



Sveriges lantbruksuniversitet  
Swedish University of Agricultural Sciences

Faculty of Veterinary Medicine and Animal Science  
Department of Animal Nutrition and Management

# Success factors for profitable dairy farming - A qualitative study on Gotland

*Emma Olsson*





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Framgångsfaktorer för lönsam mjölkproduktion  
- En kvalitativ studie på Gotland

*Emma Olsson*

**Supervisor:**

Helena Hansson SLU, Department of Economics

**Second Supervisor:**

Sigrid Agenäs SLU, Department of Animal Nutrition and Management; Stefan Nypelius, LRF-konsult

**Examiner:**

Rolf Spörndly SLU, Department of Animal Nutrition and Management

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## Abstract

The global dairy market is affecting the Swedish dairy business and the milk price is fluctuating for Swedish dairy farmers. The farmers in Sweden can do little to affect the milk price and instead their ability to manage costs at the farm determine their possibility to stay in business, and this ability varies among farmers. It is of interest to know how some farmers manage to stay profitable even when the milk price is low. This study used an interdisciplinary approach by combining animal science with insight from previous research in production economics and a social science research method to investigate which factors that differ between high profit dairy farms and farms with low profit. The inquiry was presented by LRF-konsult Gotland and the definition of profit was specified by LRF-konsult. The definition of profit for this study was; result before depreciation, which not includes depreciation and interest. The method for the study was a qualitative method using semi-structured interviews. The interview guide was based on factors important for profitability which was identified from previous literature. Factors used were: management capacity, strategy and decision making, heifer rearing and feeding. The definition for profit used by LRF-konsult was used for the selection of respondents and this was performed by LRF-konsult. The respondents were all at the time customers at LRF-konsult. The selection of farmers with high and low profit was based on data from the years of 2012 – 2015. A total of fourteen dairy farmers on Gotland were interviewed. They were divided into two groups with seven farmers in each group, one group consisted of farmers with high profit and was the group for analysis. The other group were the reference group consisting of farmers with low profit. The data was collected and analysed by a technique from grounded theory called coding where the data was broken down to smaller pieces called concepts. The data was analysed in three steps and then compared. The concepts were compared with the reference group and the concepts not identified in the reference group were used further. The concepts were formed into categories, and the categories were named success factors. Five success factors were identified; motivation to improve and to identify opportunities and challenges, attitude to economy and profitability linked to the practical daily operation, the importance of preventive work, choice of source for finding new information and the awareness of the roughage percentage in the feed ratio. It was possible to see a connection between the high profit group and the success factors, however, the cause and effect of this were discussed. It is difficult to draw conclusions from this rather small sample and therefore, the factors need to be further investigated to be valid as factors.

## Sammanfattning

Svensk mjölkproduktion påverkas av en global marknad och mjölkpriset för svenska mjölkbönder varierar som en effekt av detta. Svenska mjölkbönder har svårt att påverka mjölkpriset utan får istället försöka att klara produktionen även när mjölkpriset är lågt, och hur väl mjölkbönderna klarar sig varierar. Det föränderliga mjölkpriset förutspås att fortsätta med upp och nedgångar av priset i perioder, det är därmed intressant att veta hur vissa mjölkbönder håller sig lönsamma även när mjölkpriset är lågt. LRF-konsult på Gotland presenterade idén till denna studie och deras mått för vinst användes för att studera frågan. Definitionen för vinst angav resultat före avskrivningar och ränta. Den här studien använde ett tvärvetenskapligt tillvägagångssätt som kombinerar husdjursvetenskap med samhällsvetenskap för att på så sätt identifiera vilka faktorer som skiljer sig mellan mjölkföretag med hög vinst och mjölkföretag med lägre vinst. Metoden för studien var en kvalitativ metod och semistrukturerade intervjuer användes. Intervjuguiden som användes var baserad på tidigare litteratur i ämnet och faktorer som ansågs viktiga för lönsamhet och återkom i litteraturen. Exempel på sådana faktorer var; driftsledning, strategi och beslutsfattande, rekryteringsdjur och foder. Totalt intervjuades fjorton mjölkbönder på Gotland, respondenterna var alla kunder hos LRF-konsult och LRF-konsult gjorde urvalet av mjölkföretag baserat på mjölkföretagens vinst under åren 2012 – 2015. Respondenterna var indelade i två grupper med sju mjölkföretag i varje grupp. En grupp med mjölkföretag med hög vinst som användes för analys och en grupp mjölkföretag med låg vinst som referensgrupp. Intervjumaterialet samlades in och analyserades med en teknik från grundad teori som kallas kodning där materialet bryts ner till mindre beståndsdelar, begrepp. Begreppen behandlades i tre steg och jämfördes sedan med referensgruppen, de begrepp som inte återfanns i referensgruppen användes för vidare analys. Begreppen formades till kategorier och kategorierna utvecklades sedan till framgångsfaktorer. Fem framgångsfaktorer identifierades och dessa var; motivationen till förbättring och att se möjligheter och utmaningar, inställningen till ekonomi och lönsamhet kopplat till driften, betydelsen av förebyggande arbete, valet av informationskanal och medvetenheten om grovfoderandelen i foderstaten. Det var möjligt att se ett samband mellan gruppen med hög vinst och framgångsfaktorerna. Sambandet gällande orsak och verkan diskuterades och då studien genomfördes på en, i förhållandevis, liten grupp behöver faktorerna analyseras vidare och implementeras för att kunna säkerställas.

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# 1 Introduction

The global impact on the dairy market affects dairy farming in Sweden which is facing a market with fluctuating milk price. As a dairy farmer in Sweden it is difficult to affect the milk price, what can be done is to manage the own farm with respect to the current milk price. Fluctuations in milk price are expected to continue and have an impact on the dairy business in Sweden. Dairy farmers have been forced out of business or been compelled to make changes to stay in business and one effect of this is the structural changes of dairy farms. In 2010 there was 5 619 dairy farms in Sweden and in 2016 there was 3 872 dairy farms (www, Jordbruksverket, 2017) that is a decrease with approximately 30 %. The average dairy herds have increased in mean herd size from 62 cows in 2010 to 85 cows in 2016 (www, Jordbruksverket, 2017). The decrease in number of farms and the increase in farm size provide an understanding and a connection between Swedish dairy farmers with a larger herd size and staying in business. Whether this is a reason for staying in business can not be stated from these facts, instead, it raises the question regarding the dairy farmers; how come some farmers manage to stay profitable during several years, even when the milk price is low, and some farmers do not.

