, the literature showed that the owners usually lack marketing skills and they are too busy with their daily activities (Rawwas & Iyer 2012). For that reason, owners view strategic marketing as the process of selling, talking to customers or suppliers. This approach enabled them to market their products, but themselves too.

Differentiation strategy was another way small firms respond to trends from the environment, especially in a heterogeneous, turbulent and complex environment (Porter 1980). The reason why small firms are more able to implement differentiation strategy quickly is flexibility. Flexibility in small firms was recognized as a competitive advantage when dealing with uncertain and competing environment (Gray & Mabey 2005; Spicer & Sadler-Smith 2006). Small firms' ability to demonstrate flexibility with strategic planning is a big advantage that enabled small firms to follow and keep up with the changing environment (Kukalis 1989; Barringer & Bluedorn 1999). Flexibility inevitably created the chance for more frequent improvement (Matthyssens et al. 2005).

Additionally, flexibility means that small firms are able to quickly implement innovative ideas. Innovation was seen as necessary for small firms; described as a way to overcome risky and unpredictable future (Cobbenhagen 2000); respond to competition and customers' demands; and to maintain or improve performance (Damanpour 2009). It is more likely that small firms introduce innovative ideas on the short run (Pavitt et al. 1987) as small firms are more likely to create plans for the short run (Blackburn et al. 2013). However, the nature of the business is an important factor that determined how quickly innovative ideas can be implemented in small businesses. For example, it is easier to be innovative in the fashion industry (Ashworth 2011) than introducing innovative ideas in agriculture (Cobbenhagen 2000; Baregheh et al. 2012). It is easier to introduce new colour or shape of clothing than to introduce something new to the food production. Small food producers put more focus on "incremental innovation as opposed to radical innovation" and they find it more meaningful to be involved with "product and process innovations than in packaging, position and paradigm innovations" (Rowely et al. 2012).

Information and communication technology (ICT; i.e. the Internet) and small firms. Whilst ICT has proven to be beneficial for big firms a new stream of research points out that small firms using ICT had a positive influence on their business activities and decisions (Henchion & McIntyre 2000; Morley et al. 2000; Nicolas & Acosta 2010 Raymond 2001; Houghton & Winklhofer, 2002; Pflughoeft et al. 2003; Chiarvesio et al. 2004; Simmons et al. 2007). It enabled firms to improve knowledge flow in the firm, storage and exchange of that knowledge (Roberts 2000). ICT allows owners to be more aware of what is happening in their surrounding environment as it offers easy access to the outside information (Lopez-Nicolas & Soto-Acosta 2010).

Schools and universities are shown to be great facilitators to small firms (Braun & Hadwiger 2011). Closely cooperating with academic research centres enabled small firms to get information on trends about the environment (Braun & Hadwiger 2011). Research centres and universities are beneficial for the permanence of small firms in most developed European markets (Brickau et al. 1994).

Although some studies found supporting evidence, there is not a commonly accepted view on the issue of small firms and strategic planning and decision-making and the influence of trends from the environment on the strategies firms choose. Therefore this study conducts an empirical research by means of direct observation. In this study it is believed that small firms have strategic planning and decision-making and the strategies that small firms choose are affected by trends from the environment.

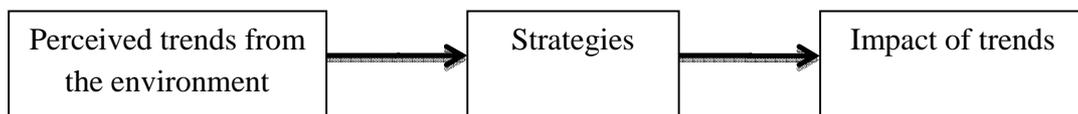
Chapter 3

Model and Hypotheses

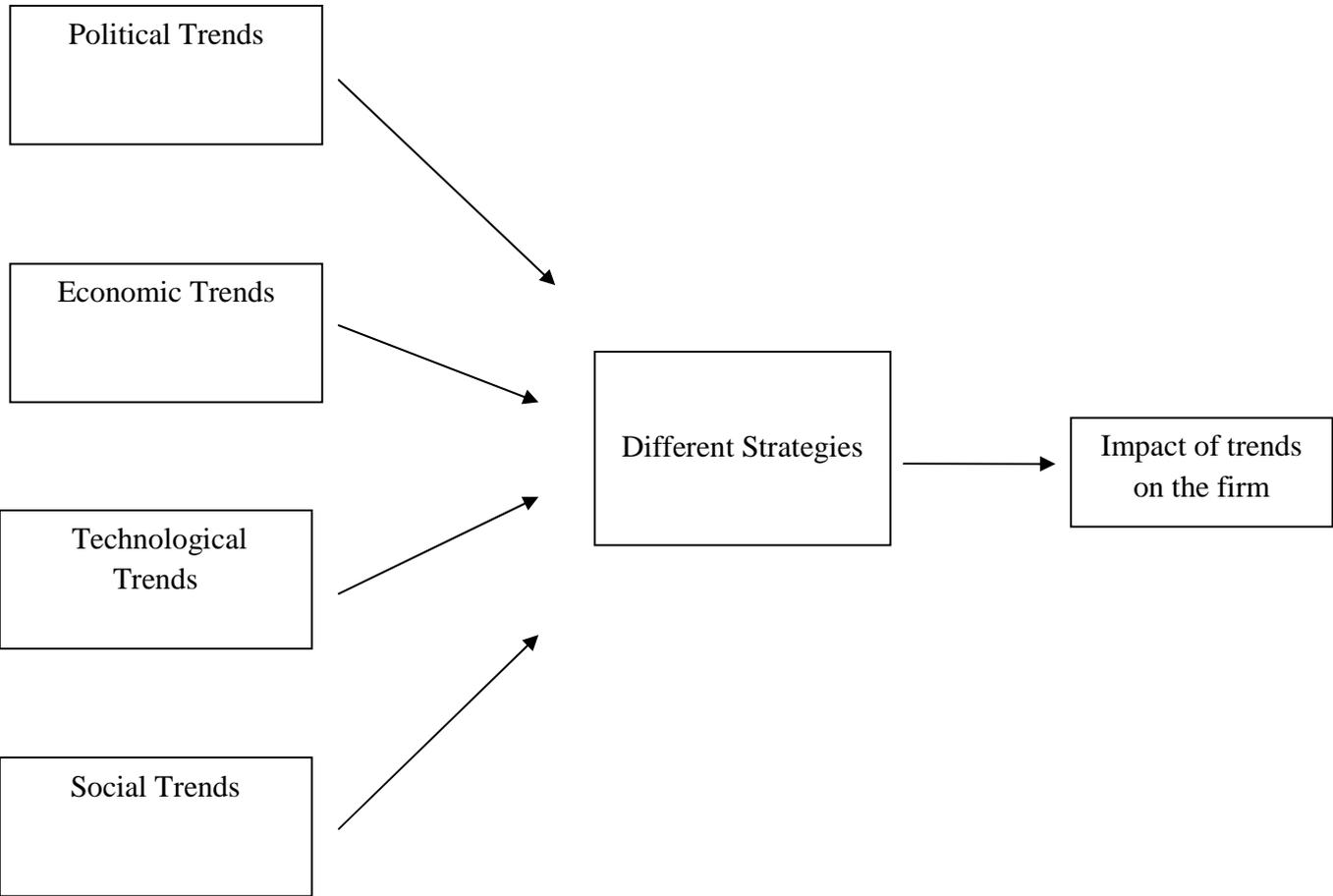
This chapter aims to demonstrate the model that was created and will be used to test the hypotheses of this research.

Model

The model aims at explaining the trends and their influence on the strategic decisions small firms choose. Although the literature did not provide exhaustive evidence that demonstrates a strong relationship between trends and strategies with small firms, in this research it was an enough indication to believe that the relationship exists. Therefore, the model that will be used in this study looks as following:



This model offers a view that there is a relationship between trends from the environment and the strategies small firms choose. More specifically, several set of trends from the environment were considered for the analysis, because the literature did not provide which trends from the environment were the exact cause for choosing a certain strategy. For the purpose of this analysis, the set of political, economic, technological and social trends (extracted from PESTEL) are examined. PEST analysis is known and commonly used as a tool for defining and scanning the environment (Kotler 2013). A more detailed view on the model that is used for this study is shown below:



Hypotheses

The hypotheses are based on the relationships between the variables in the model for small firms.

The environment in which businesses operate consists of factors that can be described as uncontrollable (McCarthy 1960). Thus it is important to consider these factors very carefully (Duncan 1972). The farmers in the Netherlands are faced with strict regulations and legislations for pesticide usage, and 2015 will bring more restrictions on the topic of pesticide usage. On top of that, new technologies and consumer demands seem to be flowing in constantly. Dutch consumers want more sustainable products while a major part of these consumers still look at the prices of products very carefully (NIMA 2014). Therefore farmers are in a very delicate situation for which careful environmental consideration is necessary.

