ENVIRONMENTAL SCANNING AND STRATEGY OF DUTCH INTENSIVE LIVESTOCK FARMS

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ABSTRACT

This research contributes insights into the strategic planning of farmers and the link with strategy. The purpose of this paper is to examine the relationship between the external environment and the strategy farmers choose for their farm. Data from an online survey of 125 intensive livestock farmers was analysed using one-way ANOVA and multivariate analysis. Cluster analysis resulted in five clusters with different strategic orientation. The clusters indicated that farmers chose different strategies to adapt to the external farm environment. However, when comparing the data of the strategic groups on the external farm environment, few differences were found. Results indicated limited support for the link between the expected appearance of the external farm environment and the difference in strategic orientation, as well as the link between the effects of trends in the external farm environment among the intensive livestock farmers with different strategic orientation. This paper provides interesting insights into how the differences in the external environment of farms relate to the different strategic orientation. Moreover, not many contributions have been made to literature about the strategy on farms and the relationship with the external environment.

CONTENTS

1 INTRODUCTION

The Dutch Agri & Food sector is of critical importance to the Dutch economy. Agri & Food is the largest manufacturing sector in The Netherlands and contributes 9.2 percent of the total GDP. The Netherlands is the second largest food exporter in the world (TopsectorAgri&Food, 2013). The Dutch agricultural sector is well known worldwide for its knowledge centre and innovation (Wubben et al., 2012). The sector consists mainly of small farms (Verhees et al., 2011). However, the Dutch agricultural sector is under pressure due to continuous developments and high competitiveness within the total global agricultural sector (Terluin et al., 2013).

The external environment (macro environment) in which farmers operate is becoming more and more complex (Ondersteijn et al., 2006). The macro environment is the external influence on the company which include factors that are both uncontrollable and unchangeable (McCarthy, 1960). For example agricultural policy in The Netherlands has a strict regulatory policy regarding pesticide use, wildlife conservation and manure restrictions. In 2015, new European legislation will be introduced concerning the restricted use of several pesticides. While government restrictions require restricted use of pesticides, societal demands are two-sided. Given that the land area of The Netherlands is small for the high population, the price of productive agricultural land is high. Therefore society's claim on agricultural land increases. Despite the high cost of productive agricultural land, society's demands on the land have become greater due to recent food scandals. Retailers demand more sustainable products (Terluin et al., 2013), even though a large proportion of consumers are still price-sensitive (NIMA, 2014). While the debate continues on regulation, society, product quality and producer sustainability demands, farmers are exposed to increased international trade for raw materials, shorter product life cycles, and rapid technological changes. Due to increased complexity, the external environment is of growing importance for the decisions farmers have to take when running their business (Duncan, 1972). Changes within the marketplace increase market complexity and technological uncertainty, as well as commercial uncertainty (Langerak and Commandeur, 1994, Slater, 1993).

Farms are exposed to changes in the external farm environment which occur simultaneously and continuously. Changes offer opportunities for the one, and threats for the other. Problems may arise when farmers fail to adapt to these changes in the external farm environment. (Aguilar, 1967, Choo and Auster, 1993, Kotler, 2013, David, 2009). Many studies have shown that market orientation 1.) strengthens the competitive position (Hunt and Morgan, 1995, Kirca et al., 2005) and 2.) helps with formulation of the strategy (Choo and Auster, 1993, Aguilar, 1967, Sutton, 1988). Many consider strategy as an important factor for a firm to achieve an outstanding performance. Hence the current debate about the strategy formulation of small firms continues (Brinckmann et al., 2010).

The focus of this paper is on the differentiation of strategic groups within the subsector intensive livestock farming in the agricultural sector. The goal of this study is to examine the relationship between environmental scanning and the different strategic orientation farmers will implement in the coming years. More specifically, this study uses cluster analysis to examine whether homogeneous subgroups of intensive livestock farmers exist, based on the strategic focus of farmers. Secondly, this study carries out one-way ANOVA tests to examine

differences in the expected appearance of trends and the effect of environmental factors on farming across the clusters. In addition, this paper contributes to the current discussion about whether small firms execute a specific strategy.

Earlier empirical research has been conducted linking external environment and strategy (Hambrick, 1982, Ondersteijn et al., 2006). Hambrick (1982) studied the relationship between environmental scanning and organizational strategy. However the study 1.) had a general focus on the amount of time for scanning the external environmental instead of a trend-specific focus, 2.) was limited in framework to prospector and defender strategies and 3.) had no focus on the agricultural sector. In an agricultural context, Ondersteijn et al. (2006) studied the effect of external farm environment on strategic choice by looking at perceived environmental uncertainty. Results of the studies showed that farmers with high perceived uncertainty tend to choose a diversification strategy, whereas farmers with low perceived uncertainty are likely to choose a control strategy. Control strategy in this study focuses on both; efficiency and quality.

This research is unique in the sense that no previous research has been conducted on the basis of trend research data. Farmers are divided into strategic groups according to the strategic focus that the farmers implement. Farmers score the environmental trends according to the expected appearance and the effect that the external environment has on the farm. From a Darwinian perspective 'the fittest survive'. The 'fittest' companies are those who best adapt to their environment (Thomas, 2004).This research is important because it looks at which trends farmers expect to appear in the external environment and rate the effect of trends on their farm. It is unclear whether two farmers in the same subsector, but with different strategic focus, respond differently to the external farm environment. If differences were to exist, would this be because farmers unequally score the expected appearance of the trends? Or would a trend have a different influence on their farms?

To solve the stated problem, the following research questions have been formulated and used as a guideline for this paper:

- *What are the strategic groups in intensive livestock farming that can be distinguished based on the strategic focus of the farmers?*
- *Is there a significant difference between the different strategic groups in the expected appearance of the external farm environment trends?*
- *Is there a significant difference between the different strategic groups in the effect on the farm of the external farm environmental factors?*

The remaining sections discuss the Literature review (2), Conceptual model & Hypothesis (3) , Methodology (4), Results (5), Conclusion (6) and Discussion (7). Section two, Literature Research, introduces literature about the strategy in small firms and links it with performance. The third section introduces the basis of the conceptual framework used in formulating the hypothesis. The methodology section explains the sample, measures and methods of analysis. Section number five, Results, gives an overview of the findings of the

research discussed according to the formulated model. In section six, the conclusion is drawn and is then discussed in section seven regarding the value of the research to the literature and potential managerial implications.

2 LITERATURE REVIEW

"You may not be interested in strategy, but strategy is interested in you". L. Trotsky

What is strategy

Strategy originates from the Greek word *'strategos',* which means *'general'* and has its roots in the military (Bracker, 1980). Von Neumann and Morgenstern (1947) were the first scientists to link strategy to business with their game theory, and many followed over the next 65 years (e.g. Nandakumar, Hofer and Schendel, Mintzberg, Porter and Ansoff). Due to the elaborated research area, not just one definition strategy exists (Mintzberg et al., 1995).

In the late 70's (Hofer and Schendel, 1978) showed through their study that major diversifications existed between the authors in studies conducted up to that point in time. The main differences were firstly in the breadth of the concept of the strategy, secondly the components of the strategy, and lastly the strategy formulation process. (Mintzberg et al., 1995) distinguished four basic definitions of strategy; 1.) plans for the future, 2.) realized strategy / past patterns, 3.) position on the ground and 4.) a business theory.

Four specialists give their view on different strategy perspectives. Ansoff (1965) defines strategy as "*A rule for making decisions determined by product/market scope, growth vector, competitive advantage, and synergy*". According to Porter (1998) *"Strategy is about making choices, trade-offs; it's about deliberately choosing to be different".* Knight (2000) formulates strategy as following; *"Strategy reflects the firm's short and long term responses to challenges and opportunities in the business environment"*. Finally, some authors focus more on the need for a match with the environment. According to (Mintzberg, 1979) "*Strategy is a mediating force between the organization and its environment: consistent patterns in streams of organizational decisions to deal with the environment*"

In this research the planning perspective of (Mintzberg et al., 1995) is taken. Strategy is an indented plan to achieve a long term goal. Taking into account the resources and capabilities of the company and the threats and opportunities present in the environment (Rue and Holland, 1989). The literature notes that implementing a strategy leads to excellent business performance and is essential for maintaining a firm (e.g. Ansoff, Porter, Delmar and Shane).

Strategy and small firms

However, for small and medium enterprises a strategy is not always perceived as a necessity for the firm. Small firms have the ability to create sales without planning their marketing activities (Stokes, 2000). According to Carson and Gilmore (2000) the decisions of small firms are taken at any point in time in an unstructured non-sequential manner. This is in line with other literature which notes that what is applicable to large firms might not count for small firms (Blau and Schoenherr, 1971, Chen and Hambrick, 1995). Small firms differ in multiple ways from their larger rivals (Hills, 1988, Chen and Hambrick, 1995). According to different researchers small firms are credited for their flexibility (Fiegenbaum and Karnani, 1991), speed (Katz, 1970), risk-taking behaviour (Hitt et al., 1991) and price (MacMillan et al., 1982).

Currently an ongoing debate in literature is whether small firms (agricultural) follow a predetermined strategy. Brinckman (2010) discusses whether entrepreneurs in smaller firms should learn by doing or plan a strategy. This takes into account two views on strategy and performance. One group of researchers (planning school) proposes that business planning leads to outstanding performance, which is crucial for long term survival, including for small firms (e.g. Porter, 1998, Ansoff, 1965). Delmar and Shane (2003) discuss the multiple positive effects of planning; more rapid decision-making and avoidance of bottlenecks. Controversially, another group of researchers challenges this approach. They argue that small firms should be flexible, focusing on both learning and controlling resources (e.g. Brews and Hunt, 1999, Mintzberg et al., 1995). Vesper (1993) concluded that planning leads to organizational inertia and strategic inflexibility, which is in line with research by Mosakowski (1997) and Haveman (1992). Companies need to adapt quickly and the emergent strategies have to capture the arising opportunities, especially those companies that are active in environments with a high degree of uncertainty. In his quantitative synthesis of empirical studies, Brinckmann et al. (2010) found a positive relationship between strategy (business planning) and performance. The benefits of the possession of market information outweigh the costs of information-gathering by small firms. This supports earlier findings by Bracker et al. (1988), which stated that entrepreneurs who execute strategic planning procedures outperform entrepreneurs who do not implement structured strategic planning procedures.

