

Wageningen University – Department of Social Sciences

MSc Thesis Marketing and Consumer Behaviour

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# **Gaining a competitive advantage for pig feed suppliers**

Influences on the sustainability strategies of pig farmers

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As a student in Animal Sciences, conducting a minor thesis within the Marketing and Consumer Behaviour group was a whole new experience. For me, this thesis was not only an opportunity to gain more insight into the pig sector, but the thesis also provided a lot of space to learn how to conduct a study from a whole new perspective. I really enjoyed to perform this study. If it was not for the lack of time, I would have loved to go further into the details of this subject.

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# Summary

The farm supply industry in the European Union is confronted with an increasing level of competition as a result of shrinking markets, market internationalization, and shorter product life cycles. Within the feed supply market of the Dutch pig sector, a high competitive rivalry exists between different companies. Furthermore, legislation forces firms to operate more sustainable within the organisation and throughout the supply chain. As the farmer is the direct customer of feed suppliers, farmers have an important role in integrating sustainability within the supply chain. This thesis focusses on making clear what the role of feed suppliers is in making Dutch pig farms more sustainable. In this way, the thesis studies whether sustainable feed production offers a competitive advantage to pig feed producers.

A conceptual model is set up, identifying which stakeholders are influencing the current sustainability strategy and the expected sustainability strategy of 2020. The model suggests that the current and the future sustainability strategy of farmers are influenced by perceived opportunities by the veterinarian, the feed supplier, the supplier of housing systems, and the breeding company. Furthermore, the model suggests sustainability strategy is influenced by the opinion of the farmer on sustainability, and the perceived opinions of the slaughterhouse, the supermarket, consumers and society. Finally, the model suggests that the future sustainability strategy is influenced by the current sustainability strategy. For both stakeholders and sustainability strategies, sustainability is measured across seven sustainability dimensions. These are income, emission of ammoniac, processing of manure, nature preservation, animal welfare, use of antibiotics and working conditions.

To test the model, a cross sectional survey is performed among 25 pig farmers. Multiple regression analyses are performed to identify which stakeholders influence the current and the future sustainability strategy of pig farmers. Furthermore, multiple regression analyses are performed to test whether influences of stakeholders on the sustainability strategies differ across sustainability dimensions.

Results show that the perceived opportunities by the veterinarian, and the perceived opinion of the slaughterhouse and the supermarket influence the current sustainability strategy of farmers. The opinion of the farmer, perceived opportunities by the veterinarian and perceived opinion of the slaughterhouse influence the expected sustainability strategy of 2020. Also the current sustainability strategy has a high influence on the sustainability strategy of 2020.

In conclusion, this study shows feed suppliers do not influence the sustainability strategy of pig farms. Therefore, results show feed suppliers have to wait for demand arising among pig farmers to integrate sustainability within farm operations, instead of focusing on a driving-market strategy.

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# 1. Introduction

Several factors influence the design of supply chains. Globalisation, increased competition among firms and the thrive to bring down production costs have caused firms to rely increasingly on resources supplied more globally. Supply chains are thus being expanded in terms of distance (Chopra and Meindl, 2010; Reuter et al., 2010).

Relevant within supply chains are environmental issues and sustainability. Legislation forces firms to operate more sustainable within the organisation and throughout the supply chain. For instance, many European countries are in the process of developing legislation that aims at reducing environmentally harmful emissions (De Koeijer et al., 1999). However, pressure to operate more sustainable is not only enforced by legal demands. With technology getting more advanced, also more information is available for external parties, such as consumers and non-governmental organizations (Taco Awaysheh et al., 2010).

Furthermore, the farm supply industry in the European Union is confronted with an increasing level of competition as a result of shrinking markets, market internationalization, and shorter product life cycles (Kool et al., 1997). Within the feed supply market of the Dutch pig sector, a high competitive rivalry exists between different feed companies (Kretowski, 2009).

In order for organisations to be able to compete in a market, threshold resources and capabilities are needed. However, for an organisation to gain a competitive advantage over competitors operating in the same market, distinct capabilities need to be developed. A first mover advantage might arise by starting early with evaluating where sustainable practices could be implemented into not only an organizations' operating, but also through the supply chain (Reuter et al., 2010). Therefore, it might be beneficial for feed suppliers to integrate sustainability within their operations to a bigger extend than demanded by legislation, as this has the potential to develop into a capability which is hard to imitate, thus leading to competitive advantage (Reuter et al., 2010).

When considering the whole supply chain in which a feed supplier is operating, this includes suppliers of raw materials up to consumers. As the farmer is the direct customer of feed suppliers, farmers have an important role in integrating sustainability within that supply chain. Just as bigger firms, farms are obliged to become more sustainable due to legislation. Since one of the biggest costs Dutch pig farms are dealing with are feeding costs, and one of the biggest aspects regarding decision making is feed management (Galanopoulos et al., 2006), opportunities for feed suppliers exist in having a major role in integrating sustainability within pig farms.

This raises the question whether it is beneficial for feed companies to focus on innovations which aim at developing feed products that enhance sustainable practices of farms. This thesis focusses on making clear what the role of feed suppliers is in making Dutch pig farms more sustainable, according to farmers. Thus, the main question of this thesis is:

- *Does sustainable feed production offer a competitive advantage to pig feed producers?*

To clarify this, several sub-questions need to be answered:

- *Which sustainability strategies do farmers apply on their own farm?*
- *What influences sustainability strategies on farms?*
- *What role do feed suppliers have in implementing sustainable strategies of farmers?*

## 2. Literature

Within this literature study, several concepts are explored and explained. At the end, a conceptual model will be presented together with hypotheses.

### 2.1 Sustainability

Sustainability has many definitions. The World Commission on Environment and Development defined sustainable development as 'Development which meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, 1987). A successful sustainable organisation operates through the principle of the triple bottom line, in which the term sustainability rests on three pillars; people, planet and profit (Simpson and Radford, 2012), to highlight the social, environmental and economic aspects of sustainability. To develop a successful sustainable organisation, these three pillars are equally important and need to be balanced.

### 2.2 On farm sustainability

Economic, environmental and social performance cannot be measured as such, but need to be quantified in sustainability indicators in order to be measurable. These indicators are practical tools that can be used to measure the degree of sustainability on farms (De Boer and Cornelissen, 2002).

#### 2.2.1 Indicators of economic sustainability

Instead of focusing on immediate economic growth, economic sustainability stands for the long-term viability of a firm (Simpson and Radford, 2012). Economical sustainable issues characteristic for Dutch farms are for instance to secure farm continuity, to maximize equity capital, and to prevent economic losses (due to for instance disease and mortality) (De Boer and Cornelissen, 2002). Farm continuity and equity capital are quantified most easily by measuring farm income, since farm income indirectly determines these issues (De Boer and Cornelissen, 2002; Mollenhorst et al., 2006). Furthermore, by looking at for instance return to labour and equity, a comparison can be made to the opportunity costs for labour and equity elsewhere (Kay et al., 2012). These opportunity costs determine the income that could be received by using a resource in its most profitable alternative way. Comparing returns to labour and equity to opportunity costs, and subsequently choosing the best alternative, can be seen as important managerial decisions (Kay et al., 2012). Eventually these managerial decisions can be determining for the sustainability for the farm, since long-term survival of the farm may depend upon these decisions.

#### 2.2.2 Indicators of environmental sustainability

In Dutch agriculture, the environmental impact of farms include categories such as emission of ammonia and losses of nitrate and phosphorus. Both De Boer and Cornelissen (2002) and Mollenhorst et al. (2006) identified these categories, together with efficient energy use, use of detergents, disinfectants and pesticides, and water use as issues regarding Dutch agriculture. Also the Dutch government recognizes these problems. Laws and regulations have been introduced to minimise environmental impacts. Pig farmers have to keep track of the amount of manure produced on the farm in kilograms nitrate and phosphate, and can only produce a certain amount of manure per acre of land they own. Any excess of manure has to be processed (Meststoffenwet, 2014). Furthermore, only a specific amount of emission of  $\text{NH}_3$  in kg/animal is allowed. The maximum amount of  $\text{NH}_3$  emission allowed will be lowered per January 1st, 2020 (Besluit-emissiearme-huisvesting, 2015). Also use of energy was determined as an environmental issue. However, there are no policies

determining the amount of energy that is allowed to use or the amount of reduction of energy use that should be applied, except that it is the responsibility of an entrepreneur to reduce energy use as much as possible (Activiteitenbesluit-milieubeheer, 2007).