The set of trends used in the model are chosen as indicators of changes that have a direct impact on the strategies small firms choose. Not all trends from these huge categories will show significant relationships with small firms' strategies. However, most of the trends identified in the set of trends are believed to have some kind of relationship with the strategy firms choose. Trends are described as a movement, sequence of events; a momentum that will exist for an amount of time (Kotler 2003). Trends are durable and businesses can predict what to do next to some extent. Trends could range from increased consumers demands to technological changes and so on (Motes 2010). In order to respond effectively and efficiently, marketers try to respond to trends by carefully adjusting changes to their marketing mix (Kotler 2002). Most trends assist firms to grow and become more competitive and profitable. They tend to improve firms' development and create viable advantage over other competing businesses (Motes 2010).

Political and economic set of trends are believed to immediately affect strategies. If a new law comes in force firms have to adopt quickly if they do not want to suffer penalties or losses. The Technological set of trends also highly influence the strategies of small firms because technologies rapidly change and continuously improve the way firms operate. These rapid changes often force businesses to keep up with the newest trends from the tech world. Economic

set of trends are also seen as highly important and directly affecting the strategies small firms choose. The Social set of trends is more than present and more taken into account in countries such as the Netherlands, where consumer needs, wants and preferences are of high importance to producers. Therefore these set of trends demonstrate strong relationship with the strategic choices of small firms. Ultimately, these trends could determine the survival or bankruptcy of firms in a heterogeneous, complex and competing environment (Ondersteijn et al. 2006). Moreover, it is generally thought that business owners have a shared source from where they get their information about industry and trends – also known as the common body of knowledge (Hambrick 1982). For small scale farmers that might be local magazines, news from suppliers and so on. Although the notion of farmers' mutual knowledge and understanding of their environment can be assumed true, their business strategies might be different in the same industry. The different strategies farmers choose could be explained by the different (informal) business plans, financial situation and so on (Ondersteijn et al. 2006). Therefore by examining different strategic groups within an industry could lead to discovering which strategies farmers prefer. Simply put:

H1: There is a relationship between trends from the environment and small firms strategic decisions.

The second hypothesis says that the effects of trends from the environment differ amongst the different strategic groups. The different effect occurs because different strategic focus leads to differences in the effect of the external environment on the farm (Smallbone & Wyr 2000; Richbell et al. (2006) Mazzarol et al., 2009). While one group of farmers might act in one way based on the effect of trends, another group of farmers might see the same trends in a different way. That means that the effects of trends pose different outcomes for different farmers.

H2: The effects of trends on small firms differ amongst different strategic groups.

The last hypothesis tests whether small firms stick to one strategy or the strategic decision-making shifts from one year to another. Although it is still not clear whether small firms should strictly stick to a strategic decision without being flexible and ready to respond to the unstable environment (Richbell et al. 2006; Spicer and Sadler-Smith 2006), many authors agree

they should (Matthews & Scott 1995; Porter 1996; Hammel 2006). Therefore, the third hypothesis states that small firms choose a strategy and implement it for a duration of one year only.

H3: An industry's strategic orientation shifts from one year to another.

Chapter 4

Methodology

Sample

The sample in this study is Dutch farmers from the dairy industry. The dairy producers used in this study are small scale producers. This sample was taken from a database that was used in an earlier research on trends called NIMA FAM “Forward in Agro & Food” in 2012 and 2013. The findings from this research were presented in 2013 and 2014. The sample for the earlier research was extracted from a database of Agridirect including personal information and locations of the farmers from the Netherlands. The total sample was n=713 collected from nine different industries in the Netherlands. Out of this number, the responses of 80 dairy farmers were used for this analysis.

Design

Farmers were sent a self-administered online survey November/December 2012 and 2013. The survey includes sixteen questions covering the four distinguished aspects of PEST environmental analysis. The two main questions that farmers were answering were (1) “To what extent do you expect that the following attributes will occur in the next 5 years?” The second question farmers gave their answers to was (2) “To what extent do you expect the following topics to have an influence on your business?” Likert-scale is the most frequently used measurement scale in the domain of marketing research. Therefore, the chosen 166 variables were measured on 1-5 Likert-scales. The odd-numbered questions stand for the expected perception of the attributes. The Likert-scale was used so that 1 stands for “certainly not occur” and 5 for “certainly occur”. The even-numbered questions stand for the effect of the attributes on the farm. In this case, Liker-scale was used so that 1 stands for “no effect” and 5 stands for “large effect” on farm.

Analyses

The dairy farmers were divided into smaller sup-groups based on their strategic focus. The nine strategies available to the farmers from the questionnaires were used for this purpose. Cluster analysis is useful for making groups of small farm producers. Hierarchical clustering, followed by k-means, with Ward's method was used for creating strategic groups. In order to measure similarities for cluster analysis Squared Euclidean distance measured the distance between respondents on number of variables chosen. A post-hoc LDS test was used in order to check whether the means differ significantly from one another (if $p\text{-value} < .05$).

ANOVA or analysis of variance is an analytical technique that is dealing with the evaluation of group differences. A mean significantly differs when the p-value is smaller than .005. The scores were averaged for all respondents within a particular group so that group has an average. This occurred for all groups. In this case the different clusters of farmers were compared simultaneously in order to see whether these farmers differ in their strategic choices. Since there are different respondents in each group, the between groups design compared group to group and the different sets of respondents. The F-value test determined whether the variances within each group were statistically different from each other.

Multivariate Analysis of Variance (MANOVA) instead of single dependent variables focuses on multiple dependent variables at the same time. MANOVA looks at group differences across all dependent variables of interest simultaneously. There are two major reasons for using MANOVA. First, in case of several correlated dependent variables for which one statistical test is needed instead of multiple tests. Second, and most commonly used, when one wants to check what is the impact of several independent variables on the patterning of responses on the dependent variables. MANOVA in this study was used in order to check whether a set of environmental trends, for instance economic demonstrate different results across the different strategic groups of farmers. In essence, the seven attributes in the economic set of trends were tested showing whether these attributes are dependent on the cluster variable (independent). Four different tests are available in SPSS for this multivariate test, naming them as Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root. Each of these tests has its own associated F ratio and in some cases the tests give an exact F ration testing the null hypothesis.

Sometimes the F ratio is approximated. However, Pillai's Trace is considered to be the most powerful and robust test in which case if $p < .005$ then the outcome suggests a significant effect

Crosstab with a chi-squared test of independence will be utilized at the end in order to see whether the frequencies that occur signalize change in strategic orientation from one year to another. The hypothesis 3 can be rejected if chi-squared test is significant ($p < 0.05$) or no strategic change between years.

Chapter 5

Results

Section 1: Strategic Focus of Dairy Farmers

Using standardized scores from farmers' responses, the hierarchical cluster analysis suggested a three cluster solution. These clusters were obtained after k-means was applied in order to finalize the cluster centres. One-Way ANOVA and LDS post hoc test revealed the significantly different cluster means. The results from the cluster solutions are reported below in Table 1, which was finalized with these clusters:

Table 1: Strategic Focus of Dairy Farmers

Variable name		Cluster			Sig
		1	2	3	
Size of cluster	n	40	18	22	
	%	50	22.5	27.5	
<u>Strategic focus</u>					
Reduce cost price		0.35	-0.03	0.16	.00*
Scale up		0.50	0.63	0.39	.00*
Increase quality		0.53	0.25	0.26	.01*
Increase selling price		0.09	-0.11	-0.01	.00*
Collaboration with customers		-0.05	-0.32	-0.16	.01*
Start new activities		-0.95	0.20	-0.60	.00*
Vertical integration		-1.32	-1.18	-0.78	.00*
Reduce debt		0.61	0.36	0.31	.00*
Adapt to demands of society		0.25	0.21	0.40	.09*

Note: (*) significant at $p < .01$

The cluster analysis suggested three cluster solutions. Cluster 1 has a Reduce debt focus. Cluster 2 suggests Up-scaling focus for these farmers while Cluster 3 focuses on following the Demands of society. As shown in Table 1, all nine strategic variables significantly differ from one another, with a small exemption of "Adapt to demands of society". This outcome probably suggests the strict rules farmers must follow in order to be able to sustainably work and function

in their industry. All clusters showed positive scores on Reduce debt variable, which can be linked to the financial crises. Interestingly but not surprising, none of the clusters scores positively for Collaboration with customers due to the nature of their business. In the dairy industry, small scale farmer deliver their milk to suppliers, who in this case, are the main and biggest customers. Thus there is no room for a lot or any new collaboration rather than business agreements. All clusters also demonstrated they are not able to increase their selling prices, probably because these farmers are selling their product mostly to their suppliers.