The beginning of strategic planning is market orientation (environmental scanning). Market orientation is defined as the collection and dissemination of market information throughout the company, whereby decisions are made based on the relevant market information in order to create outstanding customer value (Jaworski and Kohli, 1993, Jaworski and Kohli, 1990, Narver and Slater, 1994, Narver and Slater, 1990, Deshpandé et al., 1993). Literature has shown that market orientation strengthens the competitive position (Katz and Kahn, 1966, Emery and Trist, 1965, Thompson, 1967, Jaworski and Kohli, 1993). Market orientation has a positive effect on the profitability of companies. To actively anticipate and respond to changes in the market environment is an increasingly important requirement for success. Next to environmental scanning, competitor analysis and industry analysis are also an important part of the market orientation of companies. (Hunt and Morgan, 1995, Kirca et al., 2005). Possessing knowledge about the trends in the company's environment exposes opportunities and avoids threats, which helps with the formulation of a suitable strategy. (Aguilar, 1967, Sutton, 1988, Choo and Auster, 1993).

Many studies also looked at the relationship between strategy and performance, taking into account the external environment (e.g. (Homburg et al., 1999, Ward et al., 1996, Hambrick, 1982). The performance of an organization largely depends on the match between the environment and the strategy (Mintzberg, 1979). According to Nandakumar et al. (2010), the external environment acts as a moderator in the relationship between strategy and performance. Other literature suggests that to remain successful, firms need to generate a strategy per generation (Post, 1993, Sharma et al., 1997).

In relation to agriculture, little research has been conducted. Ondersteijn et al. (2006) studied the relationship between farm strategies and performance. He concluded that different strategies lead to differences in farm structures, farm management and operational farm practices, however they do not significantly affect performance.

3 CONCEPTUAL MODEL AND HYPOTHESIS

Conceptual model

Figure 1 shows the proposed model to test the relationship between environmental scanning and strategy. This model applies to farmers. The study defines a farmer as a person who owns and manages a business (farm). The main source of income depends on the cultivation of soil, growth of crops and / or raising livestock (Verhees et al., 2011). Most farms are defined as micro-firms according to the regulations of the European Union. The majority of farms are firms with less than ten employees and with either less than 200 million euro annual turnover or less than a 200 million euro balance sheet total (EuropeanCommission, 2003).

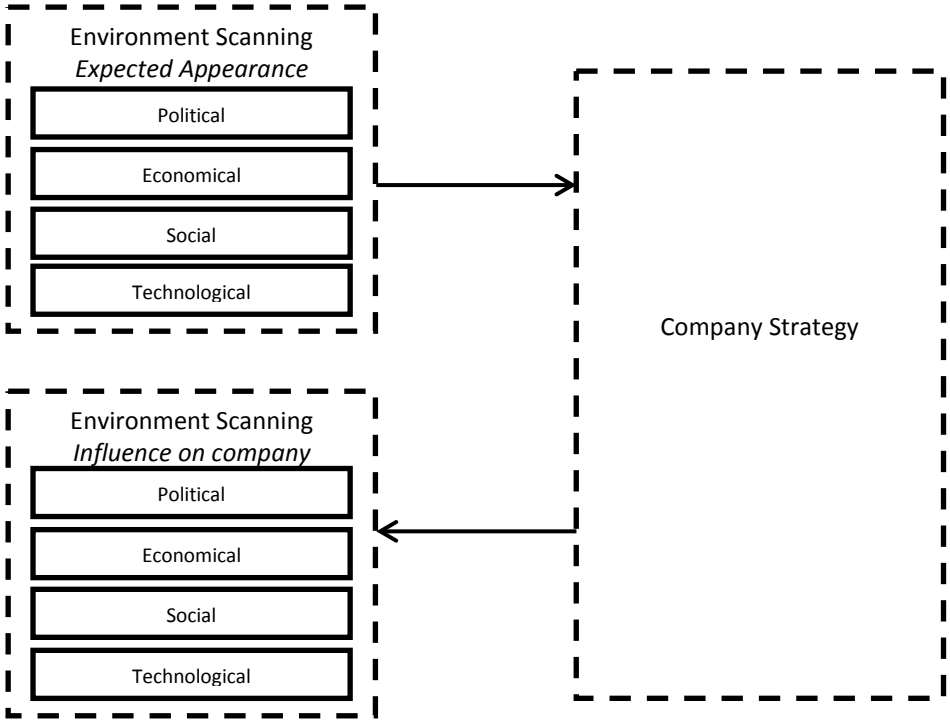

FIGURE 1:CONCEPTUAL MODEL LINK ENVIRONMENTAL SCANNING AND COMPANY STRATEGY

Environmental scanning is defined as the process of monitoring, collecting and circulating information about the external environment throughout the business (Mintzberg et al., 1995). Environmental scanning consists of both the internal as well as the external environment of the business. In this research the focus is on the external environment, specifically the macro environment. The macro environment is defined as the external influence on the company which include factors that are both uncontrollable and unchangeable (McCarthy, 1960). This research paper is in line with the traditional marketing or adaptive approach to the macro environment (Kotler, 1980, Scott and Marks, 1968). From this stream of research the external environment variables are analysed and the strategy will be adapted to the changes in the environmental variables (Kotler, 1980, Scott and Marks, 1968). Different researchers have researched scanning of the macro environment (Aguilar, 1967). Aguilar (1967) was one of the first to design a concept to scan the macro environment. The 'ETPS analysis', currently known as PEST analysis, is a commonly used tool and one of the basics of marketing taught to scholars to define and scan the macro environment (Verhage, 2004, Kotler, 2013). The PEST analysis

is divided into four main areas of research, namely; political, economical, socio-cultural and technological (PEST). The macro analysis collects information and identifies trends which might open up attractive opportunities and avoidable threats that affect the business (Aaker, 1992).

Strategy is defined as an intended plan to reach a long term goal (Mintzberg, 1978). The strategic focus of this study is on business-level strategy rather than corporate-level strategy. Business level strategy specifically focuses on '*How does the firm compete in a given business?*' rather than '*What business does the firm choose to be in?*' (Nandakumar et al., 2010). This definition of strategy has been chosen due to the inclusion of the future plans of the farmers.

Hypothesis

Environmental factors are hypothesized in order to have different expected appearances among different strategic groups of intensive livestock farmers. The different strategic groups of intensive livestock farmers are hypothesized in order to lead to differences in the influence of the external farm environment on farming.

The first hypothesis is formulated to examine the expected appearance of trends in the external farm environment. Literature states that there is a 'common body of knowledge' within an industry (Aguilar, 1967, Hambrick, 1982). According to Hambrick (1982), who introduced the concept 'common body of knowledge', strategic differences do not occur due to the unequal possession of information. He states that the strategic difference occurs due to internal and political processes. The study of Hambrick (1982) is supported by the studies of Aguilar (1967) and (Spender, 1981). They state that executives rely on the same sources for gathering information about the external environment, and hereby all executives possess equal general information. This concept of 'common body of knowledge' might be applicable to large companies who have the required resources (e.g. financial and time) to execute environmental scanning. However, the literature also suggests that what is applicable for large firms does not necessarily have to be applicable for small firms (Chen and Hambrick, 1995, Carter et al., 1994). Large firms possess the human resources as well as substantial financial support to scan the external environment (Dean et al., 1998). Competitive differences arise due to the actions a company undertakes regarding their external environment, which leads to the execution of different strategies (Miles et al., 2003). Different strategies occur due to differences in the missions, internal strengths and weaknesses as well as the personal preferences of the executive (Ondersteijn et al., 2006). There are 70,000 farmers in the Netherlands; this study assumes that the expected appearance of the external environment differs among the strategic groups of intensive livestock farmers because of limited resources.

Hypothesis 1: The external environment has unequally perceived expected appearance of trends amongst the different strategic groups of the intensive livestock farmers.

The second hypothesis examines the effect of the external farm environment on the farm. Factors of the external farm environment have different influences among the strategic groups. Firstly, according to Hambrick (1982) companies cannot create distinctions by scanning the environment. However, a company creates distinctive competences by how it acts upon the information it possesses. Secondly, where entrepreneurial

farmers perceive changes in the farm environment as an opportunity, others (less entrepreneurial farmers) consider changes to the external farm environment as a risk (Shane and Venkataraman, 2000). Different strategic focus leads to differences in the effect of the external environment. According to many researchers, there has to be a 'fit' between the environment and the strategy (Venkatraman and Prescott, 1990). This indicates that a different strategic focus leads to differences in the effect of the external environment on the farm. Therefore, it is hypothesized that the effect of the external environment differs across the groups of intensive livestock farmers with a different strategic focus.

Hypothesis 2: The effects of the external environment on the farm are different amongst the different strategic groups of intensive livestock farmers.

Finally, the third hypothesis is formulated to examine whether farmers adapt a long term strategy, or continuously adjust to the changes in the environment. Strategy in this research is defined as an intended plan to reach a long term goal (Mintzberg, 1978). However, there is an ongoing debate about the strategy formulation of small firms (Brinckmann et al., 2010). Brinckmann stated that planning is beneficial to small firms, therefore it is hypothesized that small firms implement a strategy whereby no switch in strategic orientation occurs during a time span of one year.

Hypothesis 3: A small firm implements a long term strategic orientation, whereby no strategic orientation switch occurs during a time span of one year.