This study was an inquiry from LRF-konsult Gotland that wanted to investigate the question further. The study was performed on Gotland which is a region with a high density of dairy farms. In 2010 there were 258 dairy farmers on Gotland and in 2016 there was 177 dairy farmers, which is a decrease of approximately 30 %, same as on national level (www, Jordbruksverket, 2017). In 2010 the number of cows on Gotland were 16 349 and in 2016 the number were reduced to 15 272 dairy cows, a decrease with approximately 6 % (www, Jordbruksverket, 2017). The mean herd size was in 2016 estimated to 86 dairy cows, similar to average in Sweden (www, Jordbruksverket, 2017). The limitation to Gotland was made to direct the focus on a certain area and identify factors within this particular region. LRF-konsult Gotland provided farmers from their data base using a measure of profit where farms with the highest result before depreciation were defined as having high profit.

## 1.1 Problem background

Farms with similar conditions can vary in profitability despite having the same conditions for production (Rougoor *et al.*, 1998). Studies have shown that farms, with dairy production and livestock, have the potential to be more profitable than they are at the moment (Brümmer, 2001). By using efficiency scores Hansson (2007a) found that farms had the potential to lower their costs and increase earnings, if all farms were as efficient as the most efficient farm in the study. Farms that are performing on an average efficiency rate could be more efficient by adapting the most efficient farms routines and practises (Hansson *et al.*, 2011). Moreover, with the global dairy market, it is crucial to be efficient as a farmer and use the inputs as efficient as possible (Galanopoulos *et al.*, 2006). These are examples of studies concluding the differences between farms regarding profitability and efficiency.

During a change of milk pricing system in the U.S. price risks were a great concern and would affect the dairy farmers' profits and even force some farmers to go out of business. The farmers with low margin, low yield, inefficiency and high debt ratio were most vulnerable to this (Mishra & Morehart, 2001). Dairy farmers in the U.S. handled this in different ways and they chose strategies differently between farms, some farmers managed in a financial successful way while others did not (Mishra & Morehart, 2001). This could be applicable to today's global dairy market affecting Sweden where price risks are a current issue and farmers with small economic margins are struggling to maintain farming.

To be able to push low-profit farms towards better economic result, it is of interest to know what high-profit farms do to maintain their profitable and viable capacity. However, this assumption where low-profit farms need to become more profitable can be questioned. One aspect on this, in accordance with Mishra & Morehart (2001), is that dairy farms with low-profit will have difficulties to stay in business during market fluctuations with small economic margins and will thereby suffer economical when the revenue from milk production is reduced. To be able to keep farming it is required to be more profitable. To advise a dairy farmer towards profitability the strategy of the farm need to be known to be able to advise the farmer in the direction of the goal (Ondersteijn *et al.*, 2003). It is also important to increase the awareness of how dairy farmers manage this today and what farmers can learn from each other.

The challenge is then to identify factors that differ between low and high profit dairy farms. Previous literature on the subject suggests that factors affecting profitability is level of specialization on dairy farming (Brümmer, 2001; Hadley 2006; Hansson, 2007a), personality of the farmer, decision-making (Hansson, 2008), managerial ability (Mishra & Morehart, 2001), milk yield and prevalence of mastitis (Hansson 2007a).

All previously mentioned studies were performed with quantitative methods using large data bases to find these results, some used surveys. A quantitative method makes it possible to reach a wide group of farmers together with a high number of participants. However, it is only possible to achieve results based on key figures or short informative, written, answers as in surveys with a quantitative method (Bryman & Bell, 2015). Key figures on farm level economical or herd figures can work as indicators of how farmers differ. However, by only comparing these figures it is difficult to understand the whole farm perspective. The differences in key figures can have several causes, both in management and biological factors, and these reasons are difficult to find using a quantitative method, the method makes it problematic to reach what is the underlying factor for the key figure. Instead, when using a qualitative method, a smaller group of farmers participate and it is possible to receive more extensive data from each participant by using interviews (Bryman & Bell, 2015).

This study used a qualitative method even though it is not the most common in previous literature while studying profitability. The benefits of a qualitative method in this study are that the data received differs from previous studies where using large data bases and statistics have been the chosen approach. With a qualitative method the collected data are more exhaustive by providing the farmers' personal perception and conditions in a context (Bryman & Bell, 2015). A context that builds around how farmers perceive their own farm business and their attitude towards farming. This provides an insight on what farming means for each individual and how they experience their role as a farmer, and thereby receive data consisting of more than only the effect, such as a key figure. With an understanding for what is important for the individual farmer it is also possible to understand the cause and effect of certain key figures and choices they make. Farm business can also have similar key figures but how they reach them differ and by using a qualitative method it is possible to understand how the individual farmer reasons on the connection between their choices and the results. By using a qualitative method, it was possible to identify factors affected by soft values, values within the farmers own opinion and interest. This method also provides the study with an interdisciplinary approach where animal science is important for the study and reliability in the context of dairy production together with economy in social science reaching the management aspects.

## 1.2 Aim

Therefore, the aim of this study was to identify factors for being profitable as a dairy farmer on Gotland. By using interviews together with current research to identify factors important for dairy farming and why some farms have higher profit than others within the same geographic area and similar environmental conditions. The definition of being profitable was defined by LRF-konsult and LRF-konsult provided dairy farms for the study. The objective was to identify factors for high profit, called success factors, and use these in further research and in consulting dairy farmers towards higher profitability and viability.