The biggest cluster solution is Cluster 1 with half of the respondents grouping here (50%). This cluster group has the highest score on reducing debt which strongly suggest that these farmers are most likely the farmers who invested the most in their business. That is probably the result of the milk quota that will end in 2015, which leaves these farmers no choice but to reduce their debts as much as possible. However, their second and third highest scores are scale up and increase quality. There is no willingness for vertical integration or collaboration with customers which is obvious because these farmers need to reduce their debts which leaves them no space for any extra costs. Also starting new activities is definitely not in their agenda for the next five years. This cluster will be called “The Reducers Debts”.

Cluster 2 is the smallest cluster with 22.5% of the farmers gathered in this cluster. This group of farmers has a Scaling up focus for their businesses. While reducing debt showed also high scores for this group of farmers too, this group of farmers is the only one that scored positively on Start new activities. It can be assumed that this group of still want to be able to operate in this competitive environment. This group probably will differentiate from the rest by doing something new rather than just supplying their suppliers. This cluster will be called “The Up-scalers”.

Cluster 3 is the second biggest cluster with 27.5% of the farmers grouping there. The biggest focus here is mainly on adopting the demands of society. Additionally, this group of farmers also aims at reducing the debt they have accumulated. Although there is not too much accent on increasing quality, which is with no doubt an important precondition for operating in the dairy industry it is still considered to be a valuable aspect of the farmer’s strategy in order to

scale up. Similarly to the biggest cluster 1, this cluster of farmers too does not consider any vertical integration but rather trying to increase the quality a little bit. This cluster will be called “The Adapter to the demands of society”.

A more detailed description and explanation will be described in the Conclusion section, where combined with the results from the analysis more characteristics can be discussed.

Section 2: Perception of trends from the environment across the three different clusters

Section 2 overviews the results from the expected perception of set of trends across the different strategic groups. The result from the One-way ANOVA test indicates that there is one significant difference in the perception of the political set of trends among the three strategic groups of dairy farmers. From the total of fifteen trends only one trend showed to be significantly different from the rest, as shown in Table 2.

2.1 Perception of Political Trends across Cluster Groups

Table 2: Perception of Political Trends across cluster groups

Variable name	<i>n</i>	Strategic groups			F Value	p Value
		1	2	3		
Size of cluster	<i>n</i>	40	18	22		
Energy efficiency		<u>4.22</u>	<u>4.30</u>	<u>3.98</u>	3.97**	0.020
Water usage		3.63	3.75	3.55	1.16	0.313
Animal welfare		4.09	3.89	3.87	1.91	0.138
Global warming		3.49	3.54	3.59	0.31	0.733
Nature conservation		3.49	3.48	3.56	0.20	0.814
Feeding humanity		3.97	4.15	3.97	1.46	0.233
Raw material scarcity		3.90	4.06	3.81	2.12	0.121
Transparency production process		3.54	3.66	3.40	1.92	0.147
Tracking and tracing		3.81	3.82	3.55	2.63	0.073
Public health		<i>4.31</i>	<i>4.37</i>	<i>4.28</i>	0.37	0.686
Corporate sustainability		3.85	4.03	3.74	2.80	0.061
Resource usage		<i>4.05</i>	<i>4.07</i>	<i>4.02</i>	0.78	0.925
Food miles		3.23	3.43	3.11	2.47	0.085
Genetic technology		<i>3.51</i>	<i>3.59</i>	<i>3.42</i>	0.67	0.510

Waste reduction	3.43	3.66	3.50	1.68	0.187
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Note: sig. different at (*)= $p < 0.5$

Examining the Table 2 above it can be seen that amongst the three strategic groups of dairy farmers view the set of political trends more or less equally. The only statistically significant difference was shown with the trend “Energy efficiency” where $F(2,426) = 3.97$, $p = .020$. “Public health” and “Resource usage have the highest rate of perception for all strategic groups. The first trend has higher rate of perception for all clusters: 2 (4.37), cluster 1 (4.31) and cluster 3 (4.28). “Corporate sustainability” has higher significance for cluster 2 (4.03) when compared to cluster 1 (3.85) and cluster 3 (3.74). All strategic groups scored low on the trends “Genetic technology” and “Waste reduction” in comparison to the other trends. From the results obtained, it seems as the political set of trends do not have a significant effect on the strategic clusters as farmers with different strategic orientation. This result shows that dairy farmers rate the political trend more or less in an equal manner.

However, when looking at Pillai’s trace, the multivariate test revealed that there was significant effect of the strategic clusters on the expected perception of the political set of trends, where $V = 0.077$, $F(32,522) = 0.654$, $p = 0.92$., which does not lead to the support of hypothesis 1.

2.2 Perception of Legislation Items across Cluster Groups

Table 3: Perception of Legalisation Items across cluster groups

Variable name	n	Strategic groups			F value	p Value
		1	2	3		
Size of cluster	n	40	18	22		
More efficient use of minerals		4.14	4.07	3.96	1.24	0.290
More efficient use of energy		3.47	3.72	3.54	2.11	0.122
Reduction greenhouse emission		3.51	3.50	3.26	0.99	0.160
Reduction waste production		3.02	3.21	3.07	1.84	0.298
More efficient use of water		3.21	3.39	3.30	1.21	0.372

Similarly to the political trends, the legislation and the expected introduction of certain new laws and regulations did not show any significant difference among the three strategic

groups of dairy farmers, seen above on Table 3. However, all three strategic groups resulted with high perception in the “More efficient use of minerals” where cluster 1 has the highest rate of perception (4.14) compared to cluster 3 (3.96). Low rate of perception was noticed on the “Reduction waste production” variable with cluster 1 scoring the lowest rate of perception (3.02) compared to cluster 3 (3.07) and cluster 2 (3.21).

Nevertheless, the MANOVA test also confirmed that there is no statistical significant difference, where Pillai’s trace had $V=0.034$, $F(10, 842) = 1.456$, $p=0.151$, which does not lead to the support of hypothesis 1.

2.3 Perception of Economic Items across Cluster Groups

Table 4: Perception of Economic Items across cluster groups

Variable name	n	Strategic groups			F Value	p Value
		1	2	3		
Size of cluster	n	40	18	22		
More sales outside Europe		<u>3.68</u>	<u>3.57</u>	<u>3.24</u>	4.48**	0.012
Growing demand		3.54	3.56	3.37	1.00	0.369
Growing imports		2.73	3.11	3.04	4.50**	0.012
More sales inside Europe		3.05	3.48	3.12	7.00*	0.001
Lower selling price		2.92	2.85	2.73	0.80	0.446
More sales in The Netherlands		<u>2.43</u>	<u>2.83</u>	<u>2.39</u>	6.85*	0.001
Lower cost price		1.86	2.14	1.58	7.24*	0.001

Note: sig. different at (*)= $p < 0.1$ and at (**)= $p < .05$

The expected perception of the economic set of trends revealed that there are statistically significant differences, seen on Table 4. “Lower cost price” resulted with $F(2, 427) = 7.24$, $p=.001$ level of significance. “More sales inside Europe” has $F(2, 420) = 7.00$, $p=.001$ and “More sales in the Netherlands” with $F(2, 417) = 6.85$, $p=.001$. The post hoc LDS test revealed that “More sales in the Netherlands” shows statistically significant difference between cluster 1 (2.43) and cluster 2 (2.83). The highest rate of perceptions is indeed on these two variables among all the three different cluster groups. “Lower cost price” scores the lowest rate of perception for cluster 3 (1.58) compared to cluster 2 (2.14). “More sales outside Europe” also demonstrated significantly different results $F(2, 418) = 4.48$, $p=.012$, which was lower for cluster

1 (3.68) compared with cluster 3 (3.24). “Growing imports” has also shown statistically significant difference $F(2,424) = 4.50$, $p = .012$, especially for cluster 1 (2.73) and cluster 3 (3.04) when compared with cluster 2 (3.11).

The MANOVA test also revealed that the economic set of trends shows significant difference among the strategic groups with Pillai’s trace $V = 0.124$, $F(14,794) = 3.74$, $p = 0.000$, which leads to the support of hypothesis 1.