4 METHODOLOGY

Sample

The sampling frame for this study is made up of Dutch intensive livestock farmers. The sample was extracted from an existing database, from which data was collected earlier for trend research by NIMA FAM "forward in Agro & Food" in 2013 and 2014 (NIMA, 2013, NIMA, 2014). The data for both studies was collected via an online survey in the periods November - December 2012 (trend session 2013) and November – December 2013 (trend session 2014). The sample for the trend research in 2013 was drawn from a Prosu database with names and addresses of farmers in The Netherlands. The sample for the trend research in 2014 was drawn from an Agridirect database with names and addresses of farmers in the Netherlands. The total sample (n = 713) was drawn from nine different subsectors of the agricultural sector. In total 153 (100 %) intensive livestock farmers returned the questionnaire, of which 28 were with missing values (16.3 %). This study has used the responses from the 125 intensive livestock farmers who are either pig, cattle or poultry farmers in The Netherlands.

Measures

In order to assess the views of intensive livestock farmers on the external environment of their firm, an online trend survey was conducted. The respondents were invited via email to participate in a self-administered internet survey, which was formulated according to the external environmental topics of Aguilar (1967) and Kotler (2013). MarketProbe implemented the online questionnaire and collected the responses. Afterwards data was provided in SPSS.

The survey consisted of sixteen linked questions which mapped the four parts of the PEST analysis (Aguilar, 1967). The first of the linked questions asked the farmer about the expected appearance of a trend: *'To what extent do you expect that the following attributes will be current in the next 5 years ?'*. The second question had the same attributes, but asked the farmer about the effect of a certain topic on his farm*: 'To what extent do you expect the following topics to have an influence on your business?'*

The first set of variables (questions one through four) mapped the political environment, which looked at expectations on the political agenda and on legislation. The second set of variables (questions five and six) described the economic developments, inter alia price fluctuations, export and changes in sales. The third set of variables (questions seven through ten) dealt with social aspects which looked at consumer issues and changes in the mind set of society. The fourth set of variables (questions eleven through fourteen) addressed technology and the impact of technological developments. The fifth set of variables (questions fifteen and sixteen) addressed the remaining developments. Those aspects were not easily classified in one specific topic and did not need different phrasing. Finally, the last set of variables (question eighteen) dealt with the strategic focus of the farm for the coming years.

The variables were measured with a one-to-five Likert-scale interval. The Likert-scale is the most common measurement scale in market research (Zikmund and Babin, 2009). The odd-numbered questions asked about the expected appearance of attributes: whereas 1 stands for "certainly not occur" and 5 stands for 'certainly

occur'. The even numbered questions looked at the effect of the given attributes on the farm: whereas 1 stands for 'no effect' and 5 stands for 'large effect'.

The questionnaire in 2012 (results 2013) was slightly different from the questionnaire in 2013 (results 2014), which was adjusted after receiving feedback from the farmers. Firstly, for each sector there was a sector-specific questionnaire, which meant that irrelevant variables were deleted from the questionnaire. Secondly, questions with many similarities were removed in one of the subset questions. Only the variables which were asked in both questionnaires were used for this study (total of 166 variables).

Data analysis

The intensive livestock farmers were separated from the rest of the dataset due to the research focus on this subsector.

The first step divided the intensive livestock farmers into subgroups with similar strategic focus. The data of the nine strategic variables was used for the tests, whereby the farmers' scores for strategic items were standardized per respondent. Before a cluster analysis was applied, a Pearson correlation test examined the relationship between the nine individual strategic variables. If there is a high co-linearity between the items ($r > .9$), then items are not sufficiently unique to identify distinctive strategic orientations (Mooi and Sarstedt, 2011). If high co-linearity occurs, then one of the variables with high co-linearity is not used for the formulation of the strategic groups.

In order to create strategic groups, a hierarchical clustering with Ward's method and squared Euclidean distance, followed by a k-means with cluster analysis, was executed. A post-hoc LDS test was conducted to check whether the means significantly differed across the strategic groups of intensive livestock farmers. Means of the clusters differ significantly when the p-value is smaller than .05.

Once the clusters were formed, the second step was to check whether the expected appearance and effect of the external farm environment significantly differed among the formed clusters. A one-Way ANOVA test was used to check whether the differences in means were significant. A mean significantly differs when the p-value is smaller than .10. A post-hoc LDS test was conducted to see which variables significantly differed in means among the clusters of intensive livestock farmers. For the 'expected appearance' the raw data was used and means per group were calculated, whereby the higher the score, the higher the subgroup of farmers expected the trend to appear. The 'effect variables' were standardized in order to see which trends were really important per cluster. If trends score below zero the effect of a trend is below average for the sub group. Moreover, the standardization of the data helped to correct differences in scale use of respondents (Field, 2013).

Once the individual differences were tested, a Multivariate Analysis of Variance (MANOVA) was conducted to conclude if a topic (e.g. politics) differed between strategic groups. The MANOVA determines if independent variables have an effect on the dependent variables. This research examined whether the attributes of a topic (topic politics consists of 17 attributes) are dependent on the cluster variable (independent). The multivariate

tests in SPSS lists four test statistics; Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root. Research suggests that for small and moderate sample sizes, the outcomes of the four tests differ only a little. This study made use of the Pillai's Trace test because it is considered to be the most reliable. Pillai's Trace is the sum of the variance which can be explained by the calculation of discriminant variables. (Field, 2013) If the Pillai's Trace statistic is significant (p <.05), then the outcome shows a significant effect of the strategic orientation of the cluster (1, 2, 3, 4 or 5) on the combined dependent variable of the external farm environment (one topic such as politics).

Finally, a crosstab with a chi-squared test of independence was used to determine whether the frequencies in the crosstab represented a movement in strategic focus which is a systematic movement, or whether they occurred by chance. This test examined the relationship between the number of respondents in a strategic group and the strategic year. If the outcome of the chi-squared test is significant (p <.05), then hypothesis 3 can be rejected, which concludes that there is a movement in strategic orientation.

5 DATA ANALYSIS AND RESULTS

Data about the strategic focus of the intensive livestock farmers was investigated by means of SPSS 19.0. Cluster analysis was conducted to obtain a different cluster of farmers with similar strategic focus. After forming the clusters of intensive livestock farmers with the same strategic orientation, hypothesis one and two were tested with the one-way ANOVA test. Section 5.2 discusses the expected appearance of the topics in the external environment among the strategic groups of intensive livestock farmers to test hypothesis 1. The non-standardized data is used for this section. Section 5.3 discusses differences in effect of the external environmental topics on the farms of the intensive livestock farmers. The political, economical, social and technological topics are tested on both aspects and findings are described. Section 5.4 reveals a description per cluster of their main characteristics, whereby strategic orientation and interpretation of external environment are taken into account. Finally, section 5.5 discusses the changes in the strategic orientation.

5.1 STRATEGIC ORIENTATION OF INTENSIVE LIVESTOCK FARMERS

Cluster analysis was conducted to obtain different clusters of farmers with similar strategic focus. The farmers scores for strategic items are standardized per respondent. Before a cluster analysis is applied, the Pearson correlation test reveals the relationship of the nine strategic variables with each other. The nine strategic variables are not highly correlated, so not one variable is removed from the research.

Based on the standardized farmers score for nine strategic variables, clusters were formed. The hierarchical clustering suggested a five cluster solution, whereby the k-means with initial starting values of the hierarchical clustering, finalized the clusters centres. The results of the final k-means cluster centres are shown in table 1. A One-Way ANOVA with LSD post hoc test, revealed the significantly different cluster means. The cluster analysis created the following strategic groups (see table 1).

TABLE 1: DESCRIPTIVE STATISTICS OF CLUSTERS OF INTENSIVE LIVESTOCK FARMS

		Cluster					Sig.
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	*n*	35	16	22	34	18	
	%	*28*	*12.8*	*17.6*	27.2	*14.4*	
Strategic focus							
Reduce cost price		0.48	**0.66**	-0.37	0.24	-0.58	.00*
Scale up		-0.72	-1.63	**0.35**	***0.80***	**0.25**	.00*
Increase quality		**1.17**	*0.48*	0.13	*0.44*	**0.90**	.00*
Increase selling price		-0.10	0.00	-0.23	-0.06	0.01	.81
Collaboration with customers		-0.06	0.32	-0.43	-0.09	**0.84**	.00*
Start new activities		-0.78	**0.24**	***0.56***	-1.16	-0.24	.00*
Vertical integration		-1.15	*-0.73*	**0.31**	-1.32	-1.09	.00*
Reduce debt		0.62	**0.77**	-0.49	0.70	-0.97	.00*
Adapt to demands of society		0.53	-0.12	0.17	0.44	**0.87**	.00*

Note: * significant at $p < .01$

The cluster analysis resulted in five significantly different clusters. Of the nine strategic variables, only 'Increase selling price' did not significantly differ across the five clusters of intensive livestock farmers. The clusters one, two and four have a cost focus. These clusters focus on the reduction of the cost price as well as the reduction of their debt. As well as the similar cost focus, the clusters also have differences. Where cluster one focuses mainly on quality, cluster two focuses on collaboration with customers and cluster four on up-scaling. Neither clusters 3 nor 5 have the cost focus.

The largest cluster, cluster one, groups 28 percent of the respondents characterized by the focus on quality. Next to quality, which is a 'precondition to operate', reducing cost price and debt are important to the group. Despite above-average orientation of those strategic variables, there is not a specific focus. Enlarging the farm, starting new activities or taking over current activities of suppliers are significantly less important for strategic group one. It is assumed that the external farm environment also reflects a lack of focus. Overall general trends will have an impact on this strategic group, such as lower selling price, price fluctuation and food safety. It is also assumed that there is a low effect of attributes which refer to enlarging farm capacity or innovation. This group is referred to as 'The Undecided'.

The second largest cluster, cluster four, groups 34 respondents (27 %). The fourth cluster, focuses on up-scaling, which desire to enlarge their production capacity. Hence this strategic group also focusing on reducing debt. Innovation and collaboration is not important to this strategic group. Therefore, cluster four is referred to as 'Cost Leaders by economy of scale'. It is assumed that trends concerning price and enlarging farm capacity rate highly for this strategic group (e.g. consumers demand for low prices).

The middle cluster, cluster three, groups 22 respondents (17.6 %). The focus of this cluster is either starting new activities or taking over activities of suppliers or customers (vertical integration) which are both significantly more important for this strategic group compared to the other groups. Therefore this cluster is referred to as 'the innovators'. It is assumed that, amongst other things, powerful customers and suppliers, changing customer wishes, low selling price and increased production and labour productivity, all score highly. The Innovators do not focus on cost and collaboration, which should be reflected in low scores on 'low customer prices' for this strategic group.