### *2.2.3 Indicators of social sustainability*

Also within social sustainability multiple categories can be identified regarding pig production. Animal welfare, product quality and on-farm working conditions were identified as sustainability indicators (De Boer and Cornelissen, 2002). Product quality is a broad category which comprises several topics. When selling pigs to the slaughterhouse, the quality of meat is determined by the slaughter weight of the pig and the back fat percentage. However, quality of meat is also concerned with food safety, in terms of for instance residues of medicines such as antibiotics (Mollenhorst et al., 2006). It is prohibited to use antibiotics in a preventive way, and can only be prescribed by a veterinarian (NVWA, 2013).

Another social issue is the working conditions of the farmers. Identified indicators were the number of working hours per day, the distribution of these working hours, the composition of the air (the presence of dust particles, or the amount of NH<sub>3</sub> in the air), and the working posture of the farmer (De Boer and Cornelissen, 2002).

## **2.3 Influences on sustainability strategy**

In this thesis, the way sustainability is integrated within farm operations is called the sustainability strategy. The strategy through which a farm is operated, is highly dependent of several factors. Decision making processes can mainly be divided in individual differences such as personality and motivation, and environmental influences (Kotler and Keller, 2006; Engel et al., 1995). Also Kool (1994) indicates decisions within farm operations are influenced by market characteristics, farm enterprise characteristics, and individual characteristics.

Previous research on sustainable practices of individuals mainly has been focussing on the motivation of individuals to act in a sustainable way. The problem which then arose was that people, who showed high motivation for acting in a sustainable way, didn't show the sustainable behaviour which was expected. For instance, Thøgersen (1997) found in his studies about the way households process their waste, that only motivation to separate waste in a sustainable way was not enough to induce the actual behaviour. People who showed a high motivation but where restricted in opportunities or restricted in skills and abilities eventually didn't show sustainable waste processing. This also applies the other way around. People which were highly facilitated to process waste in a sustainable way, but were not motivated to do so, didn't show sustainable behaviour.

Thus in 1995, Thøgersen (1995) introduced the "Motivation-Opportunity-Ability-Behaviour" (MOAB) theory, to explain through what mechanisms individuals are being influenced to (not) participate in sustainable practices. According to this theory, only motivation to act sustainable is not enough. The individual should have the facilities to act sustainable, and should for instance know how to behave sustainable. The conceptual model set up to explain the MOAB- theory is shown in figure 2. Hughes (2007) explains motivation as 'the impetus towards a behaviour', ability as 'Skills and capabilities requisite to the performance of behaviour', and opportunity as 'Contextual and situational constraints relevant to the performance of behaviour.' Further definitions which can be found trough MOAB-theory literature support this (Thøgersen, 1995).



Within the conceptual model as presented in Chapter 3, the sustainability strategy practiced on the farm is seen as the behavioural outcome. This sustainability strategy itself is divided into the current sustainability strategy and the expected sustainability strategy in 2020. Since farm enterprise characteristics are important upon further decision making within farm operations (Kool, 1994), hypothesis 1 is established.

*H1: The current sustainability strategy influences the expected sustainability strategy in 2020.*

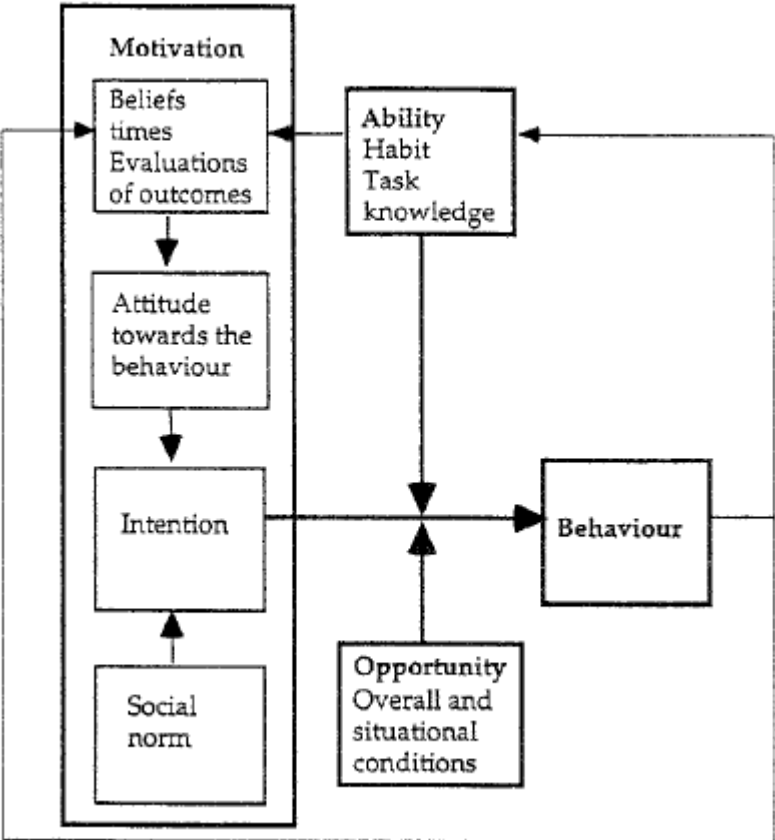


Figure 1, The Motivation-Opportunity-Ability model (Thøgersen, 1995).

**2.4 Motivation**

As mentioned in section 2.3, the first factor influencing the on-farm sustainability strategy is the personality of the farmer himself, together with his motives and his opinion on sustainability. Behaviour of an individual is a complex process influenced by many factors, which can mainly be divided in individual differences and environmental influences. Those individual differences could be off course personality and motivation, but also resources like money, time and available information. Factors coming from the environment that are shaping an individual, are among others culture, social class and the groups an individual associates himself with, like friends, co-workers or family (Kotler and Keller, 2006; Engel et al., 1995).

A certain opinion on sustainability and sustainability practices can be caused by several demographic features and characteristics. For instance, within the review of Van Liere and Dunlap (1980), 21 studies were assessed concerning demographic characteristics related to environmental concerns. Features correlated with environmental concerns that are often

mentioned in behavioural studies are age, gender, political orientation, income and education, since these characteristics are often included in surveys. Younger people show a higher concern for environmental issues. A higher education level was in many studies positively correlated with environmental concern. Also political ideology is important. Reviewing the different studies, Van Liere and Dunlap (1980) concluded liberal oriented people are more concerned with environmental issues than conservative people. In the review, also living situation was considered. People living in an urban environment seem to show a higher concern than people living in a rural area. This could be due to the fact people living in an urban situation encounter more pollution, or due to the fact people living in a rural situation use natural resources in utilitarian activities, such as farming or mining (Van Liere and Dunlap, 1980). However, evidence from the different studies were conclusive. In addition, environmental concern was showed to be negatively correlated with household income and women seemed to show a higher environmental concern than men (Hirsh, 2010).

Besides demographic features, studies have also been conducted to show which characteristics are typical for people concerned with sustainability. Borden and Francis (1978) identified people which are concerned with the environment as having a strong value- and person orientation, and having a strong ethical-conscientiousness. Again gender differences were found. Woman being concerned with the environment showed to be extravert 'leader-types'. It was found to be the opposite for men.

Studies looking at motivations for sustainable behaviour were mainly focussed on environmental sustainability. Economical sustainability and social sustainability were not considered.

*H2a: The personal opinion of a farmer on sustainability influences the current sustainability strategy of that farmer.*

*H2a: The personal opinion of a farmer on sustainability influences the future sustainability strategy of that farmer.*

## **2.5 Opportunity**

The second factor in the MOAB-model consists of 'Opportunity'. Several parties can be influential in making farm operations more sustainable, since these parties are able to provide opportunities for the farmer to become more sustainable. Becoming more sustainable is only possible when having access to the right resources. Opportunities to show a certain behaviour can both be measured subjective, as perceived conditions, or objective, as situational variables (Thøgersen, 1995; Hughes, 2007). In the case of perceived conditions, people can experience the same opportunities differently. According to the MOAB-theory, sustainable consumer behaviour is not seen when experiencing restrictions to show sustainable behaviour (Thøgersen, 1997). A farmer will have a certain expectation of the roles and responsibilities different parties should have in making farm operations more sustainable. In this thesis, it is examined which parties are perceived to provide opportunities to make farm operations more sustainable. Therefore, suppliers of goods purchased (regularly) by farms are included in the conceptual model presented in Chapter 3.