2.4 Perception of Social Items across Cluster Groups

Table 5: Perception of Social Items across cluster groups

Variable name	Strategic groups			F Value	p Value
	1	2	3		
Size of cluster n	40	18	22		
People's opinions about your industry will improve	<u>3.14</u>	<u>3.74</u>	<u>2.86</u>	25.93*	0.000
People more interested in the process of your industry	3.06	3.44	2.81	9.89*	0.000
People get more knowledge about food production	3.07	3.26	2.83	3.97**	0.019
People demand more products from The Netherlands	3.10	3.44	2.70	15.46*	0.000
People demand more products from their own region	3.29	3.66	3.00	11.79*	0.000
Easier to obtain suitable staff	2.37	2.51	2.26	1.45	0.234

Note: sig. different at (*)= $p < 0.1$ and at (**)= $p < 0.05$

Looking at the Social items in Table 5, it is clear that there are four statistically significant differences among these trends. Those are the set of trends “People's opinions about your industry will improve” with $F(2,424) = 25.93$, $p = .001$. This trends shows significant differences between clusters 1(3.14), cluster 2 (3.74) and cluster 3(2.86). “People more interested in the process of your industry” with $F(2,428) = 9.89$, $p = .001$. “People want to buy more products from the Netherlands” with $F(2, 426) = 15.46$, $p = .001$ and “People demand more products from their own region” with $F(2, 427) = 11.79$, $p = .001$, where per cluster the results showed cluster 1 (3.29), cluster 2(3.66) and cluster 3(3.00). The post hoc LDS test confirmed that there is statistically significant differences among on the item “People’s opinions about your industry will improve” for cluster 1 and 2 (3.14 & 3.74 respectively) compared to cluster 3

(2.86). The same stands for “People are more interested in the process of your industry” and “People demand more products from the Netherlands”, where for cluster 1 (3.10), cluster 2(3.44) and cluster 3(2.70). In addition, “People get more knowledge about food production” also showed statistically significant difference $F(2,416) = 3.97, p = .019$ with differences between cluster 1 (3.07), cluster 2 (3.26) and cluster 3 (2.83).

Disregarding the natural similarities amongst the clusters when it comes to the social items, all items combined, the multivariate test and Pillai’s test revealed that there is a significant difference amongst the groups on the set of social items with $V = 0.142, F(12,778) = 4.94, p = 0.000$, which leads to the support of hypothesis 1.

2.5 Perception of Consumer Items across Cluster Groups

Table 6: Perception of Consumer Items across cluster groups

Variable name		Strategic groups			F Value	p Value
		1	2	3		
Size of cluster	n	40	18	22		
Food safety		4.36	4.40	4.23	1.54	0.214
Health		4.36	4.42	4.10	5.98**	0.003
Convenience		3.99	4.28	3.93	5.21**	0.006
Low prices		4.09	4.01	3.91	0.88	0.414
Enjoyment		3.66	4.12	3.79	10.10*	0.000
Environment		3.53	3.66	3.45	1.36	0.257
Nature		<u>3.28</u>	<u>3.41</u>	<u>3.44</u>	0.97	0.380
Variation		3.38	3.69	3.35	4.86**	0.008

Note: sig. different at (*)= $p < 0.1$ and at (**)= $p < .05$

As seen in the Table 6 above, there two statistically significant difference among the Consumer items across the three strategic groups of dairy farmers. “Health” significantly differs among the groups of dairy farmers with $F(2,429) = 5.98, p = .003$ and “Enjoyment” with $F(2,428) = 10.10, p = .001$. “Nature” has the lowest rate of perception amongst the strategic groups of farmers, where as “Food safety”, “Health” and “Low prices” scored the highest rate of perception. The post hoc LDS test revealed that Enjoyment shows statistically significant

differences among the clusters with cluster 1 (3.66), cluster 2 (4.12) and cluster 3 (3.79). “Convenience” demonstrated statistically significant differences as well $F(2,427) = 5.21$, $p = 0.006$, where per cluster the differences were as cluster 1 (3.99), cluster 2 (4.28) and cluster 3 with the lowest rate of perception (3.93). “Variation” too showed differences in the perception with cluster 2 having the highest rate (3.69) compared to cluster 1 (3.38) and cluster 3 (3.35) with $F(2,426) = 4.86$, $p = 0.008$.

Not surprisingly, the multivariate test revealed that there is a significant difference amongst the groups of farmers based on the consumer items, with $V = 0.114$, $F(16,804) = 3.04$, $p = 0.000$, which leads to the support of hypothesis 1.

2.6 Perception of Technical Areas across Cluster Groups

Table 7: Perception of Technical Areas across cluster groups

Variable name		Strategic groups			F Value	p Value
		1	2	3		
Size of cluster	n	40	18	22		
Mobile communication technology		3.86	4.12	3.66	6.62*	0.001
Information and computer technology		3.92	4.15	3.78	5.34**	0.005
Medications		3.74	3.77	3.14	9.61*	0.000
Food safety		3.88	4.07	3.59	7.44*	0.001
Precision agriculture		3.81	4.17	3.53	12.32*	0.000
Breeding		3.56	3.54	3.15	3.54**	0.030
Storage Techniques		3.55	3.70	3.30	4.86**	0.008
Cooperation		3.22	3.90	3.09	24.22*	0.000
Marketing, such as (term) contracts		3.30	3.64	2.92	13.10*	0.000
Bio-based economy		3.27	3.44	2.92	5.95**	0.004
Logistic systems		3.56	3.74	3.13	11.24*	0.000

Note: sig. different at (*) = $p < 0.1$ and (**) = $p < .05$

As shown in the Table 7 above, all of the technical aspects demonstrate statistically significant differences amongst the three groups of dairy farmers. “Medications” has $F(2,361) = 9.61$, $p = 0.000$; “Food safety” has $F(2,412) = 7.48$, $p = .001$; “Precision agriculture” with $F(2, 389) = 12.32$, $p = 0.000$; “Marketing” with $F(2.413) = 13.10$, $p = 0.000$; “Logistic systems” has

$F(2,419)=11.24$, $p=0.000$. Then “Info and computer tech” has $F(2, 426) = 5.34$, $p=.005$ and “Bio-based economy” $F(2,359) =5.59$, $p=.004$. Lastly, “Storage techniques” also demonstrates statistically significant differences for the groups of farmers with $F(2,399, p=0.008)$. The post hoc LDS test revealed that “Precision agriculture” showed significantly higher rate of perception for cluster 2 (4.15) compared to cluster 3 (3.78).

The MANOVA and Pillai’s trace indeed confirmed that there is a significant difference amongst the different groups of farmers with $V=0.26$, $F(30,434) =2.18$, $p=0.000$, which leads to the support of hypothesis 1.

2.7 Perception of Technological Improvements across Cluster Groups

Table 8: Perception of Technological Improvements across cluster groups

Variable name	Strategic groups			F Value	p Value
	1	2	3		
Increase product quality	3.69	4.05	3.08	32.22*	0.000
Increase production	3.69	3.91	3.15	16.88*	0.000
Reduce environmental tax	3.40	3.79	2.91	20.13*	0.000
Increase labour productivity	3.58	3.89	2.93	26.08*	0.000
Alleviate labour	3.63	3.95	3.19	15.34*	0.000
Reduce cost per product	3.15	3.35	2.38	20.99*	0.000

Note: sig. different at (*)= $p < 0.1$

Looking at the Table 8 above it is clear that there is a statistically significant difference amongst all of the technological improvements across all three groups of dairy farmers. All of the technological improvements are statistically significantly different starting with “Increase product quality” with $F(2,427)=32.22$, $p=0.000$, “Increase production” has $F(2,427)=16.88$, $p=0.000$, “Reduce environmental tax” with $F(2,427)=20.13$, $p=0.000$, “Increase labour productivity” has $F(2,427)=26.08$, $p=0.000$, “Alleviate labour” with $F(2,428)=15.34$, $p=0.000$ and lastly “Reduce cost price per product” has $F(2, 426)=20.99$, $p=0.000$. Cluster 1 had significantly lower scores compared to the other clusters on the aspect of “Increase production”

with 3.69. Also, on reducing environmental tax and increase product quality there were also some differences amongst the clusters. For environmental tax regulations cluster 3 had the lowest rate of perception (2.91) compared to cluster 2 (3.79) and cluster 1 (3.40). Increasing the product's quality showed also low rate of perception for cluster 3 (3.08) compared to cluster 2 (4.05) and cluster 1 (3.69).

All items taken into account, the technological improvements had a significant difference amongst the different groups of farmers and that was confirmed by Pillai's trace $V=0.174$, $F(12,842)=6.68$, $p=0.000$, which leads to the support of hypothesis 1.