The second smallest cluster, cluster five, assembles a minority of respondents (14.4 %). This group has a significantly higher score on collaboration with customers and is referred to as the 'Collaborators'. Hereby adapting to the demands of society is also significantly more important for this strategic group. Cost and innovation are not key issues for this cluster and score significantly lower. We expect that the strategic orientation is reflected in the way the farmers look at the environment. Attributes like 'mobile communication technology' and 'social media' are higher due to the focus on adapting to the demands of society. It is assumed that trends such as increased consumer power and the changing customer demands have a high effect on these farmers.

Finally the smallest group, cluster two, which groups 16 respondents (12.8 %). The farmers in this cluster specifically focus on cost. Reduction of cost price and reduction of debt score significantly the highest for this strategic group. Enlarging their farm or adapting to the demands of society are significantly the least important for this strategic group. Following cost, farmers in this strategic group are open for innovation and collaboration with customers. This cluster is referred to as the 'Wanderers'. The Wanderers are people who are side-tracked from their core business 'farming'. We assume that this small group of farmers focuses on activities on-the-side and that they 'wander off' from the core activity of farming. Next to the general effect of trends, we assume that this would be the only group where consumer trends such as nature, convenience and environment have a high effect. Effects of 'increasing production', 'increasing labour productivity', 'breeding' and 'medication' are expected to be low in comparison with the other strategic groups.

Based on this cluster analysis in combination with the findings in the expected appearance of the external farm environment and the effect of the external farm environment on the farm, final descriptions of the strategic groups can be found in paragraph 5.4.

5.2 Expected Appearance of External Farm Environment

The One-way ANOVA test revealed that there were two significant differences in the expected appearance of political trends among the five strategic groups of intensive livestock farmers. Two out of fifteen political topics were significantly different in expected appearance (see table 2).

TABLE 2: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE IN POLITICAL ITEMS ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	*n*	35	16	22	34	18	
Public health		4.60	4.50	4.41	4.62	4.39	0.58
Resource usage		**4.24**	**4.44**	3.64	**4.24**	**4.53**	3.236**
Animal welfare		**4.38**	4.31	3.86	**4.52**	4.24	2.121*
Tracking and tracing		4.15	4.13	3.59	4.12	3.82	1.74
Feeding humanity		4.06	4.00	4.05	4.03	4.06	0.01
Energy efficiency		4.03	4.25	4.18	4.00	4.22	0.40
Raw material scarcity		3.83	3.56	4.18	3.79	4.22	1.42
Corporate sustainability		3.77	4.00	3.86	4.06	4.28	1.00
Transparency production process		3.70	3.60	3.41	3.56	3.61	0.24
Water use		3.57	3.44	3.14	3.35	3.50	0.65
Gene technology		3.55	3.36	3.85	3.36	3.44	0.77
Nature conservation		3.49	3.50	3.09	3.71	3.61	1.09
Waste reduction		3.40	3.69	2.91	3.38	3.72	1.62
Global warming		3.26	3.38	3.27	3.32	3.71	0.52
Food miles		3.09	3.33	2.79	3.12	3.00	0.53

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

As shown in Table 2, there was a statistically significant difference among the five strategic groups based on 'animal welfare' and 'resource usage' variables. These variables have the highest rate of appearance after

public health. Animal welfare is statistically significantly different (F(4,116) = 2.12, p = .083). The expected appearance of animal welfare was significantly higher for strategic groups one (4.28, p = .026) and four (4.52, p < .01) compared to strategic group three (3.86). There was no significant difference between the strategic group three and strategic groups two (p = .10) and five (p = .17). The expected appearance of 'Resource usage' is significantly different (F(4,118)=3.24, p = .015). Strategic group 3 (3.64) has a significantly lower expected appearance of resource usage compared to all the other strategic groups (group 1: 4.24, p =.013 ; group 2: 4.44, p <.01 ; group 4: 4.24, p =.013; group 5: 4.53, p <.01).

When analysing the results per cluster it makes sense that the innovators (3) score significantly lower than the political topics 'animal welfare' and 'resource usage'. Those two topics have been in the news a lot recently with the government and non-governmental organisations such as 'Wakkerdier' airing their views. Animal welfare and efficient use of resources are already seen as a 'licence to produce' by the Innovators (3), who think a step ahead of their competition.

All attributes combined, when using Pillai's trace the multivariate test revealed that there was no significant effect of the strategic clusters on the expected appearance of political topics, V =0.73, F(60,352) = 1.31,p=0.074.

When looking at *legislation* and the expected introduction of certain laws, one significant difference exists across the strategic groups of intensive livestock farmers (see table 3).

TABLE 3: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE IN LEGISLATION ITEMS ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	n	35	16	22	34	18	
More efficient use of minerals		**4.29**	4.00	3.68	**4.24**	**4.39**	2.26*
More efficient use of energy		3.51	3.44	3.50	3.18	3.78	0.84
Reduction greenhouse emission		3.11	3.50	2.91	3.29	3.78	1.67
Reduction waste production		3.03	3.13	2.48	3.03	3.39	1.80
More efficient use of water		2.94	2.88	2.86	3.06	3.33	0.54

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

Table three shows that the expected appearance of more efficient use of minerals is significantly different across the strategic groups (F(4,120)=2.26, p = .067). The post hoc test revealed that strategic group three (3.68) expects legislation concerning minerals to be significantly lower compared to strategic groups one (4.29, p = .014), four (4.24, p = .024), and five (4.39, p = .013). Hence for all strategic groups this is the most important trend with the highest expected appearance.

Despite the significantly lower score of 'more efficient use of minerals' for Innovators (3), this variable still has the highest rated expected appearance for this strategic group. Innovators (3) tend to walk a step ahead of the rest of the sector, which is why this group has a lower score for expected appearance.

The MANOVA showed that there was no significant effect of the clusters on the expected appearance of legislation, V =0.21, F(20,472) = 1.29, p = 0.18

The expected appearance of one of the *economic* variables significantly differs across the strategic groups of intensive livestock farmers (see table 4).

TABLE 4: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE IN ECONOMIC ITEMS ACROSS STRATEGIC GROUPS

	Strategic groups					F value
Variable name	**1**	**2**	**3**	**4**	**5**	
Size of cluster n	35	16	22	34	18	
more sales outside Europe	4.00	3.56	3.45	3.68	3.50	1.06
growing demand	3.74	3.56	3.68	3.85	3.39	0.57
growing imports	3.17	2.75	3.14	2.59	**3.50**	2.01*
more sales inside Europe	3.26	3.19	3.36	3.09	3.44	0.39
lower selling price	2.68	2.87	2.73	2.65	2.83	0.13
more sales in The Netherlands	2.31	2.50	2.68	2.41	2.72	0.63
Lower cost price	2.15	2.50	1.95	2.39	2.50	0.64

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

Table 4 shows at variable level that the expected appearance of growing imports significantly differs among the strategic groups (F(4,120)=2.01, p = .097). The post hoc test revealed that strategic group four expects the appearance of the growing import to be significantly lower compared to strategic group five (2.59 versus 3.50, p = .014). The results of the one-way ANOVA test in terms of expected appearance of the economic aspects does not lend for the support of hypothesis 1 (this was also confirmed by the multivariate test). There was no significant effect of the strategic clusters on the expected appearance of economic topics, V =0.18, F(28,444) = 0.75,p=0.84.

When looking at the expected appearances of the *social* items, no significant difference across the strategic groups of intensive livestock farmers is evident (see table 5).

TABLE 5: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE IN SOCIAL ITEMS ACROSS STRATEGIC GROUPS

	Strategic groups					F value
Variable name	**1**	**2**	**3**	**4**	**5**	
Size of cluster n	35	16	22	34	18	
People's opinions about your industry will improve	2.94	3.44	3.41	3.15	3.28	0.70
People more interested in the process of your industry	2.76	3.50	3.09	2.94	2.94	1.23
People get more knowledge about food production	2.74	3.06	2.82	3.03	3.39	1.02
People demand more products from The Netherlands	3.26	3.63	3.18	2.88	3.06	1.33
People demand more products from their own region	3.09	3.53	3.23	2.91	3.44	1.43
Easier to obtain suitable staff	1.97	2.86	2.36	2.24	2.24	1.61

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

Although there were no significant differences among the strategic groups of intensive livestock farmers, it makes sense that the Wanderers (2) rate variables such as ‘more interest in the process of industry’ and

'increased demand for Dutch products' are higher. This group drives away from their core activities and with the execution of their side activities they get closer to the people, which is in their interest. The cost leader (4) does not expect a growth in demand for Dutch products, which makes sense because it is not their focus. This group focuses on producing bulk at low price. When using Pillai's trace, the multivariate test revealed that there was no significant effect of the strategic clusters on the expected appearance of social topics, V =0.22, F(24,436) = 1.04, p = 0.41.

The results of the one-way ANOVA test in terms of expected appearance of the *consumer* aspects do not reveal significant differences between the groups of intensive livestock farmers (see table 6).

TABLE 6: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE IN CONSUMER ITEMS ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	n	35	16	22	34	18	
Food safety		4.51	4.25	4.05	4.56	4.17	1.75
Health		4.34	4.00	4.23	4.50	4.50	1.71
Convenience		4.12	3.73	4.38	4.15	4.11	0.86
Low prices		3.85	3.75	3.86	4.24	3.83	0.77
Enjoyment		3.74	4.06	4.00	3.79	3.89	0.40
Environment		3.63	3.50	3.41	3.56	3.94	0.69
Nature		3.43	3.47	3.05	3.12	3.56	0.96
Variation		3.29	3.50	3.73	3.39	3.39	0.58

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

As seen in table 6, all strategic groups of intensive livestock farmers rate the expected appearance of consumer aspects relatively equally. The fact that no significant differences appear in expected appearance does make sense. All the intensive livestock farmers are themselves consumers and by looking around, and by their own experience and observing others, they can obtain a pretty clear view of the expected appearance of consumer trends. The multivariate test revealed that there was no significant effect of the strategic clusters on the expected appearance of consumer items, V =0.33, F(32,444) = 1.26, p = 0.16

When looking at the expected appearances of the *technological aspects*, two significant differences across the strategic groups of intensive livestock farmers are evident (see table 7).