*H3a: The perceived opportunities provided by farm suppliers influence the current sustainability strategy of a farmer.*

*H3b: The perceived opportunities provided by farm suppliers influence the future sustainability strategy of a farmer.*

## **2.6 Ability**

As explained within MOAB-theory, 'Ability' is defined as the skills and capabilities needed to perform a certain behaviour (Hughes, 2007). These skills and capabilities are often measured as the habit to perform a certain behaviour combined with the task knowledge to perform that behaviour (Hughes, 2007). Task knowledge can be formed with factors such as intellectual capability and experience (Hughes, 2007). Furthermore, to reach a certain goal (in this case becoming more sustainable), knowledge on how to reach that goal may be insufficient (Thøgersen, 1995). In this thesis, the component 'Ability' is used as the ability of farmers to spot trends and current processes in the environment concerning sustainability, by measuring perceived opinions of the supply chain and the society.

### *2.6.1 Market demand*

Consumer demand can have a major influence on on-farm sustainability by means of the influence they have on the way the supply chain is operated (Grunert, 2011). Consumers have an important role in sustainable development within supply chains, as products and services offered by firms represent demand at the site of consumers. Therefore, the extent in which sustainable development of products and services takes place is among others dependent on the interest consumers show for sustainable products or services. Consumers have shown a positive attitude towards sustainable products (Grunert, 2011; McDonald and Oates, 2006), however the consumer perception on sustainability is only focussed on the environmental aspect; consumers associate sustainability with resources, the environment, and waste. Social responsibility such as responsibility for working conditions of employees, or profitability of the firm are hardly mentioned (Simpson and Radford, 2012).

Furthermore, despite the positive attitude towards sustainable products, a difference is seen between attitude and actually buying such product. When making a sustainable purchase, consumers often have to make a compromise like having to pay more or having to travel further for the purchase (McDonald and Oates, 2006). It is often argued that this difference in behaviour can be explained by lack of communication (Grunert, 2011). Consumers in supermarkets are confronted with a large variety of different labels indicating the level of sustainability of a product, whilst it is often not clear what these labels represent. Therefore, having better and clearer communication, which make such labels understandable, has potential to increase consumer demand for sustainable products (Grunert, 2011).

Because of this influence consumers have on the supply chain, perceived opinions of consumers will be included in the conceptual model. However, not only consumers have an influence on the way the supply chain is managed. Within the Netherlands, only 16 slaughterhouses processed the meat of the finisher pigs in 2012 (PVE, 2012). Subsequently, only five retailers own the biggest market share within the Netherlands (Yang, 2015). Therefore, the opinion of slaughterhouses and retailers (supermarkets) on sustainability as perceived by farmers might also have an influence on sustainability strategy.

### 2.6.2 Demand society

In the past years, characteristics of Dutch pig production have changed. The number of farms has decreased while the number of animals per farms has increased. Due to upscaling of farms which contain more animals on a smaller area, concerns have risen within society towards the pig production sector (Boone and Dolman, 2010). Social support for this sector is greatly influenced by rising discussions (e.g. in media) about topics such as animal welfare, food safety and environmental issues. Often these discussions contribute to a negative perception of these topics (Boone and Dolman, 2010).

Boogaard et al. (2008) defined what citizen panels perceived as issues concerning livestock production after bringing them to dairy farms. Respondents were mainly concerned with hygiene of the milk production, animal welfare, and landscape and nature, in terms of grazing cows, an open landscape, silence, and fresh air. Respondents were positive towards mechanisation and automation of farm activities, stated that the farm should be financially profitable and did not show great concerns about environmental issues such as waste water from farm operations.

An example of how Dutch pig production is influenced by pressure from society, is the castration of male piglets. This used to be done without sedation of the piglets. In 2008, the Dutch pig sector voluntary signed the so called 'Verklaring van Noordwijk', in which it agreed not to castrate the male piglets after January 1, 2015, and to castrate with sedation up to this date (Baltussen et al., 2009).

*H4a: Perceived opinions from the environment influence the current sustainability strategy of a farmer.*

*H4a: Perceived opinions from the environment influence the current sustainability strategy of a farmer.*

# 3. Conceptual framework

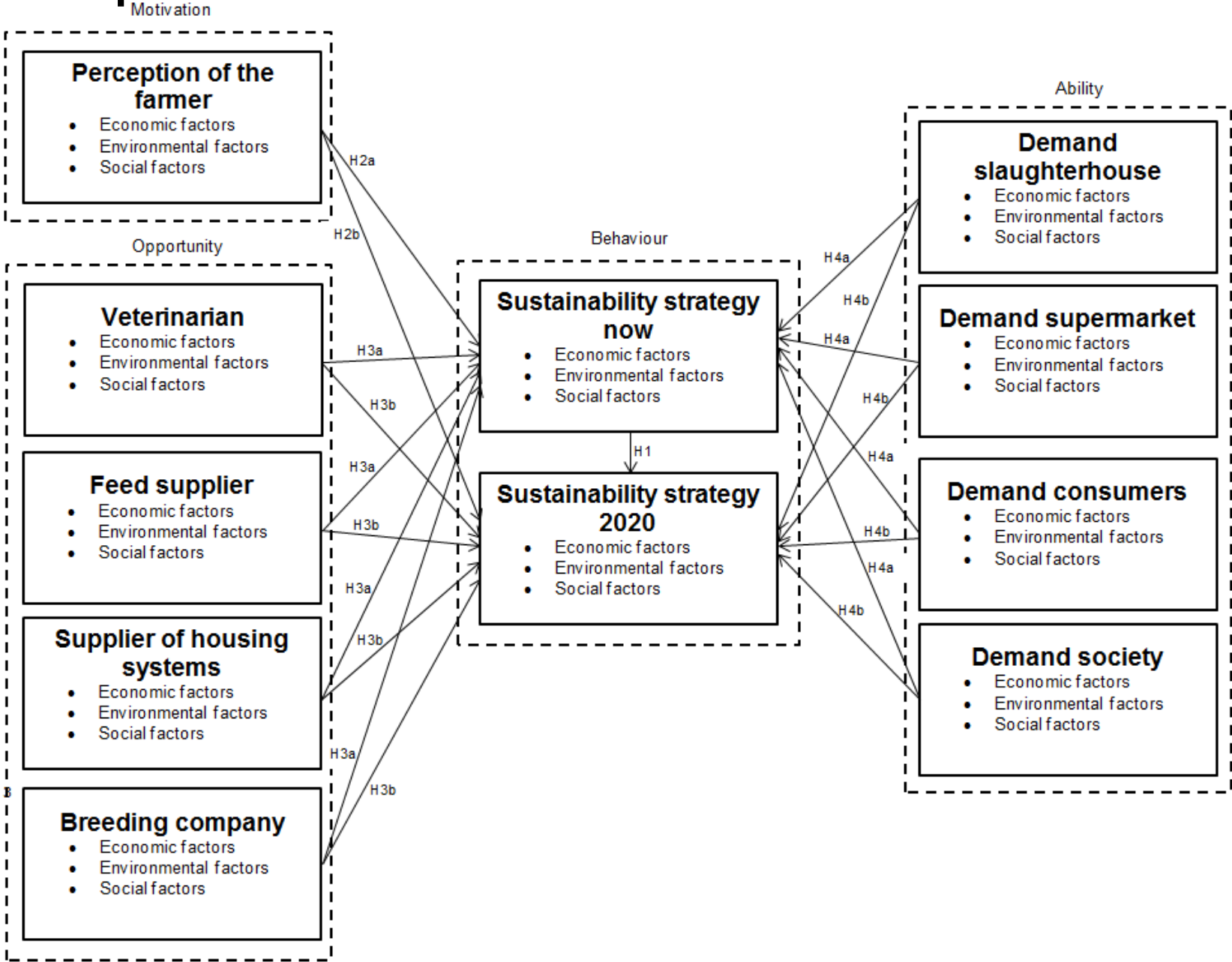


Figure 2: Conceptual framework

## 4. Methodology

This chapter describes the methodology used for the research. The research strategy of this research is based on the conceptual framework as presented in chapter 3. To test the hypotheses as set up from literature and the conceptual model, a survey is set up to identify which different sustainability strategies exist among farmers, and to identify which sustainability strategies are expected to be implemented in 2020. Furthermore, the survey is meant to identify which factors influence the sustainability strategy of a farmer. At first the chosen indicators of sustainability will be described. Subsequently, the sampling method, the design of the research and the analysis of the data will be explained.