## 1.3 Contribution

As mentioned earlier the most common method used when studying efficiency and profitability in dairy farming is a quantitative collection of data from different data bases (for example: Mishra & Morehart, 2001; Ondersteijn et al., 2003; Hansson, 2007b). This study contributes to research by studying profitability in dairy farms with a qualitative method. By using interviews with personal meetings with farmers to identify the differences between low-profit farms and high-profit farms and thereby targeting soft values such as managing capacity, farm conditions and driving forces. These differences being identified by using an interdisciplinary approach using knowledge from animal science together with a method from economy in social science providing an understanding for how each farm manage and what differs between farms in personality and practical practise.

## 2 Conceptual framework

In this chapter previous literature will be presented on factors affecting profitability and efficiency. The majority of the studies presented have a quantitative approach and several studies have studied efficiency as an indicator for profitability. Efficiency is a measure for success where the inputs or the outputs are considered (Farrell, 1957). The approach for the literature review were to consider current research in creating an interview guide and finding factors already identified as important for profitability, to support the findings in this study. The interview guide was based on topics which reappeared in the literature, and references providing similar references. Each topic in the review represents a field of interest regarding profitability and can be derived back to the interview guide. The literature review was made in a narrative manner meaning that the focus in the literature could be changed during the review and literature could be added and rejected during the process (Bryman and Bell, 2015). During the literature review search words as; profitability, dairy farming, efficiency and management were used in databases such as Primo and Google Scholar.

### 2.1 Management factors

#### Management capacity

Management capacity is a field that is hard to define and measure. The short definition of a manager is someone that handles resources, decisions and results (Rougoor *et al.*, 1998). In this study the owner and the manager are the same person. The definition of management capacity is defined by Rougoor *et al.* (1998) as having personal characteristics and capability to manage problems and opportunities in the right moment and in the right way. Dairy farming is a complex business and the farmer need to have knowledge in dairy production, animal husbandry, crop production, growing recruitment, handling employees and all areas requires time and effort. Farming is also a risky business with high variety in prices and yields and that makes farming a risky field of business (Mishra & Morehart, 2001). Managerial capacity in the farmer is often considered to be a primary reason for profitability in farming (Mishra & Morehart, 2001) and management capacity are influenced by personal characteristics and aspects of the process in making a decision (Rougoor *et al.*, 1998). A person with the right personal characteristic and favourable conditions are expected to have good results but this is not always the case if the decision making phase is inadequate (Rougoor *et al.*, 1998). Being able to dived time and make priorities are important when it comes to the process of making decision (Rougoor *et al.*, 1998). The differences between failure and success could be, according to Manevska-Tasevska *et al.* (2016), the effort of planning, implementation and control when it comes to complex decision management, as in farming.

#### Management and strategy

A study by Hansson (2008a) raises the question of why farms are not using their potential for profitability with the aim to investigate the importance of managerial capacity. The study concludes that farmer's personality affects the business and decision-making process. Galanopoulos *et al.* (2006) compared pig farms with different efficiency levels to find management factors which conforms in the efficient farms and concludes that several managerial factors and breeding factors could affect farm performance. According to the same author, using less input, lowering the production cost and gaining higher profits is how efficiency in farming is increased. Furthermore, it shows how higher profits is the motivation factor for adapting. These studies used quantitative methods and the conclusions were based on numbers and figures explaining these factors, no interaction with the manager and no personal perceptions taking into account.

Manevska-Tasevska et al. (2016) suggests in their review of papers that management issues can be viewed from two perspectives; what the manager do and who the manager is. Those two perspectives can affect farm performance by one factor affecting the other one, in an advantageously way or not. Ferguson and Hansson (2013) found that there were different reasons and identities for farming, one identity was as business manager and another identity strongly connected to wanting to stay on the farm. These identities together with other values such as wanting family to take over the business and expectation on the profitability, can provide insight in how prone the farmer is to make strategic plans or keep farming unchanged. This literature shows how important it is to know the farmer's reasons for farming, and other factors such as family and personality and consider its impact on farm performance. Another aspect is knowledge where a person with skills in a field can be more efficient because regular tasks will be low demanding (Kahneman, 2003). When applying this to farming, farmers with knowledge in farming can spend time on other areas than only regular tasks, such as being able to organize the business and reach a higher performance on farm (Manevska-Tasevska *et al.*, 2016). This previously mentioned literature brings up the importance for the manager to have a strategy.

A farm strategy is a long-term plan and important for the profitability but the short-term plan is also of interest since it affects the daily practical operation. The short-term strategy is easily changeable, since it can be done in the daily operation, compared to the long-term strategy (Hansson & Öhlmér, 2008). The operational managerial practise is considered to be important for cost-minimizing (Hansson & Öhlmér, 2008). Operational managerial practise can be defined as animal health, breeding and feeding, and are considered to be improved and adjusted in the daily work (Hansson & Öhlmér, 2008). Managers that work with written plans, budgets and follow up their results have better knowledge in the current situations and can thereby act in a suitable way as a react to external factors (Cadez & Guilding, 2008).

### Decision making

Öhlmér et al. (1998) concluded that research in the field of decision making largely is based on how farmers should do, instead of based on how farmers actually make decisions. This being an effect of the research often being performed in a quantitative way where the farmer's perception is not taken into account. This could be a reason for farmers doing in their own way and not adapting to management service tools (Batte *et al.*, 1990). Farmers tend to use their social network widely rather than using management planning tools (Öhlmér *et al.*, 1998). Öhlmér et al. (1998) suggests that decision-making contains of four phases with four sub-processes. The phases being; problem detection, problem definition, analysis and choice, and implementation. And the sub-process being; searching and paying attention, planning, evaluating and choosing, and last bearing responsibilities. This model of how farmers make decisions should be viewed as a matrix instead of a linear model. Except this four phases and sub-processes Öhlmér et al. (1998) identified five characteristics among famers decision making; continual updating, a qualitative approach, a "quick and simple" approach, incremental implementation and checking during implementation. When making a decision it is important to be efficient, not to get caught in small details that will not be crucial for the decision. A manager should be able to see areas of importance and make priorities to become successful (Rougoor *et al.*, 1998). Having the right knowledge and information when making a decision could improve the use of resources and the company (Cadez & Guilding, 2008). It is possible to see the outcome of a decision beforehand by reflect on the process which was the basis for the decision (Rougoor *et al.*, 1998).