TABLE 7: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE IN TECHNICAL AREAS ACROSS STRATEGIC GROUPS

	Strategic groups					F value
Variable name	**1**	**2**	**3**	**4**	**5**	
Size of cluster n	35	16	22	34	18	
Mobile communication technology	**4.00**	4.06	3.45	3.94	**4.41**	2.34*
Information and computer technology	3.83	4.06	4.05	4.03	4.28	0.73
Medications	3.88	3.44	3.62	**4.21**	**4.25**	2.10*
Food safety	4.20	3.69	3.68	4.06	4.18	1.64
Precision agriculture	3.53	3.06	3.79	3.83	4.00	1.73
Breeding	3.58	3.25	3.85	4.00	3.82	1.47
Storage Techniques	3.60	3.44	3.24	3.44	3.76	0.69
Cooperation	3.12	3.00	3.05	3.29	3.76	1.41
Marketing, such as (term) contracts	3.06	2.75	3.32	3.35	3.50	1.39
Bio-based economy	3.09	3.00	3.16	3.30	3.47	0.44
Logistic systems	3.40	3.56	2.86	3.53	3.33	1.54

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

As seen in Table 7, there was a statistically significant difference among the five strategic groups based on the aspects 'mobile communication technology' and 'medication'. These aspects both have high rates of appearance. Mobile communication is statistically significantly different F(4,119)=2.34, p = .059). A Post Hoc LSD test revealed that the expected appearance of mobile communication was significantly higher for strategic groups one (4.00, p = .047) and five (4.41, p < .01) compared to the strategic group 3 (3.86). The expected appearance of 'medication' is significantly different as well (F(4,114)=2.10, p = .085). Strategic group 2 (3.64) has a significantly lower expected appearance of resource usage compared to strategic groups four (4.21, p = .023) and five (4.25, p =.040).

The two significant differences among the strategic groups of intensive livestock farmers make sense regarding the choice of executing a certain strategy. The Collaborators (5) expect a lot of development in mobile communication, which perfectly suits their strategic orientation on collaboration and adaption to society's demands. The significantly lower expected appearance for the Wanderers (3) on medication, is because this group is slipping away from their core business. Making improvements in medication is also not their point of interest and this group does not keep up to date with what precisely happens in this specific field.

However, when using Pillai's trace the multivariate test revealed that there was no significant effect of the strategic clusters on the expected appearance of areas of technological developments, V =1.24, F(60,124) = 0.93, p = 0.62

The One-way ANOVA test of the expected appearance of the results of *technological improvement* revealed that there are significant differences among the five strategic groups of intensive livestock farmers. Half of the technological improvements were significantly different, which lends support for hypothesis 1 that the expected appearance of trends differs among strategic groups (see table 8).

TABLE 8: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE OF RESULTS OF TECHNOLOGICAL IMPORVEMENT ACROSS STRATEGIC GROUPS

	Strategic groups					F value
Variable name	**1**	**2**	**3**	**4**	**5**	
Increase product quality	*3.60*	3.50	*3.45*	***4.09***	***4.17***	2.68*
Increase production	**3.60**	2.94	**3.86**	**3.68**	**4.17**	3.01*
Reduce environmental tax	3.51	3.38	3.55	3.50	3.89	0.51
Increase labour productivity	*3.20*	2.88	**3.64**	***3.79***	**3.67**	2.77*
Alleviate labour	3.20	3.31	3.41	3.74	3.72	1.21
Reduce cost price per product	2.94	3.19	3.05	3.38	3.28	0.57

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

Table 8 shows at the variable level that the expected appearance of increased product quality due to technical improvement significantly differs among the groups of intensive livestock farmers (F(4,120)=2.68, p = .035). Strategic group three (3.45) expects significantly less increased quality due to technological improvement compared to strategic groups four (4.09, p = .022) and five (4.17, p = .026). Differences among the strategic groups were also significantly different for increased production (F(4,120)=3.01, p = .021). Strategic group two expects significantly less increased production due to technological improvement compared to strategic groups one (3.60, p = .044), three (3.86, p = .01) four (3.68, p = .026) and five (4,17, p <.01). The results were almost identical for increased labour productivity (F(4,120)=2.77, p = .031). Strategic groups one and two scored the expected appearance of the increased labour productivity due to technological improvement significantly lower compared to groups three, four and five.

The results reveal that part of the expected appearance of technological results differ significantly among strategic groups. Notable is the expected appearance which corresponds with the strategic orientation. Increasing production and labour productivity is significantly higher for the Innovators (3), Cost leaders (4) and Collaborators (5). These are the groups who partially or totally focus on expansion. The scores of the Wanderers (2) on expected appearance confirms that this group does not expect that technology will lead to either increased production or increased labour productivity.

The multivariate test revealed that when using Pillai's trace there was indeed a significant effect of the strategic clusters on the expected appearance of results in technological developments, V =0.30, F(24,471) = 1.59, p = 0.04.

Finally, table nine reviews the expected appearance of other variables which have not yet been discussed. The results of the one-way ANOVA test showed a significant difference across the strategic groups in three variables.

TABLE 9: TESTING DIFFERENCES MEANS OF EXPECTED APPEARANCE IN OTHER ITEMS ACROSS STRATEGIC GROUPS

Variable name	Strategic groups 1	2	3	4	5	F value
Size of cluster n	35	16	22	34	18	
Production the Netherlands will increase	3.03	2.88	2.91	3.06	3.33	0.39
Suppliers will be more powerful	3.74	3.25	3.55	3.53	3.89	0.74
Customers will be more powerful	4.17	3.88	4.23	4.12	4.00	0.37
Desires of consumers will change	3.94	3.33	3.55	3.71	**4.22**	2.21*
Wishes of customers (clients) will change	3.88	3.53	3.91	3.88	4.11	0.89
Distribution channels will change	3.31	3.63	3.36	**3.85**	**4.00**	2.22*
Social media is used	3.44	3.38	3.67	3.56	4.00	0.87
Products will change	3.09	3.00	3.43	3.24	3.53	1.00
Production processes will change	3.29	2.94	3.36	3.38	**3.89**	2.04*
Prices will increase	2.74	2.40	2.77	2.50	2.76	0.45
Customers want to work more intensively	3.06	3.53	3.33	3.38	3.65	1.05
Suppliers want to work more intensively	3.40	3.40	3.45	3.82	3.67	1.06
Commodity prices fluctuate considerably	4.09	4.19	4.41	4.47	4.28	1.03
Selling prices will fluctuate considerably	4.06	3.94	4.32	4.29	4.06	0.73
Investment in innovation	3.53	3.69	3.75	3.91	4.00	0.95
The government will withdraw	2.80	1.94	2.55	2.73	2.50	1.35
Bureaucracy will decrease	1.97	1.80	2.14	1.53	1.94	1.20
Competitiveness will improve	2.51	2.56	2.36	2.35	2.67	0.28
International trade will increase	3.60	4.00	3.95	4.09	3.89	1.30
The pressure of disease will increase	2.79	2.69	2.73	2.71	3.11	0.38

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

Table 9 shows at the variable level that the expected appearance of change in consumer demands differs significantly among the five groups of intensive livestock farmers (F(4,119)=2.21, p = .072). The follow-up test revealed that strategic group five expects a significantly higher rate of changing consumer demands (4.22) compared to strategic groups two (3.33, p = .012) and three (3.55, p = .035). Differences in appearance across the strategic groups were also significant for the change in distribution channels (F(4,119)=2.22, p = .071). Strategic group one (3.31) expects significantly less change in distribution channels compared to strategic groups four (3.85, p = .028) and five (4.00, p = .023). Finally, changing production processes also significantly differs across strategic groups (F(4,120)=2.04, p = .093). Strategic group five expects the change of production processes to be significantly higher than strategic groups one (3.29, p = .039) and two (2.94, p < .01).

When taking the different strategic orientations into account, the results of table 9 become clearer. The Collaborators (5) expect the appearance of changing consumer demand, distribution channels and production processes to be significantly high. The high expected appearance of those trends results in a strategic focus whereby the group searches for collaboration in order to anticipate all the expected changes in the environment.

Disregarding the significant differences in the one-way ANOVA test, the multivariate test revealed that there was no significant effect of the strategic clusters on the expected appearance of other attributes, V =0.60, F(80,372) = 0.82, p = 0.85.

5.3 Effect of External Environment on Farm

This section overviews the effect of the external environmental topics on the intensive livestock farmers. To test the second hypothesis the same external environmental items are given. Differences amongst strategic groups of effects on the farm are measured. Political, economical, social and technological topics are tested and findings are shown.

The One-way ANOVA test revealed that there were only two significant differences in the effect of the *political* items on the farm among the five strategic groups of intensive livestock farmers. Two out of fifteen political topics were significantly different, which does not support hypothesis 2 (see table 10).