### 4.1 Indicators of sustainability

To identify the different sustainability strategies, the degree of sustainability practised on farms and the degree of sustainability on farms expected in 2020 is measured using sustainability indicators as described in literature. The sustainability indicators used in the survey comprise the three dimensions of sustainability, namely economic, environmental and social aspects. Requirements of selection of these indicators are that they need to be representable indicators for sustainability, it should be possible to make a measurable scale concerning the indicator, and the indicator itself should be an understandable term for someone making the survey. Therefore, some sustainability indicators as mentioned in literature, appeared not to be suited. For instance, use of water and energy can be seen as environmental issues, but cannot be quantified into a scale, since there is no legislation on use of water or energy for Dutch agriculture. Also, an indicator such as 'product quality' could be interpreted in different ways by different respondents. The selected indicators of sustainability are shown in table 1.

Table 1, Selected indicators of sustainability

<b>Economic</b>	<b>Environmental</b>	<b>Social</b>
Income	Ammoniac emission Processing of manure Nature preservation	Animal welfare Use of antibiotics Working conditions

### 4.2 Sampling method

The respondents of the survey were obtained through convenience sampling. These respondents were farmers who had indicated in another research that they were willing to participate. The used population were Dutch pig farmers managing different types of pig farms. The survey was spread among a sample of 37 individuals. 25 respondents filled in the survey. The survey was opened for two weeks after distributing, after which the survey was closed. The research only includes data of Dutch pig farmers.

### 4.3 Research design

A questionnaire was spread among 37 pig farmers. The questionnaire consisted of four sections. In the first and second section, the behavioural outcome of the MOAB-theory was tested. The sustainability strategy of farmers was measured at present time and the planned sustainability strategy in 2020 was measured. In the third section, it was measured how farmers perceived opinions from the environment on sustainability, and their own opinion on sustainability was measured. Thus this section measured both the 'motivational part' and the 'ability part' of the MOAB-theory. In the fourth section, the 'opportunity part' was measured. It was measured from which commercial parties farmers experience opportunities to become

more sustainable. For each question, answers existed out of a five-point scale. At first, a pre-questionnaire was performed among five pig farmers, to test if the questionnaire worked properly. After testing, some aspects of the questionnaire were changed. For instance, some terms and scales were changed, to make it more comprehensible for the respondents. For the complete questionnaire, see Appendix 1.

#### *4.3.1 Measuring sustainability strategy*

The behavioural part of the conceptual model was formed by the sustainability strategy of the farmer. Within that sustainability strategy, it was determined to what extent farmers meet the sustainability indicators, both at this point in time (2015) and in 2020. To be able to measure this, questions like *“What category does your farm meet concerning nature preservation?”* were developed. Respondents could answer these questions with a scale starting at *“1- My farm does not meet legal obligations”* and ending at *“5- My farm is a well-known example for the rest of the sector”*.

#### *4.3.2 Measuring the opinion of farmers on sustainability*

To measure the opinion of farmers towards the different sustainability indicators, respondents had to answer questions like *“What is your opinion regarding nature preservation?”*. Respondents could give answers with a scale starting at *“1- The farm should not meet legal obligations”* and ending at *“5- The farm should be a well-known example for the rest of the sector”*.

#### *4.3.3 Measuring perceived opinions from the environment*

The ability of the farmer to spot trends in his or her environment concerning sustainability, was determined by measuring perceived opinions of the supply chain and society. The respondents had to answer questions like *“What is, according to you, the opinion of the following group concerning nature preservation”*. At first, the only groups involved in this question were the consumer and society. However, after performing tests to check the questionnaire, it was decided to include the slaughterhouse and the supermarket as well. With these four groups involved, it was aimed to get a clear insight in how the farmer perceives environmental pressure to become more sustainable from the whole demand side of the supply chain. Respondents could answer the above question with a scale starting at *“1- The farm should not meet legal obligations”* and ending at *“5- The farm should be a well-known example for the rest of the sector”*.

#### *4.3.4 Measuring opportunities*

For this thesis, the main interest was to investigate whether focussing on sustainability offers a competitive advantage for feed suppliers, by identifying how farmers perceive opportunities from feed producers to become more sustainable. However, to keep an eye on the bigger picture, and to see how feed producers perform compared to other commercial on-farm suppliers, also the following parties were included in the model; veterinarian, supplier of housing systems, and breeding company.

With the questionnaire, it was determined whether farmers experience opportunities provided by these parties to become more sustainable. Respondents had to answer questions like *“To what extent do the following parties provide opportunities to improve nature preservation?”*. Respondents could answer with a scale starting at *“1- This party does not help to meet legal obligations”* and ending at *“5- This party provides the most important contribution in meeting legal obligations”*.

#### 4.4 Analysis of data

Before performing any tests, the dataset was restructured. The data file in SPSS was restructured from a wide format to a long format, resulting in seven observations per respondent, each observation standing for one of the seven sustainability dimensions. Namely income, ammoniac emission, processing of manure, nature preservation, animal welfare, use of antibiotics or working conditions. This resulted in the analysis of 129 observations in total.

##### 4.4.1. Influences on sustainability strategy

The first test was to analyse which stakeholders influence current sustainability strategy and future sustainability strategy. Furthermore, it was tested whether a mediator effect exists of the current sustainability strategy on the future sustainability strategy. Therefore, three regression equations were set up. The first equation measured the influence of different stakeholders on current sustainability strategy:  $Y_1 = \beta_0 + \beta_1 X_1 + \dots + \beta_9 X_9$ , in which  $Y_1$  is the measured current sustainability strategy.  $X_1$  stands for the perception of the farmer on sustainability,  $X_2$  stands for perceived opportunities on sustainability from the veterinarian,  $X_3$  stands for perceived opportunities on sustainability from the feed supplier,  $X_4$  stands for perceived opportunities on sustainability from the supplier of housing systems,  $X_5$  stands for perceived opportunities on sustainability from the breeding company,  $X_6$  stands for the perceived opinion of the slaughterhouse on sustainability,  $X_7$  stands for the perceived opinion of the supermarket on sustainability,  $X_8$  stands for the perceived opinion of the consumer on sustainability, and  $X_9$  stands for the perceived opinion of the society on sustainability. The second equation measured the influence of the different stakeholders on the future sustainability strategy:  $Y_2 = \beta_0 + \beta_1 X_1 + \dots + \beta_9 X_9$ , in which  $Y_2$  is the measured expected sustainability strategy in 2020. Again,  $X_1$  to  $X_9$  are as described above. In the third equation, the influences of different stakeholders and the current sustainability strategy on the expected sustainability strategy of 2020 were tested:  $Y_3 = \beta_0 + \beta_1 X_1 + \dots + \beta_{10} X_{10}$ , in which  $Y_3$  is the measured expected sustainability strategy of 2020.  $X_1$  to  $X_9$  are as described above, and  $X_{10}$  stands for current sustainability strategy.

##### 4.4.2. Different influences of stakeholders across sustainability dimensions.

The second test was to analyse whether influences on sustainability strategies as found from the tests described in section 4.4.1. are applicable across all sustainability dimensions. Thus again regression analyses were performed. This time, to test whether influences of stakeholders differed across sustainability dimensions, dummy variables were created to consider the different sustainability dimensions income, ammoniac emission, processing of manure, nature preservation, animal welfare, use of antibiotics and working conditions.