A farmers' attitude towards farming can affect the decisions making. An attitude is an instant response based on emotional feelings about liking or disliking (Kahneman & Sugden, 2005). It is also possible to have an attitude about things without any particular reason (Kahneman & Sugden, 2005). Attitudes can affect farming regarding decisions made related to animal welfare. Hansson and Lagerkvist (2014) suggested a difference in attitude depending on what category of animals kept on the farm or if the production was organic. Personality is another aspect which can affect farming and thereby also the decision making. In a review by Olver & Mooradian (2003) personality traits were defined as a; heritable, resistant to social impact and stable when adulthood is reached. Personality traits can be arranged in five different factors; extraversion, neuroticism, openness to experiences, agreeableness and conscientiousness, these five factors are together called the *Big five* (Olver & Mooradian, 2003). These five factors can be assumed to result in different farmers with different approaches towards farming. Attitude and personality can both affect the strategy and hence the result.

### Farm structure

Empirical findings in Hansson (2007a) suggests that high focus on only dairy production at farms were a limitation on several efficiency scores, and could therefore act as a restraining force, this is supported by several authors (for example: Brümmer, 2001; Hadley, 2006). Hansson (2007a) discuss the level of diversity on farms as not being fully dependent on one production. A diversified farm has more than one source of income and can spread the risks if one production is suffering, like a low milk price, and another production area on the farm could cover up (Barnes *et al.*, 2015). A farm with other areas of production can divide the inputs where they are most needed and where it can be useful (Hansson 2007a).

In Sweden advisory encourage dairy farmers to grow in size and companies developing dairy equipment custom their products for large buildings (Hansson, 2008b). Whether being large is efficient or not Hansson (2008b) concluded the relation between farm size and efficiency is non-linear, and the efficiency is first decreasing when farm size is growing followed by an increase later on. Results from Hansson (2008b) show that farm size is a factor for profitability by affecting farm efficiency in several dimensions. The same author suggests that increased farm efficiency could be done by increasing knowledge about how inputs on farm can be combined optimally and that farmers growing in farm size should aim for the larger scale if the strategy is to lead to a higher efficiency. According to Galanopoulos *et al.* (2006) who studied pig farms concludes that larger farms tend to be higher technical efficient than small farms. Housing could affect the technical efficiency and Hansson *et al.* (2011) found that having cows in a tie-stall had a negative impact on farm efficiency. Tie-stall was a restraining force, on all efficiency measures, which could be explained by the high work load in these barns (Hansson 2007a). Forage machinery can also act as a restraining factor on technical efficiency and economic output efficiency on dairy farms (Hansson, 2007a) which could be because these machinery requires an investment and tie up capital.



## Network structure

Network structure and its affect on profitability were suggested by Narver and Slater (1990) that market orientation is a key factor for managers aiming towards a profitable business. Hansson (2008a) concludes that discussions groups or educations with other farmers and advisors, to gain knowledge and inspiration, was important to increase the efficiency on farms and thereby also the profitability. Mishra and Morehart (2001) concludes that a higher degree of education, larger farm size, specialization, and participations in activities and advisory will bring higher returns. While Galanopoulos et al. (2006) stated that education of the farmer does not affect the efficiency level on farm.

## 2.2 Biological factors affecting profitability

### Longevity

Even though traits for longevity has been a breeding goal 15 – 25 years (Roxström, 2001), the longevity of Swedish dairy cows is still not longer now than it was 20 years ago (Bergeå *et al.*, 2016). Longevity of dairy cows is a factor for profitability because it is a cost to raise heifers and before a cow has earned her recruitment costs it requires a productive life of two lactations, however, this is depending on age at first calving (Strandberg, 1992). The high herd turnover rate due to cows short life, leads to high replacement costs (Heikkilä *et al.*, 2008) and short longevity is an economic expense and can also be a sign of low animal welfare, if the short longevity is caused by conditions that include suffering in the cows (Wathes *et al.*, 2008). Longevity is however not a common key index on farm level and farmers are not aiming towards longevity when making decisions. Other key factors are prioritized such as udder health, fertility and pregnancy (Bergeå *et al.*, 2016). Bergeå *et al.* (2016) concluded that the reason for longevity not increasing is due to non-biological reasons such as management factors. Bergeå *et al.* (2016) also found that longevity in dairy cows is not a factor that affects farmer's decisions making, the way that were expected by the researchers. A short longevity could be an indicator that management for dairy cows are inadequate and an animal welfare issue. Biological factors or management factors affect the longevity on farms, but in ways those two factors are aligned, as suggested in Bergeå *et al.* (2016) where they found that non pregnant was a reason for culling, which could be caused either by biology or management. Having more pregnant heifers than needed could also be a reason for culling, and Bergeå *et al.* (2016) found that farmers select cows for culling when heifers were about to enter the herd, to make room for them.

### Overcrowding

Overcrowding is for example, not having enough cubicles or eat spaces, for each cow. Overcrowding can have positive effects in short-term on profit since the fixed costs can be divided over a larger number of cows and also increase the total income regarding milk and meat (De Vries *et al.*, 2016). However, even if overcrowding could be economically preferable it is still a question regarding animal welfare and the long-term effects are not ensured (De Vries *et al.*, 2016). Overcrowding can affect cow performance and thereby the profitability (De Vries *et al.*, 2016), the period when the cow lay down is important for several reasons, for example rumination. Milk production is negatively affected by overcrowding (Grant, 2011). Overcrowding lead to reduced feeding activity, changed resting pattern and behaviour, and a decreased rumen activity (Grant, 2011). If the milking system is automatic the milking frequencies can decrease and thereby decreased milk production in total. First parity cows mixed with older cows are more sensitive to overcrowding than the older cows. Thereby, the production losses and the long-term effects from the previous mentioned negative effects should be taken into consideration.