2.8 Perception of Other Items across Cluster Groups

Table 9: Perception off Other Items across cluster groups

Variable name		Strategic groups			F value	p Value
		1	2	3		
Size of cluster	n	40	18	22		
Production in the Netherlands will increase		3.11	3.07	2.79	2.76	0.064
Suppliers will be more powerful		3.36	3.54	3.38	1.06	0.346
Customers will be more powerful		4.07	4.15	4.19	0.56	0.568
Desires of consumers will change		3.59	3.96	3.53	7.89*	0.000
Wishes of customers (clients) will change		3.80	4.01	3.64	5.46**	0.005
Distribution channels will change		3.60	3.95	3.19	19.88*	0.000
Social media is used		3.60	4.05	3.78	12.30*	0.000
Products will change		3.22	3.68	3.15	11.38*	0.000
Production processes will change		3.37	3.77	3.16	12.69*	0.000
Prices will increase		2.69	3.13	2.31	20.24*	0.000
Customers want to work more intensively		3.53	3.94	3.22	16.96*	0.000
Suppliers want to work more intensively		3.48	3.71	3.17	10.26*	0.000
Commodity prices fluctuate considerably		4.12	4.25	3.95	3.36**	0.035
Selling prices will fluctuate considerably		4.05	4.07	3.82	2.34	0.097
Investment in innovation		3.68	3.98	3.34	15.79*	0.000
The government will withdraw		2.85	2.97	2.78	0.68	0.505
Bureaucracy will decrease		1.76	2.09	1.86	5.15**	0.006
Competitiveness will improve		2.65	2.98	2.13	21.28*	0.000
International trade will increase		3.75	4.00	3.52	7.80*	0.000
The pressure of disease will increase		3.17	3.45	3.02	5.19**	0.006

Note: sig. different at (*)= $p < 0.1$ and (**)= $p < .05$

The Table 9 above shows that from the other items that were recognized by the farmers themselves more than half of the items presented above indicate that there is statistically significant difference amongst the three clusters. At the variable level that the expected perception of “Production in the Netherlands will increase” differ significantly amongst the three cluster groups $F(2,427) = 2.76, p = 0.064$. “Desires of consumers” also differ significantly among the three strategic groups of dairy farmers $F(2,425) = 7.89, p = .00$. “Wishes of customers” also differ amongst the clusters with $F(2,426) = 5.46, p = 0.005$. The view on “Social media” had also recorded statistically significant differences amongst the groups $F(2,427) = 12.30, p = 0.000$, as well as “Products will change” $F(2,427) = 11.38, p = 0.000$, “Production process will change” $F(2,428) = 12.69, p = 0.000$ and as a consequences “Prices will change” $F(2,425) = 20.24, p = 0.000$. Customers and suppliers were assumed to want to work more intensively with $F(2,419) = 16.96, p = 0.000$ and $F(2,421) = 10.26, p = 0.000$ respectively. Moreover, “Investment in innovation”, “Selling prices”, “Competitiveness” and “International trade” also showed statistically significant differences with $F(2,426) = 15.79, p = 0.000$; $F(2,426) = 2.34, p = .097$; $F(2,421) = 21.28, p = 0.000$ and $F(2,427) = 7.80, p = 0.000$ following the same order of the variables. The LDS post hoc test revealed that the variable “Production process will change” showed significant results for all clusters, with cluster 1 (3.37), cluster 2 (3.37) and cluster 3 with the lowest rate of perception (3.16). Another difference the LDS post hoc revealed was with “Prices will increase” showing the results for cluster 1 (2.69), cluster 2 (3.13) and cluster 3 (2.31). Also, farmers show somewhat differences in responses on the “Distribution channels will change” for cluster 1 (3.60), cluster 2 (3.95) and cluster 3 (3.19).

Lastly, the multivariate test revealed that when using Pillai’s trace there was indeed a significant effect of the strategic groups of farmers on the expected perception of the results from the other items with $V = 0.312, F(40,758) = 3.50, p = 0.000$, which leads to the support of hypothesis 1.

Section 3: The effect of trends from the environment on farm across the three different clusters

Section 3 overviews the answers from the second question the farmers were asked. In this case farmers answered what were the effects that the set of trends appear to have on the farmer’s

strategic choices on their farm management. In other words, this section aims at discovering which of the important trends for farmers are actually applied to their farm management. Testing hypothesis 2 was done by using the same set of trends used in section 2. The differences of the effects that these trends have on the farmers strategic choices were measured. The results from the various set of trends are shown below in the following tables. Again, one-way ANOVA and MANOVA were used to come to these results.

As seen from the one-way ANOVA not only the same trend seem to be statistically significantly different for the three cluster groups again (Energy efficiency), but additionally nine other trends showed similar results, as seen in Table 10 below.

3.1 Effects of Political Items on Farm across Cluster Groups

Table 10: Effects of Political Items across cluster groups

Variable name	<i>n</i>	Strategic groups			F Value	p Value
		1	2	3		
Size of cluster	<i>n</i>	40	18	22		
Energy efficiency		3.56	3.78	3.14	11.02*	0.000
Water usage		3.09	3.43	2.59	16.52*	0.000
Animal welfare		2.89	2.62	1.99	2.27	0.105
Global warming		2.64	2.77	2.45	2.32	0.099
Nature conservation		2.86	3.07	2.79	1.89	0.151
Feeding humanity		2.80	3.28	2.50	10.29	0.000
Raw material scarcity		3.63	3.87	3.10	13.38	0.000
Transparency production process		3.17	3.52	2.81	12.15*	0.000
Tracking and tracing		3.14	3.71	2.90	16.51*	0.000
Public health		3.38	3.50	3.10	3.70**	0.025
Corporate sustainability		3.51	4.01	3.18	19.98*	0.000
Resource usage		3.89	3.75	3.52	3.10**	0.046
Food miles		2.76	3.31	2.41	15.83*	0.000
Genetic technology		2.48	2.54	2.41	3.91**	0.021
Waste reduction		2.78	3.11	2.56	8.11*	0.000

Note: sig. different at (*)= $p < 0.1$ and at (**)= $p < 0.05$

The LDS post hoc test revealed that Water Usage has significant results for all three clusters with lower rate of perception for cluster 3 (2.59) when compared to cluster 1(3.09) and cluster 2 (3.43). Tracking and tracing showed again low rate of perception for cluster 3 (2.90) compared to cluster 1(3.14) and cluster 2 (3.71). Gen technology had also shown significant differences amongst the clusters with lowest rate of perception from all trends, including cluster 3 with lowest (2.41), cluster 1(2.48) and cluster 2 (2.54).

Although most trends did not show statistically significant differences in the expected perception it still does make sense that farmers chose them. Just by looking at the table above, it seems pretty clear that these trends are more of a requirement from any governmental and regulatory laws for a farmer to operate in an industry. The multivariate test revealed that when using Pillai’s trace that there was a significant effect on the farm management $V=0.320$, $F(32,536) = 3.19$, $p=0.000$, which leads to the support of hypothesis 2.

3.2 Effects of Legislation Items on Farm across Cluster Groups

Although the expected perception of legislation laws and regulations showed no statistically significant differences amongst the different cluster groups, the effect these legislations have on the groups differs. Table 11 below reveals the results from the one-way ANOVA.

Table 11: Effects of Legalization Items across cluster groups

Variable name	n	Strategic groups			F value	p Value
		1	2	3		
Size of cluster	n	40	18	22		
More efficient use of minerals		3.85	3.91	3.54	3.87**	0.022
More efficient use of energy		3.32	3.49	2.96	7.51*	0.001
Reduction greenhouse emission		2.99	2.93	2.71	1.67	0.188
Reduction waste production		2.71	2.89	2.38	6.48**	0.002
More efficient use of water		2.94	3.33	2.60	12.80*	0.000

Note: sig. different at (*)= $p < 0.1$
and at (**)= $p < 0.5$

The results from the LDS post hoc test revealed the differences amongst the clusters. The use of minerals showed significance for cluster 2 (3.91) with the higher rate of perception from all items. Energy seemed to be more significant for cluster 1 (3.32) and 2 (3.49) compared to cluster 3 (2.96). Water usage also differed amongst the clusters with lower scores for cluster 3 (2.60) and cluster 1 (2.94) compared to cluster 2 (3.33).

MANOVA confirmed that when using Pillai's trace there was a statistical significance on the effect on farm with $V=0.080$, $F(10,842) = 3.51$, $p=0.000$, which leads to the support of hypothesis 2.

3.3 Effects of Economic Items on Farm across Cluster Groups

The effects of the economic items showed statistically significant differences amongst the cluster groups, similarly to the expected perception, as seen in Table 12 below. However, growing demand is seen to have statistical significance and growing imports do not show significant results, compared to the perception of these items in section 2.

Table 12: Effects of Economic Items across cluster groups

Variable name		Strategic groups			F Value	p Value
		1	2	3		
Size of cluster	n	40	18	22		
More sales outside Europe		3.42	3.68	3.28	3.21**	0.041
Growing demand		3.99	4.34	3.66	13.01*	0.000
Growing imports		3.44	3.72	3.36	2.93	0.054
More sales inside Europe		3.48	3.88	3.27	9.56*	0.000
Lower selling price		4.21	4.22	4.12	.032	0.723
More sales in The Netherlands		3.24	3.68	3.13	7.83*	0.000
Lower cost price		3.96	4.09	3.56	7.02*	0.001

Note: sig. different at (*)= $p < 0.1$ and at (**)= $p < .05$

The differences seen on the LDS post hoc test revealed the results per cluster group. Growing demand and more sales in the Netherlands has also showed significant differences amongst the clusters. Cluster 2 has the highest effect (4.34) compared with cluster 1 (3.99) and cluster 3 (3.66) for growing demand. The sales in the country have also had the highest effect for

cluster 2 (3.68) compared to cluster 1 (3.24) and cluster 3 (3.13). Lowering the cost price demonstrated difference between cluster 3 (3.56, $p=0.005$) and cluster 2 (2.09, $p=0.000$) and cluster 1 (3.96, $p=0.302$).