## 5. Results

### 5.1 The current and future sustainability strategies together with perceived opinions and opportunities of different stakeholders

Table 2 gives the overall results of the performed study. The current SS (current sustainability strategy) and SS 2020 (expected sustainability strategy of 2020) indicate for all the sustainability dimensions the current situation on the farm and the expected situation in 2020. Both for the current sustainability strategy and for the future sustainability strategy, the highest scores are shown for animal welfare, use of antibiotics and working conditions.

Results as shown for Vet (veterinarian), FS (feed supplier), SH (supplier of housing systems), and BC (breeding company) indicate the perceived opportunities provided by these stakeholders for the different sustainability dimensions. When looking at perceived opportunities by the feed supplier, especially aspects such as opportunities to reduce ammoniac emission, improving animal welfare and reducing use of antibiotics are perceived as high.

Results as shown for PF (perception of the farmer), DSI (demand slaughterhouse), DSu (demand supermarket), DCu (demand consumer), and DSo (demand society) indicate the perceived opinion of these stakeholders for the different sustainability dimensions.

Table 2, The current and future sustainability strategies together with perceived opinions and opportunities of different stakeholders

	Current SS	SS 2020	PF	Vet	FS	SH	BC	DSI	DSu	DCu	DSo
Income	2,250	2,400	3,550	2,550	2,500	2,250	2,450	2,350	2,250	2,500	2,860
Ammoniac Emission	2,550	2,500	2,420	1,250	2,710	3,430	1,900	2,420	2,740	2,320	3,400
Processing of Manure	2,450	2,650	2,650	1,150	2,290	2,450	1,600	2,400	2,500	2,670	3,550
Nature Preservation	2,470	2,400	2,550	1,250	1,480	1,450	1,350	2,200	2,700	2,900	3,600
Animal Welfare	3,000	2,760	2,800	2,900	2,700	3,100	2,300	2,800	3,050	3,250	3,950
Use of Antibiotics	3,450	3,210	3,150	3,900	3,300	2,100	2,550	3,250	3,550	3,500	3,710
Working Conditions	2,750	2,760	3,000	2,000	2,000	3,100	1,850	2,250	2,200	2,150	2,330

## 5.2 Influences on the current sustainability strategy and the sustainability strategy of 2020

Influences on both the current sustainability strategy and the sustainability strategy of 2020 are shown in table 2. Three tests were performed. Beneath 'Current SS' and 'SS2020', influences on the current sustainability strategy and the sustainability strategy of 2020 respectively are shown. Beneath 'SS 2020 \* Current', influences on the sustainability strategy of 2020 are shown, including the influence of the current sustainability strategy. All three models are significant, meaning these models are sufficient in explaining which stakeholders have an influence on sustainability strategy. Variables which do have an influence on the sustainability strategy, have a p-value below 0.05. As shown in table 2, for the current sustainability strategy, these variables are the veterinarian, the demand of the slaughterhouse, and the demand of the supermarket. Therefore hypotheses 3a and 4a are partly proven. Perception of the farmer does not have an influence on the current sustainability strategy. Therefore, hypothesis 2A is rejected. For the sustainability strategy of 2020, positive influences can be seen of the perception of the farmer on sustainability and the veterinarian. A negative influence is seen by the demand of the slaughterhouse. Thus hypothesis 2b is proven and hypotheses 3b and 3a are partly proven. When including the current sustainability strategy in the model as a possible influence on the sustainability strategy of 2020, R<sup>2</sup> increases to 0.637. Within this model, only perception of the farmer and the current sustainability strategy have a significant influence, of 0.192 and 0.784 respectively. Therefore, it is shown that the current sustainability strategy has a mediator effect on the sustainability strategy of 2020 (Baron and Kenny, 1986). The current sustainability strategy changes the causal relationships between stakeholders and the sustainability strategy of 2020. When including the current sustainability strategy in the model, other attributes become insignificant, except for the perception of the farmer on sustainability. Hypothesis 1 is proven.

Table 3, Stakeholders influencing sustainability strategy.

Variable	Current SS	SS 2020	SS 2020 * Current
Perception Farmer	0,073	<b>0,237</b>	<b>0,192</b>
Veterinarian	<b>0,307</b>	<b>0,172</b>	-0,069
Feed supplier	-0,097	-0,060	0,014
Supplier of Housing Systems	0,076	0,026	-0,027
Breeding Company	-0,161	-0,171	-0,023
Demand Slaughterhouse	<b>-0,288</b>	<b>-0,267</b>	-0,038
Demand Supermarket	<b>0,274</b>	0,166	-0,034
Demand Consumer	0,036	0,113	0,099
Demand Society	-0,006	-0,081	-0,087
Current SS	N/A	N/A	<b>0,784</b>
Significance model	0,001	0,013	0,000
R <sup>2</sup>	0,205	0,153	0,637
F	3.443	2.456	20.671
N	129	129	129

**Bold** is p-value < 0.05

### 5.3 Different influences of stakeholders on current sustainability strategy across sustainability dimensions

To test whether different influences of stakeholders on the current sustainability strategy differ across sustainability dimensions, a second regression analysis was performed. This analysis included dummy variables for the different sustainability variables, and interaction effects of the stakeholders and the dummy variables. Results of the interaction effects are shown in table 3. As shown in table 3, only for the independent variable veterinarian ( $p = 0.023$ ) influences of sustainability dimensions differ. Especially on the way farmers apply nature preservation within farming activities, the veterinarian has a high influence (1.488). On animal welfare, the veterinarian has a low influence (0.031). For the influence of the veterinarian on the processing of manure, no value has been found. This is because perfect multicollinearity existed between the dummy variable for processing of manure and the interaction effect of veterinarian x the dummy variable for processing of manure. Therefore influences of the veterinarian on the processing of manure were left out in this regression analysis.

Table 3, Different influences of stakeholders on current sustainability strategy across sustainability dimensions

	PF	Vet	FS	SH	BC	DSI	DSu	DCu	DSo
Income	0,073	0,307	-0,097	0,076	-0,161	-0,288	0,274	0,036	-0,006
Ammoniac Emission	-0,017	0,557	0,458	-0,295	-0,361	0,190	-0,051	-0,385	-0,065
Processing of Manure	-0,316		0,511	-0,220	-0,186	-0,015	-0,258	-0,502	-0,471
Nature Preservation	0,245	1,488	1,133	0,436	0,441	0,404	0,178	-0,313	-0,111
Animal Welfare	-0,062	0,031	0,315	-0,380	-0,336	0,173	-0,041	-0,285	-0,417
Use of Antibiotics	0,107	0,126	0,366	-0,132	-0,215	0,435	0,268	-0,098	0,073
Working Conditions	0,047	0,328	0,514	-0,214	-0,148	0,519	0,401	-0,034	0,042
Significance	0,641	0,023	0,129	0,294	0,494	0,295	0,428	0,554	0,161
R <sup>2</sup>	0,317	0,357	0,351	0,335	0,324	0,335	0,327	0,321	0,347
F	2,383	3,218	2,778	2,593	2,641	2,592	2,499	2,428	0,731
N	129	129	129	129	129	129	129	129	129

### 5.4 Different influences of stakeholders on the sustainability strategy of 2020 across sustainability dimensions

When testing whether influences of stakeholders on the sustainability strategy of 2020 differ across sustainability dimensions, results found are shown in table 4. Again the influence of the veterinarian differs across sustainability dimensions ( $p$ -value = 0.036). The veterinarian has a high influence on the sustainability strategy in 2020 concerning reduction of ammoniac emission (1.437). Also the influence on nature preservation is high (0.825). Again the influence of the veterinarian on the processing of manure was left out due to perfect multicollinearity.