TABLE 10: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF POLITICAL ITEMS ON THE FARM ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	n	35	16	22	34	18	
Animal welfare		0.60	0.17	0.22	**0.85**	0.47	1.97*
Public health		0.42	0.34	0.38	0.24	0.66	0.61
Raw material scarcity		0.48	0.06	0.60	0.32	0.62	1.09
Tracking and tracing		0.24	0.44	0.05	-0.10	-0.10	1.41
Corporate sustainability		0.33	0.32	0.19	0.30	0.37	0.11
Resource usage		0.17	0.29	-0.32	0.22	0.15	1.22
Energy efficiency		0.26	0.33	0.34	0.05	0.35	0.64
Transparency production process		-0.19	-0.09	-0.23	-0.05	-0.21	0.21
Feeding humanity		0.05	-0.36	0.05	-0.22	-0.02	0.67
Nature conservation		-0.39	-0.16	-0.52	-0.43	-0.50	0.31
Water use		-0.29	-0.38	-0.58	-0.46	-0.18	0.56
Waste reduction		-0.44	-0.41	-0.50	-0.48	-0.46	0.04
Food miles		-0.84	-0.64	-0.54	-0.56	-0.54	0.43
Global warming		-0.80	-0.82	-0.48	-0.60	-0.52	0.63
Gene technology		**-0.68**	-1.50	**-0.51**	**-0.75**	-0.86	2.55**

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

As seen in Table 10, there was a statistically significant difference among the five strategic groups based on the topics 'animal welfare' and 'gene technology'. The difference in 'Animal welfare' is statistically significantly different among the groups (F(4,116)=1.97, p = .10). This is also seen at 'expected appearance'. The influence of animal welfare on farming was significantly less important for strategic groups two (0.17, p = .026) and three (0.22, p = .025) compared to strategic group four (0.85). The influence of 'gene technology' is significantly different (F(4,113)=2.55, p = .043). The influence of 'gene technology' on the farm is significantly lower for strategic group two (-1.50) compared to strategic groups one (-0.68, p < .01), three (-0.51, p < .01) and four (-0.75, p = .015).

The effect of animal welfare is overall high. However the effects for the Cost Leaders (4) are significantly higher. This makes sense, because political intervention on animal welfare entails making additional costs. In the perspective of the Cost Leaders (4) this is additional cost without profit, which causes the cost price to rise and makes it harder to compete with foreign competition which does not have such animal welfare legislation. Gene technology has a low effect on all strategic groups, although for the Innovators (3) it has the greatest effect.

However, when using Pillai's trace the multivariate test revealed that there was no significant influence of the strategic clusters on the effect political attributes have on the farm, V =0.54, F(28,372) = 0.97,p=0.55.

When looking at *legislation* and the effect introduction of certain laws have on a farm, no significant difference across the strategic groups of intensive livestock farmers is evident (see table 11). The results of the One-way ANOVA test in terms of legislation do not support hypothesis 2.

TABLE 11: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF LEGISLATION ON THE FARM ACROSS STRATEGIC GROUPS

	Strategic groups					F value
Variable name	**1**	**2**	**3**	**4**	**5**	
Size of cluster n	35	16	22	34	18	
More efficient use of minerals	0.76	0.55	0.50	0.62	0.58	0.37
More efficient use of energy	0.06	0.33	-0.19	0.10	0.26	1.02
More efficient use of water	-0.21	-0.19	-0.36	-0.33	-0.59	0.67
Reduction greenhouse emission	-0.16	-0.17	-0.39	-0.40	-0.23	0.43
Reduction waste production	-0.57	-0.22	-0.63	-0.55	-0.56	0.49

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

It is expected that the effect of government laws and regulations are equal among the strategic groups of intensive livestock farmers and small non-significant differences are noted. The MANOVA test confirmed that there was no significant influence of the clusters on the effect legislation has on the farm, V =0.11, F(20,468) = 0.67, p = 0.86.

The influence of the *economic* variables on the farm do not significantly differ among the strategic groups of intensive livestock farmers (see table 12). The results of the One-way ANOVA test in terms of economic aspects do not support hypothesis 2.

TABLE 12: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF ECONOMIC ITEMS ON THE FARM ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	n	35	16	22	34	18	
Lower cost price		0.53	0.13	0.38	0.43	0.52	0.42
Lower selling price		0.89	0.63	0.66	0.70	0.70	0.29
More sales in The Netherlands		0.02	-0.02	0.06	-0.20	-0.01	0.30
More sales inside Europe		0.09	0.42	0.18	0.11	0.10	0.40
More sales outside Europe		0.29	0.28	0.05	0.16	0.12	0.28
Growing demand		0.48	0.69	0.50	0.67	0.61	0.28
Growing import		0.31	-0.19	0.19	0.26	0.05	0.69

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

When using Pillai's trace, the multivariate test revealed that there was no significant influence of the strategic clusters on the combined effect that economic attributes have on the farm, V =0.13, F(28,444) = 0.53,p=0.98.

The effect of the *social* variables on the farm are not significantly different across the strategic groups of intensive livestock farmers (see table 13). The results of the One-way ANOVA test in terms of social aspects do not support hypothesis 2.

TABLE 13: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF SOCIAL ITEMS ON THE FARM ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	n	35	16	22	34	18	
People's opinions about your industry will improve		-0.07	-0.34	-0.54	-0.19	-0.06	1.37
People are more interested in the process of your industry		-0.30	-0.57	-0.38	-0.27	-0.21	0.48
People get more knowledge about food production		-0.31	-0.39	-0.38	-0.26	-0.14	0.27
People want to buy more products from the Netherlands		0.09	0.06	-0.21	-0.14	-0.17	0.60
People want to buy more products from their own region		-0.52	-0.39	-0.19	-0.55	-0.55	0.80
Easier to obtain suitable staff		-1.11	-1.41	-0.79	-0.72	-1.21	1.88

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

The results of the social variables in table 13 show very few differences in the effect on the farm, which reflects the broader context of the influence of society. These variables are relatively general resulting in an almost equal influence among the strategic groups of intensive livestock farmers.

When using Pillai's trace, the multivariate test revealed that there was no significant influence of the strategic clusters on the combined effect of social attributes on the farm, V =0.21, F(24,452) = 1.05, p = 0.40.

The One-way ANOVA test on *consumer* variables revealed that the effect of consumer items significantly differ on the farms of the five strategic groups of intensive livestock farmers (see table 14). More than half of the

consumer items differ significantly in the effect on the farm across the strategic groups, which lends support for hypothesis 2.

TABLE 14: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF CONSUMER ITEMS ON THE FARM ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	n	35	16	22	34	18	
Low prices		0.63	0.65	0.36	0.91	0.93	1.65
Food safety		0.50	0.79	0.20	0.43	0.36	1.02
Health		0.49	0.73	0.27	0.36	0.23	1.01
Nature		-0.12	**0.39**	-0.49	-0.46	-0.36	2.67**
Convenience		-0.47	**0.39**	-0.13	-0.58	-0.58	3.72***
Enjoyment		-0.65	**0.32**	-0.26	-0.59	-0.56	3.74***
Environment		**0.38**	**0.31**	-0.31	0.16	**0.34**	2.26*
Variation		-0.46	**0.27**	-0.35	-0.51	-0.31	3.10**

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

Table 14 shows at the variable level that the influence of most consumer variables differs among the strategic groups of intensive livestock farmers. Consumer variables which are significantly different among the five groups of intensive livestock farmers are: 'Nature' ($F(4,119)=2.67$, p = .035), 'Convenience' ($F(4,118)=3.72$, p < .01), 'Enjoyment'($F(4,120)=3.74$, p < .01), Environment ($F(4,120)=2.26$, p = .067) and Variation ($F(4,118)=3.10$, p < .018). The follow-up tests revealed that strategic group two expects a greater effect from consumer trends on their farm compared to one or more other strategic groups. Firstly the effect of 'Nature' is only of considerable importance to strategic group two (0.39) compared to groups three (-0.49, p < .01), four (-0.46, p < .01), and five (-0.36, p = .026), which are below average. Secondly 'Convenience', the same accounts for this variable, only strategic group two has a positive significantly higher effect of the convenience trend on farming compared to groups one (-0.47, p < .01), four (-0.58, p < .01), and five (-0.58, p < .01). The consumer variable 'Enjoyment' only has an effect on the farm of the farmers in strategic group two, which is significantly higher for this group (0.32) compared to groups three (-0.65, p < .01), four (-0.59, p < .01), and five (-0.56, p < .01), which are all below average. The consumer variable 'Environment' has an above average effect on all strategic groups apart from strategic group three which is significantly lower (-0.31). Finally the effect of the consumer trend 'Variation', whereby consumers seek variation in their diet, is again only important for strategic group two (0.27). This variable has a significantly greater effect with strategic group two compared to all the other strategic groups.

The different effects of consumer trends among the strategic groups of intensive livestock farmers clearly match their strategy. Strategic group two, the Wanderers, is the only strategic group whereby consumer trends Nature, Convenience, Enjoyment and Variation have an above average effect on the farm. The Wanderers (2) maintain side activities to create additional income, which derives from their core activity (farming). Side activities include a farm camping, shop or playground. This is why consumer trends have an above average

effect on the farm. Low prices have the lowest effect on the Innovators (3), which makes sense because the Innovators were not entirely fixed on cost.

The multivariate test confirmed that when using Pillai's trace there was significant influence of the strategic clusters on the effect of consumer attributes on the farm, V =0.40, F(32,440) = 1.54, p = 0.032. Thus the effect that consumer items have on the farm differs significantly per strategic group.

When looking at the effect of the *technological aspects*, two significant differences across the strategic groups of intensive livestock farmers are evident (see table 15).

TABLE 15: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF TECHNOLOGICAL ITEMS ON THE FARM ACROSS STRATEGIC GROUPS

		Strategic groups					F value
Variable name		**1**	**2**	**3**	**4**	**5**	
Size of cluster	n	35	16	22	34	18	
Breeding		**0.21**	-0.44	**0.21**	**0.51**	**0.45**	3.02**
Medications		0.29	-0.24	0.05	**0.65**	0.16	3.10**
Precision agriculture		-0.57	-0.77	-0.68	-0.47	-0.59	0.34
Food safety		0.55	0.42	0.39	0.59	0.38	0.45
Storage Techniques		-0.75	-0.65	-0.75	-0.83	-0.92	0.17
Information and computer technology		0.02	0.34	0.01	0.05	0.39	0.99
Mobile communication technology		-0.25	-0.09	0.05	0.05	0.02	0.73
Bio-based economy		-0.84	-0.81	-0.33	-0.50	-0.64	1.08
Logistic systems		-0.57	-0.24	-0.25	-0.57	-0.58	1.02
Cooperation		-0.39	-0.40	-0.17	-0.15	0.02	0.85
Marketing, such as (term) contracts		-0.30	-0.70	-0.14	-0.34	-0.15	1.10

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

As seen in table 15, there was a statistically significant difference among the five strategic groups based on the aspects 'breeding' and 'medication'. These aspects are important to most of the strategic groups, because their influence is far above average. Breeding is statistically significantly different (F(4,114)=3.02, p = .021). A Post Hoc LSD test revealed that the influence of breeding was significantly lower (under average important) for strategic group two (-0.44) compared to all the other strategic groups. The influence of 'medication' is significantly different as well (F(4,116)=3.10, p = .018). The impact of medication is significantly lower for strategic groups two (-0.24, p <.01) and three (0.05, p = .019) compared to strategic group four (0.65).