## Replacement

To ensure profitability farmers need to consider how their management affects the economical outcome (Mourits *et al.*, 1999), rearing heifers stand for large costs of the total milk production costs on a dairy farm and heifers pay their rearing costs first when producing. Thereby, rearing heifers and providing the herd with heifers for recruitment affects the profitability on the farm (Mourits *et al.*, 1999). Rearing heifers should be done to a low cost and provide animals of high production (Mourits *et al.*, 1999) however, this category on the farm is often low prioritized. A dairy farm can be considered to consist of two herds that are widely dependent on each other; one with cows in production and the other one is the replacement herd (Krpalkova *et al.*, 2014). One essential factor in dairy farming management is to understand what is optimal replacement practice, according to Heikkilä *et al.* (2008) since management decisions concerning replacement affects the future profitability on the farm (Mourits *et al.*, 1999). To only breed as many heifers as the actual herd turnover rate in a herd, has a negative effect on the long-term efficiency, compared to breed all heifers, and a reason for this negative efficiency is that having more heifer to choose from, it is possible to evaluate them and only keeping the best heifers as dairy cows (Hansson & Öhlmér, 2008).

The non-productive time in a heifer's life is a period of only costs and no income, that period should therefore be considered. A common way to lower the cost for heifer rearing is to limit the amount of non-productive days, by aiming for a younger age at first calving (Mourits *et al.*, 1999). A lower rearing cost by a reduction of age at first calving could be a strategy during periods of low milk price (Pirlo *et al.*, 2000). However, only looking at the age of the heifer and to reach as low age at first calving as possible to reduce the cost period is not desirable, the whole economic perspective should be considered and the following production of the heifer (Hoffman *et al.*, 1996; Mourits *et al.*, 1999). A low age at first calving will not always mean a profitable farm (Krpalkova *et al.*, 2014) and the optimal age at first calving is not the same for all farms and different conditions need to be considered (Krpalkova *et al.*, 2014).

## Feeding and forage

Feed cost is one of the largest costs in dairy farming (Patel, 2012; Patel *et al.*, 2013) and in Sweden dairy cows are high in milk yield performance and require feed of the right nutritive value to continue to perform. This has led to the ratio of roughage reducing to lower than 50 % in the diet, to meet the cows nutritive require (Emanuelson, 2006; referred in Patel *et al.*, 2013). However, using a higher ratio of forage, of high nutritive quality, to dairy cows have been shown to increase profitability in Swedish dairy farms (Patel *et al.*, 2016), and dairy cows could beneficial be fed a higher proportion of forage after peak lactation. A ratio of 62 % of forage in the diet were the most profitable compared to a ratio of 51 % when the forage contained high nutritive values so that milk yield was maintained (Patel *et al.*, 2013). A ratio of 70 % of high nutritive value forage in the diet, were profitable no matter production system or geographic location, when feeding 90 % forage the milk yield on 305-days average were reduced (Patel, 2012).

Farms that put effort in re-grouping cows and checking feed hygiene quality were connected to farms with low technical efficiency, according to statistic conclusions by Hansson *et al.* (2011) and the farms with high technical efficiency did this actions less frequently. However, analysing the feed for nutritive values were associated with economic efficiency due to better use and input of feed stuffs (Hansson & Öhlmér, 2008). Having individual feed ratios did not have positive affects on efficiency scores (Hansson & Öhlmér, 2008). Hansson *et al.* (2011) discusses the feed quality as an important factor and the importance of having a high quality feed and

storing properly. Today's techniques make it possible to cut and store silage in a period where the nutritive value is high, and maintain nutritive and hygiene qualities for the whole year (Patel *et al.*, 2013). Farmers who lack managing skills in harvesting a high nutritive quality forage might have to add other feed sources and spend more time on checking feed hygiene quality, than farmers who manage a good hygiene quality from harvest to feeding. If harvesting a low nutritive quality forage, concentrate would need to be purchased to reach the nutritive values of the dairy cows. The price for concentrate varies over the year and between years, which makes it difficult for the farmer to anticipate the costs if dependent on these feed stuffs. Other growing business areas, such as biofuel, could become interested in grain which could lead to higher demand and higher prices, in terms making high quality silage important for dairy farming and not be dependent on grain (Patel *et al.*, 2013).

### Milk yield

Two factors that can predict the economic performance on a farm are milk yield per cow and the prevalence of mastitis in a herd (Hansson, 2007b). In this case milk yield per cow has a positive effect and the prevalence of mastitis has a negative effect. Having a higher milk yield/cow must not always mean high profitability at the farm since high yielding cows have higher nutritive requirements such as concentrate and the purchasing of feed could be a larger cost for these farms (Rougøor *et al.*, 1997). The most profitable cow combines a high milk yield with a functioning fertility, providing regular calving's (Whates *et al.*, 2008).

### Preventive measures

In a study by Hansson and Öhlmér (2008) farms were similar in animal health aspects and the less efficient farms could not become more efficient by changing animal health managerial practice, because the differences between farms were too small. However, Hansson *et al.* (2011) found that farms that were fully efficient had a lower incidence of mastitis. Mastitis is considered to be one of the most expensive diseases in dairy farming (Nilsen *et al.*, 2010) in terms of several direct and indirect costs such as milk yield loss, drug costs, veterinarian costs and extra labour. A high incidence of mastitis is therefore not profitable (Nilsen *et al.*, 2010), and a cow gets reduced milk yield already when the high somatic cell count (SCC) exceeds 50 000 cells/ml. Withdrawing milk with high SCC is not economically preferable according to Nilsen *et al.* (2010), as long as the milk price does not increase in price per delivered kg milk. Measures that are commonly used in farms with high technical efficiency were; contacting a veterinarian, culling cows with high SCC, checking hygiene routines and checking milking equipment (Hansson *et al.*, 2011).

Implementing a control programme on farm is preferable to control the incidence of mastitis and gain a higher production with higher quality on the delivered milk (Nilsen *et al.*, 2010) however, these preventive measures have a cost in both labour and investments. Preventive measures against mastitis to reduce the incidence of mastitis benefits dairy farmers economically (Nilsen *et al.*, 2010). Farmers can choose to not aim for highest milk production and not push the animals towards physiological maximum to reduce the risk for production diseases. The explanation could be non-use values and the most important for dairy farmers were that the cows were well-kept and treated well (Hansson & Lagerkvist, 2016).