Table 4, Different influences of stakeholders on the sustainability strategy of 2020 across sustainability dimensions

	PF	Vet	FS	SH	BC	DSI	DSu	DCu	DSo
Income	0,237	0,172	-0,060	0,026	-0,171	-0,267	0,166	0,113	-0,081
Ammoniac Emission	0,174	1,437	0,723	-0,239	0,098	0,544	0,414	0,216	0,116
Processing of Manure	-0,432		0,885	-0,162	0,238	-0,001	-0,120	-0,172	-0,521
Nature Preservation	-0,121	0,825	0,930	0,205	0,265	0,290	0,367	-0,065	-0,109
Animal Welfare	-0,464	0,320	0,481	0,044	0,057	0,332	0,188	0,088	-0,306
Use of Antibiotics	-0,020	0,490	0,710	0,144	0,343	0,638	0,645	0,332	0,165
Working Conditions	-0,294	0,445	0,628	0,066	0,168	0,513	0,425	0,247	-0,060

Significance	0,275	0,036	0,172	0,599	0,939	0,154	0,257	0,514	0,082
R <sup>2</sup>	0.303	0.310	0.313	0.285	0.267	0.315	0.305	0.289	0.326
F	2,282	2,643	2,384	2,086	1,906	2,406	2,297	2,129	2,533
N	129	129	129	129	129	129	129	129	129

#### 5.4 Different influences of stakeholders and the current sustainability strategy on the sustainability strategy of 2020 across sustainability dimensions

When including the current sustainability strategy in the influences on the sustainability strategy of 2020, as shown in table 5, still the model of the veterinarian is significant ( $p = 0.023$ ). This means the veterinarian has different influences on the sustainability strategy of 2020 across sustainability dimensions. A high influence (1.1001) can be found on the sustainability strategy of 2020 concerning ammoniac emission. Also a high influence can be found on strategy concerning nature preservation, animal welfare and use of antibiotics. However, these results will not be considered further, as no significant effect of the veterinarian on sustainability strategy of 2020 is found (table 2) when the current sustainability strategy is included in the model.

Table 5, Different influences of stakeholders and the current sustainability strategy on the sustainability strategy of 2020 across sustainability dimensions

	PF	Vet	FS	SH	BC	DSI	DSu	DCu	DSo	SS C
Income	0,192	-0,069	0,014	-0,027	0,023	-0,038	-0,034	0,099	-0,087	0,784
Ammoniac Emission	0,177	1,001	0,423	0,005	0,399	0,398	0,454	0,525	0,164	0,134
Processing of Manure	-0,230		0,562	0,001	0,392	-0,006	0,064	0,203	-0,177	0,012
Nature Preservation	-0,264	0,819	0,451	0,089	0,186	-0,005	0,255	0,184	-0,027	0,345
Animal Welfare	-0,341	0,398	0,326	0,394	0,434	0,352	0,324	0,384	0,057	-0,266
Use of Antibiotics	-0,108	0,414	0,442	0,235	0,490	0,308	0,439	0,416	0,107	0,034
Working Conditions	-0,363	0,146	0,185	0,216	0,158	0,112	0,083	0,263	-0,134	0,121
Significance	0,165	0,023	0,358	0,227	0,346	0,123	0,289	0,261	0,437	0,286
R <sup>2</sup>	0.681	0.687	0.673	0.678	0.673	0.683	0.675	0.676	0.671	0.675
F	10,272	11,834	9,922	10,133	9,938	10,397	10,024	10,070	9,821	10,028
N	129	129	129	129	129	129	129	129	129	129

## 6. Conclusion

The goal of this thesis was to investigate whether focusing on sustainable feed production offers a competitive advantage to pig feed producers. To reach this goal, it has been studied which sustainability strategies farmers apply on their farms, what influences both the current and the future sustainability strategy of pig farmers, and what role feed suppliers have in implementing sustainable strategies on farms.

Results have shown which dimensions of sustainability are currently developed well on farms, and which dimensions are expected to be developed well in the future. Currently, farms perform best on animal welfare, the use of antibiotics and working conditions. In 2020, farmers again expect these dimensions of sustainability to be the best developed.

The study has shown that for the current sustainability strategy, perceived opportunities from the veterinarian on improving sustainability strategy and perceived opinion of the slaughterhouse and the supermarket have an influence. The veterinarian has different influences on the current sustainability strategy across sustainability dimensions. Especially influences on ammoniac emission and nature preservation were high, although perceived opportunities from the veterinarian on decreasing use of antibiotics and improving animal welfare are relatively low.

Furthermore, perceived opinion of the slaughterhouse about sustainability has a negative influence on the current sustainability strategy.

Moreover, the study has shown that for the sustainability strategy of 2020, the opinion of the farmer on sustainability, the perceived opportunities from the veterinarian on improving sustainability strategy, and the perceived opinion of the slaughterhouse have an influence.

Again, the influence of the veterinarian on the sustainability strategy of 2020 differs across sustainability dimensions.

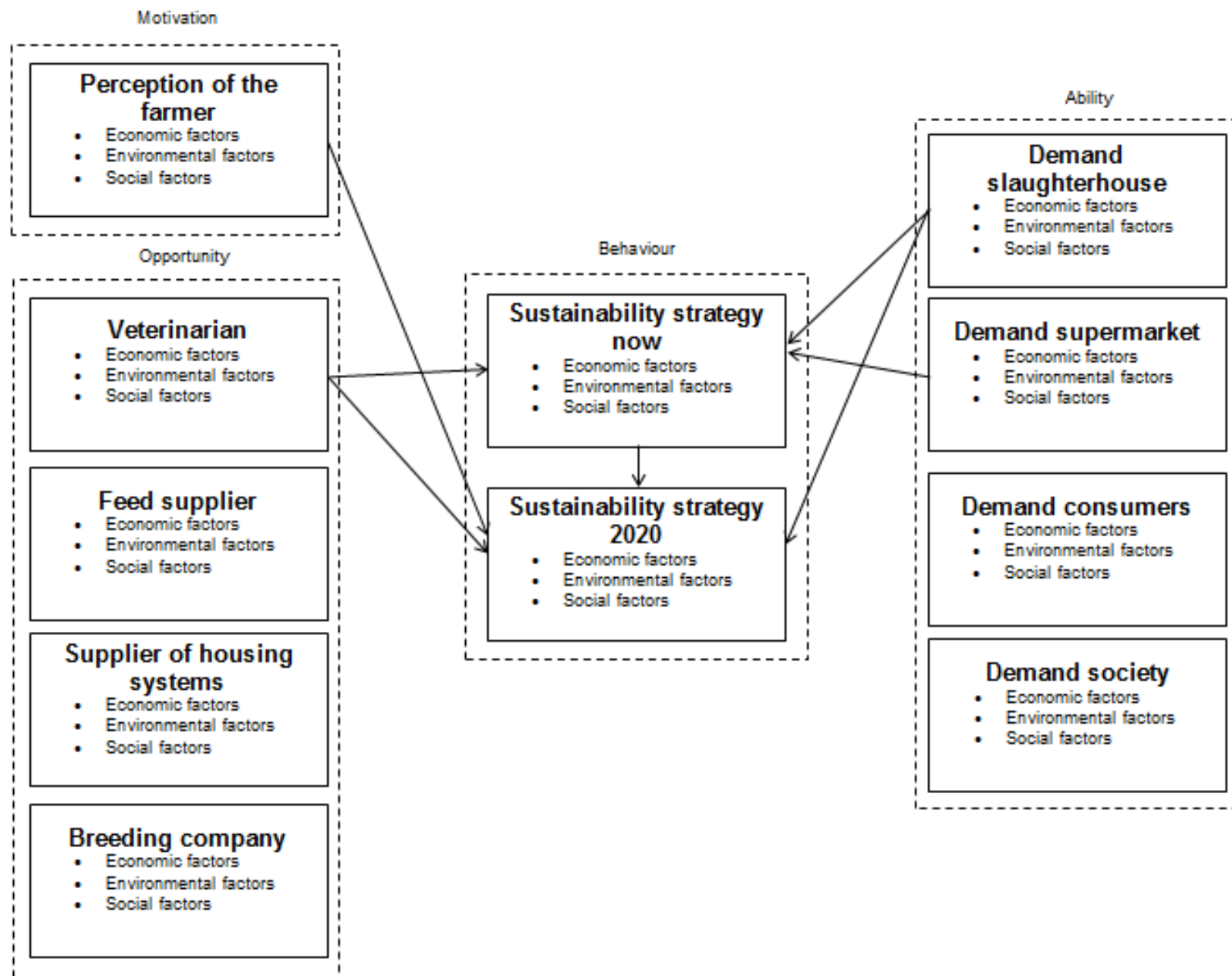
At last, results show that the current sustainability strategy of farmers is a mediating factor. This indicates that the relationships between the future sustainability strategy and the influence of the farmers' own opinion on sustainability, the perceived opportunities by the veterinarian and the perceived opinion of the slaughterhouse, are mediated by the current sustainability strategy.