The differences in the effect of technological aspects among the strategic groups of intensive livestock farmers make sense when reviewing their strategic focus. As seen in table 15 the Wanderers (2) score significantly lower on the items 'Breeding' and 'Medication'. Due to the Wanderers (2) tendency to focus on side activities, parts of the core activity have a low effect on their farms such as 'Breeding' and 'Medication'. The apparant low importance of all technical improvements (besides Food safety an ICT) show that the Wanderers do not look to the future, which makes sense as they have been side-tracked. Effects of 'Breeding' and 'Medication' are significantly higher for the Cost Leaders (4), which makes sense as they are expanding and are focused on costs.

However, when using Pillai's trace the multivariate test revealed that there was no significant influence of the strategic clusters on the effect that areas of technological development have on the farm, V =1.10, F(60,144) = 0.90, p = 0.67

The One-way ANOVA test of the effect of results of *technological improvement* on farming revealed that there are significant differences among the five strategic groups of intensive livestock farmers (see table 16).

TABLE 16: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF TECHNOLOGICAL IMPROVEMENT ON THE FARM ACROSS STRATEGIC GROUPS

	Strategic groups					F value
Variable name	**1**	**2**	**3**	**4**	**5**	
Size of cluster n	35	16	22	34	18	
Reduce cost price per product	0.506	0.012	0.287	0.527	0.428	0.948
Reduce environmental tax	0.025	-0.096	-0.053	-0.038	-0.012	0.069
Increase production	**0.364**	-0.215	**0.618**	**0.540**	0.359	2.261*
Increase labour productivity	-0.016	-0.330	***0.596***	**0.416**	*0.022*	3.584***
Increase product quality	0.367	0.485	0.376	0.475	0.513	0.192
Alleviate labour	0.070	0.109	0.254	0.479	-0.123	1.743

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

As seen in table 16 at variable level, the influence of increased production due to technical improvement is significantly different among the five groups of intensive livestock farmers (F(4,119)=2.26, p = .067). The follow-up test revealed that the influence of this trend is significantly lower for strategic group two (-0.22) compared to strategic groups one (0.36, p = .04), three (0.62, p < .01) and four (0.54, p < .01). Differences among the strategic groups were also significantly different for increased labour production (F(4,120)=3.58, p < .01). The influence of increased labour production due to technological improvement is significant lower for strategic groups one, two and five compared to strategic groups three and four.

Looking at the strategic orientation of the different strategic groups, the results reveal that the effect on Cost Leaders (4) and Innovators (3) are significantly higher on increasing labour productivity as well as increasing product quality. It is clear that the Wanderers (2) have been side tracked and that innovation or an increase in either labour productivity or production does not have any effect on them, as it is not in their interest. The effect on Innovators is high as they are a step ahead and they are the first to adapt to innovation. New technologies are interesting as they either increase production or increase labour productivity, so the innovators (3) could benefit from the innovation. It makes sense that the effects for Cost Leaders (4) are high as both increased production and increased labour productivity lead to a lower cost, which is their main focus. The Wanderers (2) show once again that the effects of increased production or increased labour productivity are low, which makes it clear that they no longer invest in the business.

Combining the effects of technological improvements on the farm, the multivariate test revealed that when using Pillai's trace there was no significant influence of the strategic clusters on the effect of results in technological developments on the farm, V =0.24, F(24,464) = 1.24, p = 0.20

Finally, table 17 reviews the influence of the remaining items which have not yet been discussed. The results of the One-way ANOVA test showed a significant difference across the strategic groups in two items.

TABLE 17: TESTING DIFFERENCES OF MEANS IN THE EFFECT OF REMAINING ITEMS ON THE FARM ACROSS STRATEGIC GROUPS

	Strategic groups					F value
Variable name	**1**	**2**	**3**	**4**	**5**	
Size of cluster n	35	16	22	34	18	
Production in the Netherlands increases	0.23	0.27	-0.09	-0.06	0.05	0.82
Suppliers will be more powerful	0.43	0.43	0.49	0.33	0.39	0.15
Customers will be more powerful	0.48	0.82	0.65	0.46	0.54	0.77
Desires of consumers will change	0.40	0.41	0.26	-0.01	0.27	1.70
Wishes of customers (clients) will change	0.40	0.31	0.51	0.29	0.28	0.44
Distribution channels will change	0.15	-0.10	0.21	0.01	0.09	0.55
Social media is used	-0.46	-0.20	-0.10	-0.60	-0.30	1.09
Products will change	-0.14	0.11	-0.12	-0.21	0.11	0.93
Production processes will change	-0.12	-0.06	0.16	-0.04	0.18	0.76
Prices will increase	0.40	0.32	0.32	0.77	0.52	1.03
Customers want to work more intensively	0.11	0.48	0.53	0.21	0.40	1.95
Suppliers want to work more intensively	0.01	-0.06	0.19	0.21	0.12	0.63
Commodity prices fluctuate considerably	0.80	0.65	0.77	0.68	0.69	0.21
Selling prices will fluctuate considerably	0.60	0.51	0.58	0.75	0.78	0.56
Investment in innovation	-0.10	0.33	0.28	**0.27**	**0.44**	2.10*
The government will withdraw	-0.22	-0.31	**0.41**	-0.03	0.09	2.03*
Bureaucracy will decrease	0.00	-0.42	0.19	-0.10	-0.08	0.87
Competitiveness will improve	0.24	0.11	0.52	0.28	0.22	0.70
International trade will increase	0.30	0.43	0.40	0.26	0.05	0.65
The pressure of disease will increase	0.21	0.23	0.27	0.11	0.39	0.29

Note: sig. different at (*)= p <0.1, (**)= p < .05 and (***)= p < .01

Table 17 shows at variable level that the influence of investment in innovation differs significantly across the strategic groups (F(4,119)=2.10, p = .085). The follow-up test revealed that investment in innovation has significantly less influence on strategic group one (-0.10) compared to strategic groups four (0.27, p = .043) and five (0.44, p = .015). Differences in the level of influence across the strategic groups were also significant for the withdrawal of the government (F(4,120)=2.03, p = .095). The influence of withdrawing the government is significantly higher for strategic group three (0.41) compared to strategic groups one (-0.22, p =.014) and two (-0.31, p =.020).

Table 17 indicates two significant differences which is expected looking at the strategic orientation of the intensive livestock farmers. Firstly, the effect of investment in innovation is significantly lower for the Undecided (1), which makes sense as they do not want to expand or start new activities. Secondly, the withdrawal of the government will have a significantly higher influence on the Innovators (3). Innovators (3) have to do research to develop new products, and the government often provides funds for research or supports certain kinds of research. When the government withdraws, less money will be available to fund innovations which will have the most (significantly higher) effect on the Innovators, as they make most use of

the funds because they have a strategic focus. Disregarding the two significant differences in the one-way ANOVA test, the multivariate test revealed that there was no significant influence of the strategic clusters on the effect on farming with all other attributes combined, V =0.70, F(80,388) = 1.03, *p* = 0.42.

5.4 DESCRIPTION STRATEGIC GROUPS

A description and a discussion per cluster of their main characteristics are described below. Cluster names derive from the respective strategic orientation and interpretation of the external environment.

Cluster-1, The Undecided (28%)

The first cluster is the biggest cluster and groups together 28 percent of the respondents and is characterised by a focus on quality. However this strategic group does not really have a clear focus. Next to quality, which is a precondition to operate, reducing cost price and debt are also important to the group. Although this scores higher, it is not a specific focus. Expanding the farm, starting new activities or taking over current activities from suppliers are significantly less important for strategic group one. The fact that this strategic group lacks a focus is reflected in the external farm environment. The more general trends such as lower selling price, price fluctuation and food safety all have an impact on this strategic group.

Cluster-2, The Wanderers (13%)

The second cluster is, with 16 respondents, the smallest strategic group (12.8%). The farmers in this cluster specifically focus on cost. Reduction of cost price and reduction of debt are significantly the highest for this strategic group. Expanding their farm or adapting to the demands of society are significantly the least important to this strategic group. Following cost, the farmers in this strategic group are interested and open for innovation and to collaboration with customers. This cluster is referred to as the 'Wanderers'. The Wanderers are people who are side-tracked from their core business 'farming'. This small group of farmers focuses on side activities and wanders off from the core activity of farming. This is the only group where consumer trends, nature, convenience and environment have a high effect. The Wanderers' focus is on here and now. The effects of increasing production, increasing labour productivity, breeding and medication are low compared to the other strategic groups.

Cluster-3, The Innovators (18%)

The third cluster groups together the Innovators (17.6%). The focus of this cluster is either on starting new activities or on taking over activities from suppliers or customers (vertical integration), which are both significantly more important for this strategic group compared to the other groups. The Innovators rate the expected appearance of public health, price fluctuations and consumer trends (e.g. convenience, health food safety) high. This strategic choice is in line with the effects of the external farm environment on the farm. Powerful customers and suppliers, changing customer wishes, low selling price and increased production and labour productivity all have a substantial effect on their business, next to price fluctuations. This effect is large because the group focuses on chain integration and expansion. The Innovators do not focus on cost and collaboration, which is shown in the lowest effect score on low customer prices for this strategic group.