The different effect the economic set of trends has on farm was confirmed with the multivariate test. Pillai's trace revealed that there was a significant effect with $V=0.098$, $F(14,830)=3.04$, $p=0.000$, which leads to the support of hypothesis 2.

3.4 Effects of Social Items on Farm across Cluster Groups

In the case of the effects of social items on the farm, as seen from the Table 13 below, it is evident that there significant differences amongst the cluster groups.

Table 13: Effects of Social Items across cluster groups

Variable name	Strategic groups			F Value	p Value
	1	2	3		
Size of cluster n	40	18	22		
People's opinions about your industry will improve	3.02	3.54	2.80	18.39*	0.000
People more interested in the process of your industry	2.95	3.50	2.55	26.01*	0.000
People get more knowledge about food production	2.89	3.24	2.66	8.41*	0.000
People demand more products from The Netherlands	3.34	3.65	3.01	10.08*	0.000
People demand more products from their own region	2.89	3.50	2.76	15.28*	0.000
Easier to obtain suitable staff	2.46	3.03	2.14	18.01*	0.000

Note: sig. different at (*)= $p < 0.1$ and at (**)= $p < 0.5$

Similarly to the expected perception on social items, the effect on social items on the farm management is significantly different for the groups. Although all these items score more or less with the same rate of effects, the significant difference for the improved opinion for the industry was somewhat lower for cluster 3 (2.80) compared to cluster 1 (3.02) and cluster 2 (3.54). The same scenario happened with people gaining more knowledge about the dairy production with cluster 3 (2.66) compared to cluster 1 (2.89) and cluster 2 (3.50). In addition, the notion that consumers would prefer buying products from their region had similar significance results. Cluster 3 (2.76) compared to cluster 1 (2.89) and cluster 2 (3.50).

When looking at the multivariate test and Pillai's trace the results revealed that there was a significant effect with $V=0.16$, $F(12,808) = 6.02$, $p=0.000$, which leads to the support of hypothesis 2.

3.5 Effects of Consumer Items on Farm across Cluster Groups

As seen from the Table 14 below, from the total of nine consumer items, only one did not show statistically significant differences amongst the cluster groups.

Table 14: Effects of Consumer Items across cluster groups

Variable name	Strategic groups			F Value	p Value
	1	2	3		
Size of cluster	n	40	18	22	
Food safety	3.39	3.67	3.09	5.65**	0.004
Health	3.39	3.64	3.31	5.04**	0.007
Convenience	2.78	3.24	2.70	7.88*	0.000
Low prices	4.04	4.29	4.05	2.41	0.091
Enjoyment	2.71	3.52	2.68	22.45*	0.000
Environment	3.38	3.57	3.18	3.34**	0.036
Nature	3.00	3.24	2.85	3.60**	0.028
Variation	2.77	3.31	2.64	13.51*	0.000

Note: sig. different at (*)= $p < 0.1$ and at (**) = $p < .05$

Compared to the expected perception only health, convenience, enjoyment and variation showed statistically significant differences. In the case of effect on farm the food safety, nature conservation as well as the environment seem to have statistical differences. Food safety scores with the highest effect on farm for cluster 1 (3.39) compared to cluster 2 (3.67) and cluster 3 (3.09). Nature had also had the highest effect on cluster 2 (3.24) compared to cluster 1 (3.00) and cluster 3 with the lowest effect (2.85). Similarly, the same thing happened for environment where cluster 1 had the highest effect on farm (3.57) when compared to cluster 1 (3.38) and cluster 3 (3.18, $p=.169$).

The multivariate test revealed that when using Pillai’s trace that there was a significant effect with $V=0.11$, $F(16,802) = 3.14$, $p=0.000$, which leads to the support of hypothesis 2.

3.6 Effects of Technical Areas on Farm across Cluster Groups

The technical areas stay consistent with the farmers’ expected perception. In the case of effects on the farm management, the Table 15 indicates statistically significant different results amongst the cluster groups.

Table 15: Effects of Technical Areas across cluster groups

Variable name	n	Strategic groups			F Value	p Value
		1	2	3		
Size of cluster		40	18	22		0.000
Mobile communication technology		3.11	3.72	2.78	24.93*	0.000
Information and computer technology		3.33	3.79	2.98	18.21*	0.000
Medications		2.99	2.86	2.10	12.60*	0.000
Food safety		3.36	3.77	2.94	12.80*	0.000
Precision agriculture		2.87	3.36	2.46	15.86*	0.000
Breeding		2.68	2.61	2.14	4.04**	.018
Storage Techniques		2.63	3.38	3.46	19.57*	0.000
Cooperation		2.96	3.76	2.57	35.92*	0.000
Marketing, such as (term) contracts		2.83	3.70	2.56	33.81*	0.000
Bio-based economy		2.57	3.11	2.18	16.78*	0.000
Logistic systems		2.82	3.56	2.50	34.12*	0.000

Note: sig. different at (*)= $p < 0.1$ and (**)= $p < .05$

The only notable difference from the expected perception on farm to the actual effect is with marketing and cluster 3 (2.56) compared to the expected perception from section 2. The multivariate test revealed that when using Pillai’s trace that there was a significant effect with $V=0.37$, $F(30,476) = 3.60$, $p=0.000$, which leads to the support of hypothesis 2.

3.7 Effects of Technological Improvements on Farm across Cluster Groups

Same as the technical areas, the technological improvements on farm show statistically significant difference on the effect on farm. Table 16 below has the results from the one-way ANOVA.

Table 16: Effects of Technological Improvements across cluster groups

Variable name	Strategic groups			F Value	p Value
	1	2	3		
Increase product quality	3.76	4.12	3.23	21.18*	0.000
Increase production	3.38	4.16	3.24	25.04*	0.000
Reduce environmental tax	3.18	3.69	2.72	26.04*	0.000
Increase labour productivity	3.67	4.13	2.96	27.18*	0.000
Alleviate labour	3.74	3.98	2.92	33.96*	0.000
Reduce cost per product	3.91	4.08	3.26	16.46*	0.000

Note: sig. different at (*)= $p < 0.1$ and (**)= $p < .05$

Once again, a small noticeable difference revealed in the LDS post hoc test was observed with the increase of production. While in the expected perception cluster 1 had significantly lower scores compared to the other clusters on the aspect of “Increase production” with 3.69, in the effect on farm this cluster scores 3.38. The noticeable difference here goes in line with what the other results have already discovered numerous times before.

MANOVA once again confirmed the results. The multivariate test revealed that when using Pillai’s trace that there was a significant effect with $V=0.31$, $F(40,790)=3.62$, $p=0.000$, which leads to the support of hypothesis 2.

3.8 Effects of Other Items on Farm across Cluster Groups

The results on the effects of other items were somewhat similar to expected perception on the same variables, as seen in Table 17 below:

Table 17: Effects of Other Items across cluster groups

Strategic groups	
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Variable name		1	2	3	F value	p Value
Size of cluster	n	40	18	22		
Production in the Netherlands will increase		3.44	3.66	3.02	10.92*	0.000
Suppliers will be more powerful		3.55	3.82	3.32	6.72*	0.001
Customers will be more powerful		3.89	4.25	3.92	6.23**	0.002
Desires of consumers will change		3.42	3.93	3.26	16.90*	0.000
Wishes of customers (clients) will change		3.57	4.06	3.60	12.88*	0.000
Distribution channels will change		3.35	4.01	3.17	28.21*	0.000
Social media is used		2.72	3.57	2.50	33.45*	0.000
Products will change		3.21	3.77	2.97	24.29*	0.000
Production processes will change		3.25	3.82	2.90	30.71*	0.000
Prices will increase		4.05	4.30	3.78	7.74*	0.000
Customers want to work more intensively		3.51	3.99	3.32	15.65*	0.000
Suppliers want to work more intensively		3.21	3.71	3.07	15.07*	0.000
Commodity prices fluctuate considerably		3.94	4.11	3.88	1.80	0.166
Selling prices will fluctuate considerably		4.02	4.13	3.86	2.16	0.116
Investment in innovation		3.35	3.95	3.11	26.82*	0.000
The government will withdraw		3.22	3.44	3.28	1.48	0.227
Bureaucracy will decrease		3.20	3.51	3.14	3.43**	0.033
Competitiveness will improve		3.54	4.07	3.27	20.37*	0.000
International trade will increase		3.44	3.75	3.24	6.54**	0.002
The pressure of disease will increase		3.69	3.95	3.50	6.22**	0.002

Note: sig. different at (*)= $p < 0.1$ and (**)= $p < .05$

The notion that supplier and consumer will be more powerful has a high effect on cluster 1 and 2 compared to cluster 3. The LDS post hoc test showed that for cluster 1 and 2 the power of suppliers has higher effect (3.55 and 3.82 respectively) than cluster 3 (3.32). More powerful customers had higher effect on cluster 2 (4.25) and cluster 3 (3.92) compared to cluster 1 (3.89). The effect of the increased production in the Netherlands was evident on all clusters. The changing consumers' needs and desires did not seem to show statistically significant effect for cluster 3 (3.26 and 3.60 in the same order) compared to cluster 1 and 2. The effect of investing in something innovating had surprisingly higher effect for the second cluster (3.95) compared to cluster 1 (3.35) and the lowest effect for cluster 3 (3.11). The bureaucratic work and its effect had also shown statistically significant differences. For cluster 2 (3.51) with the highest effect when compared to cluster 1 (3.20) and cluster 3 (3.14). The more competitive environment to come had also noted some statistically significant differences amongst the clusters. The highest

effect was noticed for cluster 2 (4.07), then cluster 1 with lesser effect (3.54) and cluster 3 with the lowest effect (3.27).