Based on these results, the conceptual model as presented in chapter 3 is redrawn in figure 3.

Results have shown that pig farmers do perceive opportunities from feed suppliers to improve several aspects of sustainability. Especially aspects such as opportunities to reduce ammoniac emission, improving animal welfare and reducing use of antibiotics are perceived as high. Therefore, when pig farmers are looking for ways to improve these aspects, this might indicate farmers will look for opportunities provided by feed suppliers.

However, results have shown feed suppliers do not have an influence in the overall way pig farmers apply a sustainability strategy on the farm. When coming back to the introduction, it was stated that a first mover advantage for feed suppliers might arise when integrating sustainability in the supply chain at a bigger extent than obliged by legislation. Feed suppliers should realise that according to the results of this study, they do not have enough influence to change sustainability strategies on pig farms. Therefore, when coming back to the main research question *'Does sustainable feed production offer a competitive advantage to pig*

*feed producers?*', the answer provided by this study would be 'Only if demand exists among pig farmers to reduce for instance ammoniac emission, improve animal welfare or reduce the use of antibiotics'.



Figuur 3, Redrawn model



## 7. Discussion

When reflecting on the results of this study, several aspects have to be taken into account. First of all, the study is a cross-sectional study. This means the results of this study do not show causality, but only to what extent variables correlate. For instance, it was found that the perceived opinion of the slaughterhouse on sustainability has a negative influence on current and future sustainability strategy. According to the conceptual model, this suggests that when a pig farmer perceives a certain opinion of the slaughterhouse, he would apply the opposite strategy, even though the slaughterhouse is the direct buyer of products delivered by pig farmers. However, it could also be that the sustainability strategy of the farmer influences the perceived opinion of the slaughterhouse negatively. In that case, when a farmer would like to improve his sustainability strategy, it could be that the farmer perceives to be restricted by the slaughterhouse, resulting in a negative perceived opinion of the slaughterhouse. If the direction of the relationships between different stakeholders and the sustainability strategy as proposed in the conceptual model should be the other way around, this might also explain some other results. In that case, a positive relationship would indicate that when a farmer wants to become more sustainable, this has a positive influence on the perception of the farmer on a stakeholder. And a negative relationship would indicate a negative influence on the perception of the farmer. Thus, when considering the positive relationship between the current sustainability strategy and the perceived opinion of the supermarket, in that case the current sustainability strategy influences the perceived opinion of the supermarket positively. The same would apply for the perceived opportunities by the veterinarian. The relationships between the perceived opportunities by the veterinarian and the current and future sustainability strategy were both positive. This indicates that when a farmer would like to become more sustainable, he does not experience restrictions by the veterinarian to become more sustainable, resulting in a positive influence of the sustainability strategy on perceived opportunities by the veterinarian.

This could also explain why the relationship between the sustainability strategies and the perceived opportunities by the veterinarian to improve ammoniac emission and nature preservation are relatively high, and relationships between the sustainability strategies and perceived opportunities to improve animal welfare and use of antibiotics are relatively low. In that case, when a farmer applies a high reduction of ammoniac emission on the farm, or highly applies nature preservation on the farm, perceived opportunities by the veterinarian to improve these aspects also go up. When a farmer strongly improves animal welfare or reduces use of antibiotics, perceived opportunities by the farmer to improve these aspects will not go up that much, since a farmer probably exactly knows in what way the veterinarian provides opportunities in improving these aspects. This might be less clear for the reduction of ammoniac emission and the improvement for nature preservation, thus resulting in a stronger relationship between sustainability strategy and perceived opportunities by the veterinarian for reducing ammoniac emission and improving nature preservation.

Secondly, because results in this study show correlations between different variables, results are dependent on variations in the population. For instance, no relationship has been found between the current sustainability strategy and the opinion of the farmer on sustainability. So if farmers all would have the same opinion on sustainability (thus no variation), but there is a lot of variation in the current sustainability strategies applied on farms, no relationship will be found between the current sustainability strategy and the opinion of the farmer.

## 7.1 Managerial implications

In the first place, this research shows insight into the way farmers apply sustainability practices on their farms. Results show which factors have an influence on the on-farm sustainability strategy. This information can be used both by stakeholders which do have an influence and stakeholders who do not have an influence on sustainability strategy. Especially feed suppliers, the main focus group of this study, could use this information on how to implement sustainability within the supply chain. Apparently, feed suppliers have no influence on the sustainability strategy of pig farmers. Two types of market orientation can be defined; a market-driven orientation versus a driving-markets orientation (Jaworski et al., 2000). Within the market-driven orientation, market players are reactive to demand on the market, accepting the market as it is. With a driving-market orientation on the other hand, market players influence the market in a proactive way, structuring the market towards a situation in which that market player gains a competitive advantage (Jaworski et al., 2000). This study has shown that when it comes down to sustainability, feed suppliers do not have the power to focus on a driving-market strategy. Instead, they are dependent on existing demand for sustainable feed.

## 7.2 Limitations and recommendations

For this research, several things could be done differently when redoing the study. First of all, the study is only conducted with 25 participants. This has resulted in some significant results, however due to the low number of participants this study is not representative for all pig farmers in the Netherlands.

Secondly, within this study there still are a few statistical tests that could be done to give more insight into the sustainability strategies on farms. In this study, overall influences of stakeholders on sustainability strategies were tested. After that, it was tested whether the influence of stakeholders was the same across all sustainability dimensions. However, when a stakeholder seemed to influence the sustainability strategy, it was only tested whether sustainability dimensions significantly differed. It was not tested whether individual sustainability dimensions are significantly influencing the sustainability strategy. For instance, results have shown that there is no overall influence of the supplier of housing systems on sustainability strategy, however it was not tested if the supplier of housing systems has an influence on individual attributes such as animal welfare or emission of ammoniac.

Furthermore, in this study it was not tested if influences on sustainability strategy differed between different farmers. For instance, participants had to indicate what type of pig farm they owned and what their age was. On the basis of these data a segmentation could have been made. Also a segmentation could have been made on the basis of the farmers' attitude towards sustainability. For segmentation more participants are needed than included in this study.

And last, when looking at the current sustainability strategy and the expected future sustainability strategy, averages seem to differ. However, it is not tested whether these differences are significant, therefore at this point no conclusions can be made in comparing the current sustainability strategy with the expected future sustainability strategy.

Thirdly, when redoing the study, it might be wise to make some changes in the questionnaire. For instance, it was asked '*To which category do you expect your farm will belong in 2020, concerning the emission of ammoniac?*'. Answers to that question were formulated as '*My farm meets abundantly the current legislation*'. When looking at the

results, for many sustainability attributes, farmers expected to score lower in 2020 than in the current situation, except for income, processing of manure, and working conditions. This might indicate that the way the question was formulated did not make clear that farmers should indicate what the situation on the farm probably would be in 2020 as compared to the current legislation. This might indicate that farmers answered the question as compared to the expected legislation in 2020, instead of the current legislation. In that sense, farmers would experience it harder to fulfil (future) legislation. Therefore when redoing the study, the word 'current' should be highlighted in the questionnaire.

This study leaves some gaps for further research. As mentioned before, only a cross sectional questionnaire was performed. This only leads to quantitative data, whereas the gaining of qualitative data could lead to deeper insights concerning the research questions. Gaining of qualitative data could be done by means of interviews with experts. In this case, experts would include all stakeholders considered in this study. Furthermore, because of the cross-sectional setup, results do not show any causality between the sustainability strategies and the different stakeholders. To investigate whether sustainability strategy influences perceived opportunities and opinions of stakeholders, or perceived opportunities and opinions of stakeholders influence sustainability strategy, more research is needed.

Also, the study has been carried out at only one point in time. Thus results only provide an insight in the current market situation, in which farmers receive low prices for the products they deliver, due to for instance a lower meat consumption, disclosure of the Russian border and overproduction of meat (LEI, 2015). Therefore, performing the same study in a period pig farmers experience prosperity could lead to other results and new insights.

Lastly, besides the pig sector, this study might also be suited to execute for the dairy cow sector. The dairy cow sector is dealing with major changes at this point of time, such as the introduction of rights to produce phosphate. Therefore, performing the same study for this sector might reveal interesting insights for feed suppliers and other stakeholders.