### 2.3 Summary of the conceptual framework

The factors included in the literature review are all considered to be important for profitability in dairy production and returning in previous literature (see Figure 1). Initially the manager and the manager capacity were reviewed and have been concluded in several studies to be of major importance for farms performance and profitability. Personality and the reason for farming being of importance together with the management strategy and the ability to prioritize and make decisions. Different attributes of a manager and strengths in manager capacity were presented followed by a short review on the business structure were different farm size and diversity, and its affects on profitability. Biological factors were presented, factors which returned in the literature and studied for profitability, these being a part of the manager's decisions, priorities and daily operation. The biological factors can be costly and of great importance for farm profitability, for instance heifer rearing and milk yield together with mastitis. This literature review was used to create the interview guide and provide an understanding for the subject of the report, this review is thereby underlying for the results from this study.

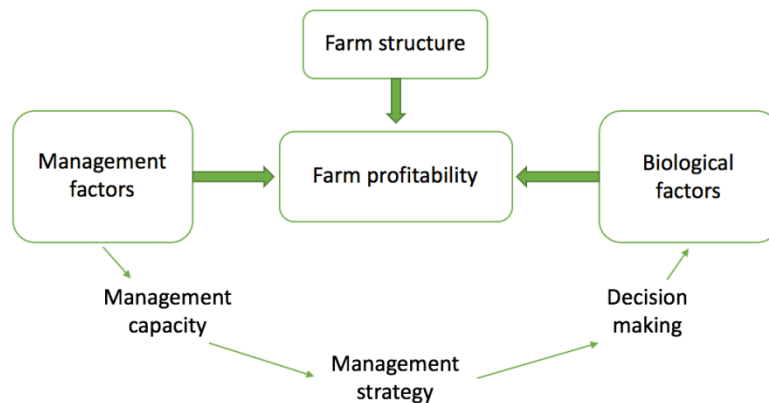


Figure 1. Showing a schematic view over the chapter conceptual framework.

### 3 Material and methods

#### 3.1 Research approach

A qualitative research method is a method when words are in focus instead of numbers and statistics when collecting data (Bryman & Bell, 2015). There is also a focus on how the respondent experiencing and interpreters his/her own social situation in a certain environment (Bryman & Bell, 2015), this method was therefore suitable with this study's aim. The method is commonly performed with an inductive approach. An inductive approach is when the theory is based on practical examples and formed during the study, this approach does not test theories instead it develops theories from the collected data (Bryman & Bell, 2015). However, this study only used an inductive approach in the analysis of the collected data in the study. Performing qualitative research is often done using interviews and one reason for that is the flexibility as interviews provide, however, it is a time consuming method with interviews and handling the large and exhaustive data that is collected. In a qualitative approach the procedure is less structured compared to a quantitative approach where the structure need to be precise to reach high reliability (Bryman & Bell, 2015). A qualitative approach can be more or less structured and interviews could be performed unstructured or semi-structured (Bryman & Bell, 2015) and in this report the later alternative was used. In semi-structured interview's it is desirable to make room for the respondent to speak freely about the topic, to form the answer based on what is important for the respondent. The interviews can thereby be adjusted to the respondents' interest and new questions can be added to get the full understanding. In semi-structured interviews broad topics are used in an interview guide to direct the respondent in a way that fits the aim of the study. Interviews are an advantageous method since it limits the risk for misunderstanding and can provide both parts with a chance to ask further questions (Kvale & Torhell, 1997).

The interview guide was made using a literature review to find themes which returned in the literature as factors affecting profitability in farming. The interview guide was designed to cover all areas of the farm business or at least the main parts as labour, feeding, recruitment, production, decision making and goals to mention a few. The questions or topics in the interview guide were structured towards comprehensive answers. It is not desirable to have a too specific interview guide, there should be room for interpretations and other ideas in the answers (Bryman & Bell, 2015).

As an interviewer the aim was to follow the list of how to manage a successful interview by steps made by Kvale & Torhell (1997).

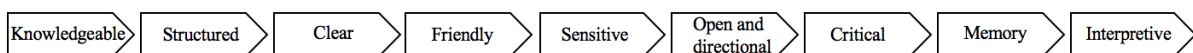


Figure 2. Showing a schematic view over the steps mentioned by Kvale & Torhell (1997).

Examples of studies using the same method are Bergeå et al. (2016) which studied the farmer's perception regarding longevity and used semi-structured interviews, Jonsson & Sandlund (2017) used a qualitative method with semi-structured interviews when studying farmer's perception of management accounting in their master's thesis.

### 3.2 Definition of profit in the context

Profitability can have a number of definitions and success factors are different for different farmers depending on aim and goal. It is therefore important to be clear on the definition used in this particular study and report. The definition for profit used in this report is from values in book-keeping and thus reported costs, presenting the result before depreciation. This means that the costs for depreciation and interest rate are not included in the result (see Figure 3). The farm businesses are all managed in the same way regardless of the salary the farmer choose to take out. One error source could be the mixture of incorporated companies and private companies among the farm businesses. The definition was set by LRF-konsult on Gotland which provided the study with farms for comparison on those terms. A success factor was defined as a factor having positive affect on the whole farm profit where a connection could be noticed between the factor and a farm business with high profit.

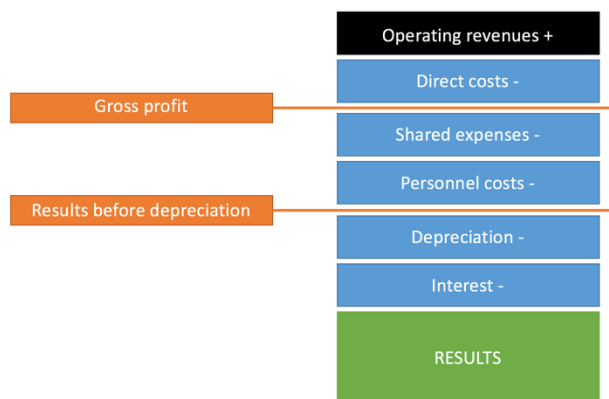


Figure 3. Schematic view over an income statement, showing the definition used in this study.