Cluster-4, The Cost Leaders by economy of scale (27%)

Cluster four, the Cost Leaders by economy of scale, are the second largest cluster grouping together 27 percent of the respondents. The fourth cluster focuses on up-scaling, they want to enlarge their production capacity and by executing this strategic focus they aim to reduce their cost price. This strategic group anticipates the expected appearance of the external environment. Next to food safety, animal welfare and health this group expects that the consumers have a high demand for low prices. This group does not expect that prices will increase and that cost prices will lower (economy). This strategic choice also makes sense when looking at the effects of the external farm environment on the farm. Consumer demand for low prices has the most effect on their business, next to price fluctuations. Due to an increase in scale technologies which can reduce cost price, increase production or alleviate labour, it has a huge effect on the profitability of the farm. Innovation and collaboration are not important to this strategic group, hence the group also focuses on reducing debt, which makes sense if they have just invested in up-scaling their farm.

Cluster-5, The Collaborator (14%)

The second smallest cluster, strategic group five, assembles a minority of respondents (14.4%). This group had a significantly higher score on collaboration with customers and is referred to as the 'Collaborators'. Hereby adapting to the demands of society is significantly more important for this strategic group. Cost and innovation are not key issues for this cluster and score significantly lower. When looking at the external environment of the Collaborators next to general issues such as health and resource usage, the expected appearance of mobile communication technology and social media is high for this group. Also changing consumer desires as well as medications are highly rated. The effect of low prices is the highest, followed by fluctuations in prices and health. Although their focus is not on starting new activities, the effect of investment in innovation is high. The Collaborators work together with their customers and this increased power has great effect. This strategic focus enables them to adapt to the demands of society without actually starting new activities themselves.

5.5 MOVEMENT STRATEGIC ORIENTATION

Finally, to see if the strategic focus of intensive livestock farmers switched between 2013 and 2014, a comparison of the strategic focus between the two years has been made. The numbers of farmers in a strategic group are divided by year and a crosstab with Chi-squared test is conducted. Table 18 shows the results.

TABLE 18: CROSSTABS ON MOVEMENT IN STRATEGIC ORIENTATION OF INTENSIVE LIVESTOCK FARMERS

			Clusters					
			1	2	3	4	5	**Total**
Year	2013	Count	13	7	16	21	13	70
		Expected count	19.6	9.0	12.3	19.0	10.1	
	2014	Count	22	9	6	13	5	55
		Expected count	15.4	7.0	9.7	15.0	7.9	
		Total	35	16	22	34	18	125

As table 18 indicates that the number of farmers following a certain strategic orientation did differ by year, $\chi^2(1, n = 125) = 10.91, p = .028$, the formulated hypothesis predicted no switch in strategic orientation

(equal numbers). However, hypothesis 3 is rejected with $p = .03$. The results indicate that the strategic focus of farmers has changed significantly over the years. Where in 2013 the majority of the intensive livestock farmers had a Cost Leader by economy of scale focus (cluster 4) the focus moved more towards a generally undecided focus (cluster 1). This change in orientation makes sense, once the farmers expand their farm, they start focusing on reducing the cost price, increasing the quality and reducing the debt (which are focus points for strategic group 1).

6 CONCLUSION

In this study, based on strategic orientation of intensive livestock farmers, five groups of intensive livestock farmers with different strategic orientation were identified. The largest strategic group (28 %), 'the Undecided', did not have a clear focus. Only general trends (e.g. low prices, price fluctuation, health and food safety) had an impact on this strategic group. Strategic group two is referred to as the Wanderers (13%). The Wanderers are people who have got side-tracked from their core business 'farming'. Consumer trends (e.g. nature, convenience and environment) have a high effect. The Innovators are the third strategic group. This group focuses on starting new activities or on vertical integration. Their strategic choice made sense as powerful customers and suppliers, changing customer wishes, low selling price and labour productivity have all had a huge effect on their business, next to price fluctuations. The fourth strategic group, the Cost Leader by economy of scale (27%) focuses on up-scaling. Expanding production capacity to reduce the cost price. Demand for low prices had a highly expected appearance as well as a high effect. Finally, 'the Collaborators' (14%), who focus along with customer collaboration on adapting to the demands of society. Expected appearance of mobile communication technology and social media were high and changing both consumer desires and medication were both highly rated. The strategic focus enables them to adapt to the demands of society without actually starting new activities themselves.

Results show that farmers have chosen different strategies in order to adapt to the external market environment. However, when comparing the different strategic groups on the external farm environment, few differences were found. Results indicate limited support for the link between the expected appearance of the external farm environment and the difference in strategic orientation, and too little evidence was found to support hypothesis one. The expected overall appearance of trends in the external farm environment was indicated equally across the five groups of intensive livestock farmers. Only the topic 'results of technological development' differed significantly across the intensive livestock farmers. Other significant differences were found only in one or two variables of a topic. The differences in the effect of external farm environment, when a certain strategic focus was implemented on a farm, were also limited. Therefore too little support was found to support hypothesis two. Few significant differences between the different strategic groups in the effect on the farm of the external farm environmental were evident. Only the effect of the topic 'consumers' differed significantly across the intensive livestock farmers.

The differences in strategic orientation among the groups of intensive livestock farmers do not occur due to differences in the external environment. Based on the results it can be concluded that the expected appearance of trends have a limited influence on the formation of strategy. Also by implementing a certain strategy, there are few differences among the groups of intensive livestock farmers when looking at the influence of trends on their farm. The movement in strategic orientation reveals that strategic focus of farmers is short-term and can change at any moment. Farmers adapt to the environment and results do not indicate that the intensive livestock farmers implement a long-term strategy.

7 DISCUSSION

Managerial implications

Results indicate that intensive livestock farmers have chosen different strategies to adapt to the external farm environment. The stakeholders; including the government, NGOs, suppliers and customers, should be aware of these differences across the intensive livestock farmers, because they influence farmers' interests and actions.

This research indicates that differences in the expected appearance of the external farm environment as well as the effect of the external environment are limited. An overall 'common body of knowledge' exists on general topics (e.g. health, prices). Therefore, farmers should focus on obvious environmental topics as well as topics which may seem less important. The less obvious topics are the 'topics' where farmers could make a difference and differentiate themselves from others active in the market. Results suggest that choosing a certain strategy is not stable and strategic orientation can switch within a year. Adapting to the environment is of critical importance and it is imperative that farmers keep track of the changes in the environment at all times.

Research implications

For researchers this study shows several implications which are subsequently discussed. Firstly this research shows that there is little strategic planning in small firms. The largest strategic group of this study does not have clear strategic orientation. Besides the fact that the biggest strategic group does not have a clear focus, strategic orientation changed significantly during a time span of only one year. Farmers are flexible; they adapt and change quickly instead of implementing long-term planning. The results are in line with researchers such as Garson and Gilson (2000) who noted that decisions are often taken in an unstructured way at any point in time. Farmers have to adapt to changes quickly in order to survive.

For researchers this study shows that also for smaller firms a 'common body of knowledge' exists, which is supported by the earlier findings of Aguilar (1967) and Hambrick (1982) who introduced the concept 'common body of knowledge'. Strategic differences do not occur due to the unequal possession of information. Looking at the information supplied to the farmers, sources are equally and easy accessible for all farmers which constitutes the support of the 'common body of knowledge'. Hardly any unique research is carried out by a farmer, due to the shortage of resources of a small farm. However, the differences in the strategic groups should be found in the 'smaller' topics. This research suggests that knowledge about general topics such as 'health' and 'food prices' is needed to maintain a farm, the so-called 'license to operate'. Differences should be found in the smaller topics because these are topics which are more strategy-dependent and differences occur.

It may be too early to state that there are differences in the market orientation of the different strategic groups due to the fact that farmers have only just started making their own choices and choosing to be different. For a long time farmers were just making commodities, with barely any differences (e.g. pork is pork). However, nowadays consumers have more choice and there are demands for more different 'kinds' of pork. For example, some customers are prepared to pay more for organic meat, others would like more regional products to be available, and other consumers do not care and just look at the price. Due to the varied needs of consumers,

differences in farming have started to occur. However, these developments are only recent which could explain why no significant differences have occurred in relation to strategy and the external farm environment. Nevertheless, cluster analysis clearly indicated different groups of intensive livestock farmers, suggesting that farmers are deliberately starting to define their own strategy.

Limitations of the research

The research has two main limitations which should be taken into account when looking at the results. One of the main limitations of this study is the problem of single respondents (Bowman and Ambrosini, 1997). All the data in this research is self-perceived data and does not guarantee that they actually execute the strategy. However, this approach is often used in management research and multiple authors have agreed that directors are generally able to provide accurate information (Hambrick, 1981). Since all the respondents in this research are farmers (mainly owners of small firms) who have provided information about their farm's strategy and the external farm environment, it is considered to be accurate. This problem could only be overcome by using accounting data.

Another limitation of this study is that the study makes use of two different data suppliers. The first year Prosu and the second year AgriDirect provided the addresses for the research. However, both are well known and specialize in agro marketing research, therefore it is assumed that they both provide a representative sample.

Finally, a minor limitation of this study is the difference in the number of respondents per strategic group, which subsequently influences the strength of the test. The strength of the one-way ANOVA test was relatively low due to sample size (*N*=125) and the unequal distribution of this sample between the strategic groups (1: *N*=35, 2: *N*=16, 3: *N*=22, 4: *N*=34 and 5: *N*=18). These issues contributed to the high number of insignificant results in this research. More respondents and equal group sizes would have given more strength to the tests.

Recommendations for further research

This study examined only the strategic orientation of the intensive livestock farmers in the Agri & Food sector. There is not only a need for further research in order to generalise the findings to represent the whole Agri & Food sector, this research indicates that there are still multiple areas of research which need to be investigated. Perhaps the most important area concerns the strategic orientation and the adaption to the external environment. Although the results of this study clearly indicated five distinctive groups of intensive livestock farmers, the results provided little support for the importance of strategy. Small differences in expected appearance as well as the effect of the external environment resulted in hypothesis one and two not being supported. No relationship between the trends in the external environment and strategic orientation has been found. Further and more detailed research on the relationship between the external farm environment and strategic orientation is needed to determine whether the 'common body of knowledge' is also valid for other subsectors of the Agro food sector.

In order to overcome the single respondent problem, future research should also take accounting data into account to validate strategic orientation of the farmers.

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