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# Appendix A, questionnaire

Deze enquête is opgesteld als onderdeel van mijn studie Dierwetenschappen aan de Wageningen Universiteit. Met behulp van deze enquête probeer ik een beeld te krijgen over hoe varkensboeren duurzaamheid toepassen binnen de bedrijfsvoering. De enquête bestaat uit vier blokken met zeven vragen en zal ongeveer een kwartier in beslag nemen. Antwoorden die gegeven worden zijn niet goed of fout, het gaat over uw mening. De door u verstrekte gegevens zullen vertrouwelijk worden behandeld en worden alleen voor dit onderzoek gebruikt. Heeft u vragen of opmerkingen over deze enquête, dan kunt u een e-mail versturen naar [marije.vantol@wur.nl](mailto:marije.vantol@wur.nl). Bij voorbaat dank voor het invullen van deze enquête.

Q1 Welk soort bedrijf heeft u? Indien meerdere soorten bij u van toepassing zijn, geef dan uw hoofdtak aan. Ook de verdere vragenlijst gaat in dat geval over deze hoofdtak.

- Een conventioneel gesloten bedrijf
- Een conventioneel fokbedrijf
- Een conventioneel vermeerderingsbedrijf
- Een conventioneel vleesvarkensbedrijf
- Een biologisch gesloten bedrijf
- Een biologisch fokbedrijf
- Een biologisch vermeerderingsbedrijf
- Een biologisch vleesvarkensbedrijf

## Huidige duurzaamheidsstrategie

Q2 Aan welke categorie voldoet uw bedrijf op dit moment wat betreft *de emissie van ammoniak*?

- Mijn bedrijf voldoet niet aan de huidige wetgeving.
- Mijn bedrijf voldoet net aan de huidige wetgeving.
- Mijn bedrijf voldoet ruimschoots aan de huidige wetgeving.
- Mijn bedrijf hoort bij de beste 25% op dit gebied.
- Mijn bedrijf is een bekend voorbeeld op dit gebied voor de sector.

\* Voor Q3 t/m Q8 het verwerken van mest, natuurbeheer, gebruik van ammoniak, dierwelzijn, gebruik van antibiotica, en werkomstandigheden respectievelijk.

Q9 Aan welke categorie voldoet uw bedrijf op dit moment wat betreft inkomen?

- Op lange termijn ben ik niet in staat het bedrijf te handhaven.
- Op lange termijn kan ik het bedrijf voortzetten, met net voldoende inkomen.
- Op lange termijn kan ik het bedrijf voortzetten, met een redelijk inkomen.
- Op lange termijn kan ik het bedrijf voortzetten, met een inkomen vergelijkbaar met ondernemers buiten de landbouw.
- Op lange termijn kan ik het bedrijf voortzetten, met een inkomen hoger dan ondernemers buiten de landbouw.

## Toekomstige duurzaamheidsstrategie

Q10 Aan welke categorie verwacht u dat uw bedrijf voldoet in 2020 wat betreft *de emissie van ammoniak*\*?

- Mijn bedrijf voldoet niet aan de huidige wetgeving.
- Mijn bedrijf voldoet net aan de huidige wetgeving.
- Mijn bedrijf voldoet ruimschoots aan de huidige wetgeving.
- Mijn bedrijf hoort bij de beste 25% op dit gebied.
- Mijn bedrijf is een bekend voorbeeld op dit gebied voor de sector.

\* Voor Q11 t/m Q16 het verwerken van mest, natuurbeheer, gebruik van ammoniak, dierwelzijn, gebruik van antibiotica, en werkomstandigheden respectievelijk.

Q17 Aan welke categorie verwacht u dat uw bedrijf voldoet in 2020 wat betreft inkomen?

- Op lange termijn ben ik niet in staat het bedrijf te handhaven.
- Op lange termijn kan ik het bedrijf voortzetten, met net voldoende inkomen.
- Op lange termijn kan ik het bedrijf voortzetten, met een redelijk inkomen.
- Op lange termijn kan ik het bedrijf voortzetten, met een inkomen vergelijkbaar met ondernemers buiten de landbouw.
- Op lange termijn kan ik het bedrijf voortzetten, met een inkomen hoger dan ondernemers buiten de landbouw.

### Meningen verschillende groepen

De volgende vragen gaan over meningen van verschillende groepen over uw bedrijf. Met een consument wordt bedoeld op personen die op het punt staan een aankoop te doen in de supermarkt. Met de maatschappij wordt bedoeld op dezelfde personen wanneer ze thuis zijn.

Q18 Wat is volgens u de mening van de aangegeven groep, *wat betreft de emissie van ammoniak*\*?

1) Het bedrijf hoeft niet te voldoen aan de huidige wetgeving. 2) Het bedrijf moet precies voldoen aan de huidige wetgeving. 3) Het bedrijf moet ruimschoots voldoen aan de huidige wetgeving. 4) Het bedrijf moet bij de beste 25% horen op dit gebied. 5) Het bedrijf moet een bekend voorbeeld op zijn dit gebied voor de sector.

	1	2	3	4	5
Slachterij	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supermarkt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consument	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maatschappij	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uw eigen mening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* Voor Q18 t/m Q23 het verwerken van mest, natuurbeheer, gebruik van ammoniak, dierwelzijn, gebruik van antibiotica, en werkomstandigheden respectievelijk.

Q24 Wat is volgens u de mening van de aangegeven groep, wat betreft inkomen?

1) Op lange termijn moet een boer niet in staat zijn het bedrijf te handhaven. 2) Op lange termijn moet een boer in staat zijn het bedrijf voort te zetten, met net voldoende inkomen. 3) Op lange termijn moet een boer in staat zijn het bedrijf voort te zetten, met een redelijk

inkomen. 4) Op lange termijn moet een boer in staat zijn het bedrijf voort te zetten, met een inkomen vergelijkbaar met ondernemers buiten de landbouw. 5) Op lange termijn moet een boer in staat zijn het bedrijf voort te zetten, met een inkomen hoger dan ondernemers buiten de landbouw.

	1	2	3	4	5
Slachterij	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supermarkt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consument	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maatschappij	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uw eigen mening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Kansen zoals ervaren door boeren

Q25 In welke mate maken onderstaande partijen het mogelijk om *de emissie van ammoniak te reduceren*?

1) Deze partij helpt niet mee te voldoen aan de huidige wetgeving. 2) Deze partij helpt mee te voldoen aan de huidige wetgeving. 3) Deze partij levert een bijdrage te voldoen aan de huidige wetgeving. 4) Deze partij levert een forse bijdrage te voldoen aan de huidige wetgeving. 5) Deze partij levert de belangrijkste bijdrage om te voldoen aan de huidige wetgeving.

	1	2	3	4	5
Veearts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Voerleverancier	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stalbouwer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fokkerijorganisatie	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* Voor Q26 t/m Q31 het verwerken van mest, natuurbeheer, gebruik van ammoniak, dierwelzijn, gebruik van antibiotica, en werkomstandigheden respectievelijk.



Q32 In welke mate maken onderstaande partijen het mogelijk om een beter inkomen te realiseren?

1) Deze partij stelt mij niet in staat het bedrijf op lange termijn te handhaven. 2) Deze partij stelt mij in staat het bedrijf op lange termijn voort te zetten, met net voldoende inkomen. 3) Deze partij stelt mij in staat het bedrijf op lange termijn voort te zetten, met een redelijk inkomen. 4) Deze partij stelt mij in staat het bedrijf op lange termijn voort te zetten, met een inkomen vergelijkbaar met ondernemers buiten de landbouw. 5) Deze partij stelt mij in staat het bedrijf op lange termijn voort te zetten, met een inkomen hoger dan ondernemers buiten de landbouw.

	1	2	3	4	5
Veearts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Voerleverancier	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stalbouwer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fokkerijorganisatie	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q33 Wat is uw geslacht?

- Man
- Vrouw

Q34 Wat is uw leeftijd?

Q35 Mogen we u over een paar jaar nog een keer benaderen voor een dergelijke enquête?

- Ja
- Nee

Q36 Indien u geïnteresseerd bent in de resultaten van dit onderzoek, kunt u hieronder uw e-mailadres invullen.

Hartelijk dank voor uw deelname.