### 3.3 Course of action

#### Selection

The selection of respondents was managed by LRF-konsult based on their definition of profit. The respondents were costumers there at the time and they were required to have a farm business with 2/3 of their turnover from dairy production to be included. To have 2/3 of their turnover from dairy production suggests that the farm business is dependent on the milk production and a large part of the turnover goes through the milk production. This can further be interpreted as these farmers consider their production as a large part of farming and identify them self's as being a dairy farm manager. LRF-konsult used data for four years back, year 2012 – 2015 from these companies, which provides the possibility to see the development in each farm business during this period of time. The database over LRF-konsult customers consists of farm business all over Sweden and are divided into four quartiles. The upper quartile consisting of farm businesses with the highest result before depreciation and the lowest quartile being the farm businesses with the lowest result before depreciation (see Figure 3 for explanation). From the national quartiles only farm business from Gotland were selected because of the limitation made for this study, providing a number of 15 farm businesses in the upper quartile and 17 farm businesses in the lowest quartile. These 32 farm businesses were then managed by self-selection by the interviewer down to fourteen. Self-selection is when the interviewer is involved in the selection and it is thereby not completely random. In this study respondents were called and those answering and wanting to participate were selected. They also had to be in business when contacted, the ones not in the dairy business when contacted were not interviewed since the aim of the study was targeting current dairy producers, instead

another farmer were contacted. The number of respondents in this study were limited as an effect of the quartile consisting of farms with low profit was fewer than expected. The reason for this was that the data base used for profit were from the years of 2012 – 2015 and with the low milk price several farmers had chosen to end their dairy production. However, this study performed seven interviews in each group and a certain saturation was reached.

## Respondents

The number of respondents should be enough to fulfil the aim of the study and provide reliability, different studies have different numbers of desired number of respondents (Kvale & Torhell, 1997). The collected data should reach a saturation in the answers, when there is no new information coming up in further interviews and this number differs among studies (Guest, 2006). Three aspects of a study affects when saturation is reached; interview structure, content and the homogeneity among the participants (Guest, 2006).

A total of fourteen farmers were interviewed and these fourteen farmers were divided into two groups. One group consisting of seven respondents with high profit and the other group consisting of seven respondents with low profit. The levels of profit originating from LRF-konsult upper and lowest quartile. The group with high profit were used as the group for analysis and the group with low profit were used as a control group. A control group is necessary as reference to see if it differs between the high and low profit quartiles, without comparison it is not possible see differences. All respondents were managed in the same way and were not informed about belonging to a certain group, this could have changed their attitude and thereby affect the outcome. The respondents were all managed in an anonymous way and were informed of this in an early stage.

## Implementation of chosen interview method

In late June 2017 the dairy farmers received a letter where the study's aim was presented together with background information about the interviewer and the objective with the study. LRF-konsult distributed the letters. The respondents were then contacted by telephone and had the choice to decline participations or being booked for interview. In the phone call the aim of the study was presented shortly together with some topics that were going to be discussed during the interview. This was performed in order to make the respondents feeling secure, highlight the credibility of the study and farmers are known to be short on time, especially during harvest, so the idea of an interview needed to sound interesting and valuable. The day before the interview the respondents received a text message with a reminder and a chance to rebook if the timing were wrong, in dairy farming unexpected events can happen and this period of interviews were during harvest. The interviews were performed between 19<sup>th</sup> of July 2017 and 23<sup>rd</sup> of August 2017. All interviews were performed on each respondents' farm and varied in time from one to two hours. Some of the interviews were performed with one respondent and some with two, but in all cases when there were two, they belonged to the same farm and had a shared responsibility. The respondents did not receive the interview guide beforehand.

## Interview approach

The interviews were initiated by a short presentation about the interviewer and the aim of the study, the respondents were also informed about the anonymity. The respondents could in some cases act a bit nervous and the interviewer thereby aimed at ease the situation, to ensure a safe conversation were the respondent could feel trust for the interviewer and the study. The respondents were not informed about what group they belonged to and if the respondent had further question about the measure for profit, they were referred to LRF-konsult. The questions were then asked one by one, read by the interviewer from the interview guide, and if the

respondents did not understand the question it was further explained. In some questions an example was given, in cases where the respondents could not form an answer. The topic was discussed where the interviewer showed an interest in their answers without showing a personal opinion. The respondents were given time to think and the interviewer would not push the answers. In some cases, supplementary questions were asked to get the full understanding of the answer, otherwise the interviewer kept to the interview guide since the interview guide was exhaustive in itself. The questions in the interview guide were to some extent asked in a way that suited the farms conditions, a small farm with no employees were not asked about being an employer for example, that was performed in a way that it did not affect the outcome. This was made more in terms of being social capable in the situation, the respondent should feel safe and secure and not being asked in a judgemental way. After the interview the respondents showed their farm with stables and animals, that was a request from the interviewer, to get a better understanding of the conditions of the farm. The interviews were recorded and notes were taken during the interview by the interviewer. Afterwards the respondents received the notes from the interview and given the chance to read what was said and control what material that was going to be used as data in the study. All interviews were performed and handled by only the author.

### 3.4 Analysis

#### Analysis of the collected data

When analysing the collected data there is not only one practise to do it and there is no general correct way (Bryman & Bell, 2015). Comparative analysis can be used for large social groups in a statistic comparison as well as in smaller social structures (Glaser & Strauss, 1976). One of the most prominent approaches is grounded theory, which is commonly used in qualitative methods and in analysis of the collected data (Kvale & Brinkmann, 2014). Grounded theory is a way to view the collected data to provide theories rather than test theories (Bryman & Bell, 2015). Grounded theory could be interpreted in several ways and the whole concept or parts could be implemented. In the present study grounded theory was not used as an approach while collecting the data since the interview guide was based on previous literature and the interviewer had a perception about the area of interest. However, after the data was collected the approach of grounded theory was applied. Grounded theory implicate certain techniques used during the process, one of them being coding where the data is broken down to smaller parts called concepts (Kvale & Brinkman, 2014; Bryman & Bell, 2015). While analysing data and applying a certain technique some creativity is needed to get started in order to find the smaller parts.