Finally, the multivariate test revealed that when using Pillai's trace that there was a significant effect with $V=0.37$, $F(30,476) = 3.60$, $p=0.000$, which leads to the support of hypothesis 2.

Section 4: Movement of strategic orientation between 2013 and 2014

Alas, a comparison between 2013 and 2014 has been made in order to check whether the dairy producers have switched a strategic focus or not. The Table 18 below shows the results from the crosstab calculation with Chi-squared test.

Table 18: Movement of strategic orientation between 2013 and 2014

		Clusters			Total	
		1	2	3		
Year	2013	Count	26	9	11	46
		Expected count	27.3	8.0	10.8	
	2014	Count	22	5	8	35
		Expected count	20.7	6.0	8.2	
		Total	48	14	19	

As shown in the table, the strategic choice of farmers differed by year $\chi^2(1, n=81) = 0.465$. The table above indicates that the number of farmers following one strategy actually switched by the next year. The hypothesis 3 predicted that there will be a change in the strategic focus of farmers between the years. The results from this table offer support for hypothesis 3.

Chapter 6

Conclusion

This study examined the current situation of the Dutch dairy producers with regard to their strategic focus on their farm management over the last two years. It was of high interest to investigate and analyze this sector of the industry due to the changes in the quota system that will take place in 2015. Based on their strategic choices, three different groups of farmers were formed.

The results from this study indicate that the dairy farmers choose different strategies as a response to the trends they observe the environment. The different results obtained from this study should be taken into account carefully by policy makers, the government and NGO's. Overall, all farmers are aware of the more general trends that more or less control their business due to regulations, such as health, waste management, the wellbeing of consumers and the environment and so on. When it comes down to the more specific trends, farmers again do not vary too much in their perception and implementation on their farm management, but more than enough for the creation of the different groups of farmers.

While on the perception of political trends only Energy efficiency was statistically significant among the strategic groups, the effect on farm was noticed by other trends too. Water usage had especially low effect on farm for cluster 3 compared to the second cluster. Also Transparency in the production process had bigger effect on farm for cluster 2 compared to cluster 3. Generally looking at the results from the political trends, cluster 3 always has the lowest rate of effect on farm whereas cluster 2 has the highest effect on farm.

The Legislation items did not score any significant results for any of the clusters; however they did seem to have an effect on farm. Besides the reduction of greenhouse gas emission (GHG) all the rest showed relatively the same effect across the clusters. This is probably the case because farmers in the Netherlands are required to reduce their GHG per year,

which means that farmers view at this legislation as a requirement (more on reduction GHG in section Discussion pg. 48).

The economic set of trends showed that farmers see the Growing demand to have an effect on their farm in the following years and this trend scored high effects on all three clusters. The Social trends were also somewhat with similar effects for all clusters. Cluster 1 scored that demands in the country will increase and these farmers do believe that consumers will demand more local products; however this cluster scores very low on this trend. These farmers do not see a high demand from their farm. Cluster 3 on the same trends scored with higher effect on their farm. Cluster 2 does not deviate too much in their perception and effect on farm scores

The Consumer trends have higher effect on farm for cluster 2. Low prices have the highest scores and effect on all three clusters. Although Low prices have high effect on farm for cluster 3, the rest of the trends have the lowest effect on farm from all three clusters. Convenience in consumer's diet is more important to cluster 2 compared to the other two clusters.

The first group of farmers that made up cluster 1- called the Reducers of debts- makes up 50% of the total number of farmers grouping there. Certainly, the biggest focus of these farmers was reducing their debts because this is the group of farmers that invested the most in their business in the past years. There is surely pressure from the banks they took loans from to reduce their debts before the cut of quota. These farmers also do not plan on investing in anything new for the coming years. It also was evident that these farmers could definitely foresee the trends that are about to happen in the next few years, but clearly since they did not see any effect on their farms.

The second biggest cluster 3 was the cluster named the Adapters of societal demands with 27.5% of the total number. The main and most important differentiating aspect about this group of farmers was their big willingness to get closer to their consumers and start new activities with them. This focus was never again noticed for the other two clusters. Naturally, these farmers want to increase the quality of their product, but they do seem to be on the more concerned about animal welfare and the wellbeing of the environment in general. Since these farmers were also the only ones that thought about the variation of the consumer's diet, it was no

wonder that they had a bigger focus on cooperating more with their consumers and being more transparent and open about their production of the possible new products. In addition, this group of farmers was again the only one that showed more interest in marketing and the usage of social media as opposed to the Reducers of debts.

Lastly, the smallest cluster 2 or the Up-scalers with 22.5 % of the total number of farmers were grouped here. This group of farmers always showed the highest effect on farm on almost all trends. The political trends had high effect as well as the economic too. These farmers have the highest effect on consumer trends, and that is in line with their high score on starting new activities. That might indicate that this group is going to expand their relationship with customers. Also the technological changes have high effect on their farm which means that these farmers see those changes as a way to scale up.

Chapter 7

Discussion

Managerial Implications

The Dutch dairy production accounts for one of the largest producers in the EU (Demeter at all. 2009). Over 11 billion kg of milk production was produced over the last decade only making dairy production an important part of the economy in the Netherlands. The exports put Dutch dairy farmers in a rather competitive international position with a value of over 4.3 billion in 2007 (Demeter at all. 2009).

The short description of the dairy industry in the Netherlands indicates the importance of this sector for the overall economy of the country. However, small farm producers face a risky and unpredictable future (Boheljet al. 2005). Bohelje & Schrader (1996) argued that new and innovative strategies need to be created for dealing with risks. Strategic planning can potentially diminish the risk of uncertain business environment for small farm producers. And as seen in this study, small scale farmers in the dairy industry are aware of this fact and some of the small dairy producers do have clear strategic planning.

Research Implications

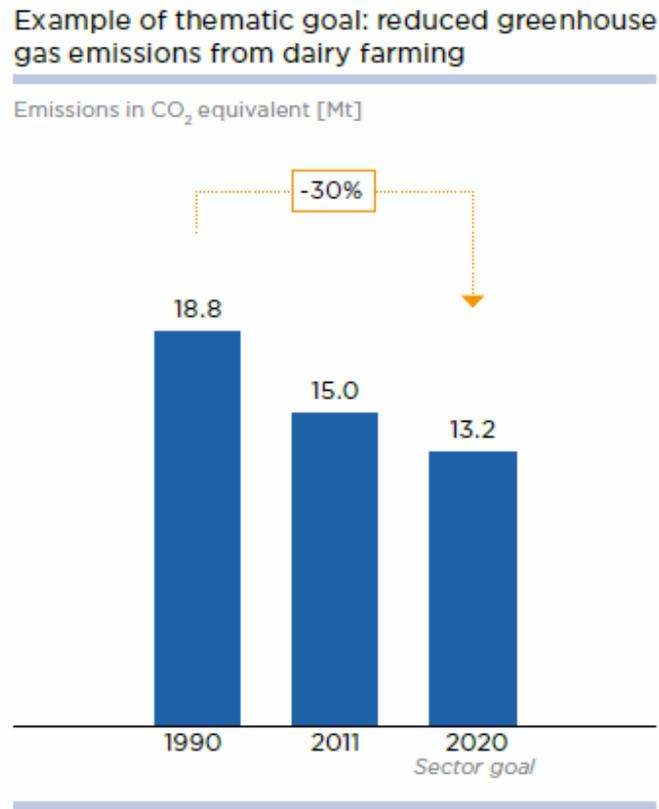
The contemporary trends that have an effect on the Dutch dairy sector are the same global trends, as seen in this study. The changing consumer preferences in The Netherlands result with a drop in dairy consumption by 7% amongst the Dutch consumers (Anon 2007). The Dutch diet was found to be less favourable on the fat content (Van Kreijl et al. 2006) which was further linked to obesity with a doubling number in the last 25 years and from all the deaths in the country, 5% was assigned to poor diet (Van Kreijl et al. 2006). This trend offers the possibility for improving the nutritional quality of milk and milk products thus offering a more favourable diet to Dutch consumers (Lock & Bauman, 2004; Haug et al 2007). This is in line

with what the group of farmers that was referred as the Innovators stand for. This group of farmers is looking for new opportunities and ways to improve their products and its quality. The improvement can be beneficial for improving the wellbeing of their consumers in general. Although this trend has a more general effect the results from this study showed that only that small fragment of the dairy farmers seek into introducing innovative ideas that can improve their product.

The constant pressure for the continuous improvements of environmental concerns such as reducing energy use, decreasing nutrient losses and lowering greenhouse gas (GHG) emissions has also had an impact on the dairy farmers (Demeter et al. 2009). Although the Dutch dairy sector has achieved a lot since the 1980 (Ramirez et al. 2006), the Ministry of Economic Affairs and the dairy sector signed an agreement in 1994 forcing the Dutch dairy producers to increase energy efficiency by 2000. Nowadays, a 2% annual reduction in energy use should be accomplished by the year 2020 (Ramirez et al. 2006). The significance of this trend was quite evident in this analysis too. The farmers referred to as the Followers and the Innovators were strongly on the side of more energy efficient use for the years to come. Since these two different goal oriented group of farmers plan on competing in the industry, it is of high importance that this trend is carefully taken into account.

Also these two groups of farmers showed to be more concerned on the nutrient use due to the fact that the Netherlands is highly nutrient intensive and it requires environmental policies to restrict undesirable changes in level of nutrients (Van Bruchmen et al 1999). In addition these policies also restrict GHG emissions (Freibauer 2003) forcing farmers to be very cautious about their practices. However Onderstejin et al. (2002) believes that closer monitoring of individual farm management is needed in order to assure less polluting strategies. Table 19 below shows the reduced gas emissions from dairy industry over the years with projections for 2020.

Table 19: Reduced GHG from dairy farming. Source: “Fit for the Future” Dutch Dairy Association 2013



Prices in dairy commodities have been unstable over the last decade resulting in higher-cost efficiency and merging of farmers (Demeter et al. 2009). Inevitably, the price pressure has an impact on the declining number of farmers (Anon 2007) and the results of this study also suggest that.

Reducing farmers DEBTS – Response to the Quota system

One of the most preferred strategies of all farmers was reducing their debts. This preference towards reducing debts is a result of the new factors that force the Dutch dairy producers towards a more cost effective production. The production of raw milk in Europe was restricted and ever since 1984 controlled by the quota of EU. Now, it will come to an end in 2015; additionally, the trade of dairy is facing similar future with less protection by the EU and national trade policies (Dillion et al. 2008). This will certainly drive prices even more down creating stronger competition.

The quota system was introduced in 1984 as means of controlling the amount of milk produced on yearly bases. Exceeding the production limit results in penalizing producers (European Commission 2006). This regime has brought stability to the European dairy market since its introduction. However, this regime will no longer exist from 31st March 2015 (European Commission 2006). Once this restriction is removed producers have to adjust their farm practises (Hoogweght Horizons 2013). However, the uncertainty about how much additional milk will be produced and what will be done with the additional milk is still questionable (Hoogweght Horizons 2013). The European Commission in its latest report indicates a modest expansion of the total milk production in the period 2013-2020. It also says that the cost-competitive region in Europe (European Commission 2006), including the Netherlands, will expand at a faster pace where the Dutch farmers expect 15-20% expansion in output amongst their suppliers (IPTS & EuroCare; Hoogweght Horizons 2013). Recent review by the Dutch Dairy Association reveals that the dairy farmers will spend €700 million in new equipment and machinery in order to be prepared and respond to the post quota future. Certainly the dairy farmers that will stay in this industry, as shown in the results and analysis, prepare their farm strategies to respond to these changes. Some farmers choose innovation as a potential strategy. A significant proportion of the extra milk is thought to be for milk powder production, new cheese production, infant formula and other ingredients since the demand for these products increases (Hoogweght Horizons 2013). The table 20 and table 21 show the opportunities for the Dutch dairy production as a response to the quota cuts.

Table 20: Opportunities for the Dutch dairy sector. Source: “Fit for the Future” Dutch Dairy Association 2013

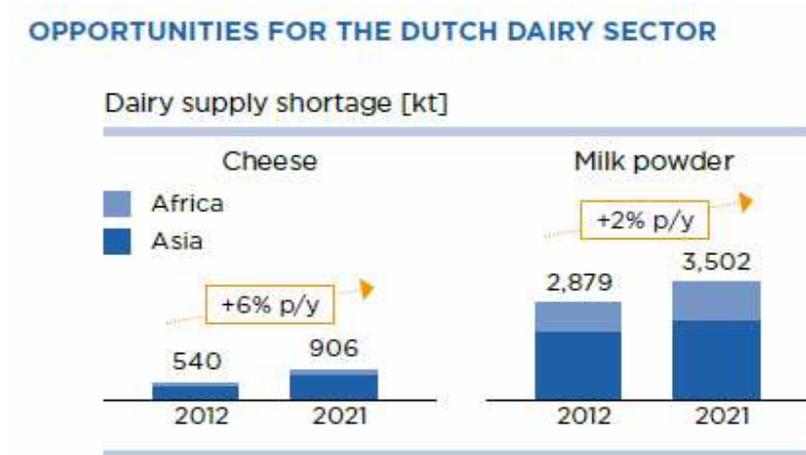
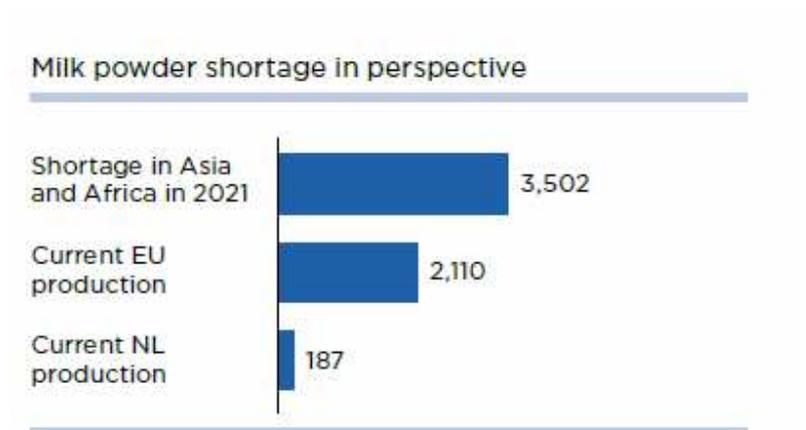


Table 21: Milk powder shortage. Source: “Fit for the Future” Dutch Dairy Association 2013



The significant changes that the dairy industry has gone through made this sector to be more market-oriented (European Commission 2006). “Support prices are being reduced, market intervention is scaled back, and export subsidies are going down. Farmers and the processing industry are already learning how to survive and prosper in a more market-oriented situation”

(European Commission 2006). This might leave small farm dairy producers in a less favourable situation due to their limited power over the big scale producers.

Limitations of the research

The biggest limitation of this research is the single respondent. The results in this study come from the farmers who are the actual owner of the small farms so it is assumed that they were accurate with their responses. However, whether they executed or will execute the strategies that they perceived as necessary for their farm management is unknown.

The second limitation of this study was the two different data suppliers. Prosu for the first and AgriDirect for the second year. However, it can be assumed that the data is representative regardless from which supplier came from due to the fact that these suppliers are specialized in agro marketing research.

Using one-way ANOVA is best when used on a higher number sample size and equal distribution of respondents per group. That was not the case in this study thus the strength of the test was low. This situation had its influence on the several insignificant results which could have been avoided if the number of respondents was equally distributed among the three groups.

Although not too limiting, the questionnaires were in Dutch language which is not the native language of the researcher of this study. Translating to English was done by using Google translate and with the help of Dutch native speaking people.

Recommendation for future research

Two recommendations come to mind when looking at the results and the current situation of the dairy industry in the Netherlands. The first one will be conducting the very same research in around 5 to 7 years from now. New farm business management practices are inevitable since the quota system stops being in force in 2015. That is a big change for the dairy industry and although speculations say that the Dutch dairy farming will not have a big changing effect, small farm producers are likely to be affected more. In addition it would be interesting to see what will

happen to those farmers who choose to stay in the industry and how much these farmers become flexible or not to the new set of trends that the quota cut system will bring along.

The second recommendation at this stage would be to conduct the same research but for a different industry in the Netherlands. In that way, the results obtained from a completely different industry would help in the attempt to study small farm producers and whether there will be any similarity amongst them regardless of what they actually produce. Those results could serve policy makers in taking small farm producer more into account.

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