The identification of these concepts was managed by a technique suggested by Alvesson & Sköldberg (2000). The technique was a memo-writing to note the concepts appearing and to build an understanding around the concepts (Alvesson & Sköldberg, 2000). When separating the concept from its origin it is important not to forget the situation, however, the concept can still be used in other contexts (Kvale & Brinkmann, 2014). Concepts which reappeared and could be found in several contexts together form a category (Kvale & Brinkmann, 2014). The identified concepts were compared in three separated steps and concepts returning in two or three steps were valid as a category. In the analysis both the terms concept and topic are used, where concepts are narrower than a topic, a topic is considered to be broad and useful for identifying concepts.



### **Analysis within each interview (1)**

The first step when analysing the interviews was to identify concepts within each interview, which meant to find concepts that returned during one interview. Data from one interview were analysed at the time, and concepts which returned more than twice during that interview were selected. A concept returning more than twice when questions regarding several topics were asked implied that this concept was important to the respondent. This step was performed on each interview in both groups.

The concepts within one interview in one farm business were then compared to the other interviews in one group, to notice if concepts found in one interview, returned within another interview. Thereby being able to see if the respondents, in one group, focused on similar concepts when they were interviewed. Concepts that returned within four different interviews in one group were kept for further analysis. Concept that returns four times in a group of seven implies that the concepts were important to the majority of the group.

Concepts returning in the group for analysis were then compared to concepts in the reference group and the concepts only returning in the group for analysis were saved for further comparisons and analyses.

This step provides insight in what each respondents focused on during the interview, and further if the respondents in one group focused on similar concepts during their interviews.

### **Analysis in-between the interview in each group (2)**

The second step of the analysis was to compare which concepts returned between the interviews in each group. The difference from the first analyse being that now concepts did not have to return within the interview, it only had to return among the interviews in a certain group, and could return randomly. By analysing the interviews in one group and identifying which concept that returned among this group, it was possible to identify what a certain group focused on. For a concept to be selected, it had to return at least three times among the interviews. The number of three returns in this analysis, which is not majority, was changed from four to three times since the interviews were not as consistent in this process compared to the first analysis. Same procedure as in the first analysis step was performed where the concepts between groups were compared and the concepts only returning in the group for analysis were saved for further comparison.

This step provides an insight on concepts that is important for the respondents as a group, not as individuals.

### **Analysis based on each answer from the interview guide (3)**

This third step of analysis differs from the previous two steps. The first two steps were performed in the same way in both groups and the collected data was analysed with no concern of what was asked. In the third step of analysis another method was used, based on the interview guide.

In this third step each answer from the interview guide was used to combine what the group of analysis answered to each topic. The interviews were semi-structured which facilitates this type of analysis. Answers that were given by at least four different respondents were defined as concepts, since this meant the concept being in majority among the answers.

Where the concepts returned and coincided in four or more answers, the concept were saved. The concepts identified in the answers of group of analysis, were then compared to the reference group. Thereby, the reference group were not completely analysed in this third step, the answers were only crosschecked with the reference group. Concepts not being identified in the reference group were saved and used for further comparison and summarizing.

This third step provide an understanding for how the group of analysis answered compared to the reference group in certain topics from the interview.

### Group A and B

The respondents were divided into two groups based on their level of profit. Group A consisted of respondents with high profit and group B was the reference group with low profit. Concepts which were in majority and identified in group A and did not appear in the same extent in group B, were used as concepts. The identified concepts were further managed in two different ways depending on what analysis step that provided them (see Figure 4). Concepts analysed in all three steps were formed into categories and further used as success factors. Concepts only appearing in the third step was also formed into categories and further used as success factors, since the third step was another method of analysing the collected data.

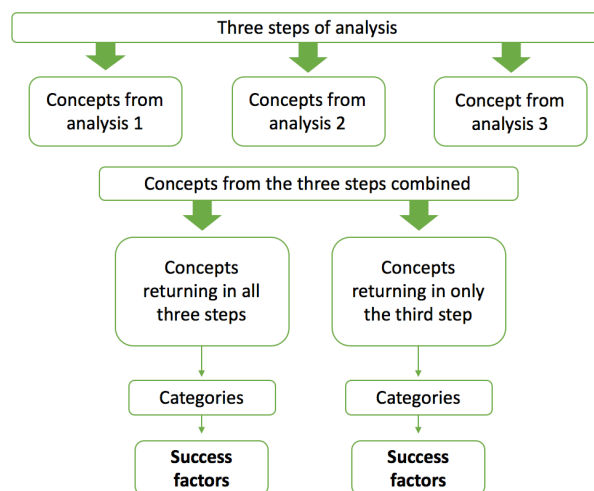


Figure 4. Schematic view over the process of analysis steps providing the results named success factors.

## 4 Results

### 4.1 Group A and B

Descriptive statistics for group A and B are presented in Table 1 and 2.

Table 1. Showing figures of the farm situation based on the interviews with mean values ( $\pm$ SD).

Attribute:	Group A	Group B
Experience from dairy cows before starting farming	All	All
Been dairy farming, years	28 ( $\pm$ 6)	23 ( $\pm$ 13)
Secondary education	All	All
Further education (university)	1/7	2/7
Use of advisory service	6/7	6/7
Diversification of the farm	4/7	1/7
Life companion involved in the farm business	6/7	1/7

Table 2. Mean values ( $\pm$ SD) for key production figures for the included farms (Växa Sweden, 2017)

Key figures:	Group A	Group B
Number of cows in the herd per year	100 – 300	20 – 150
Connected to the Swedish milk recording	5/7	7/7
Employees (including the farmer)	2.5 – 6	1 – 3
Milk yield in ECM	10 570 ( $\pm$ 1117)	10 249 ( $\pm$ 1393)
SCC in cells/ml	303 ( $\pm$ 45)	266 ( $\pm$ 101)
Animal health cost öre/kg ECM	33.8 ( $\pm$ 8.8)	33.5 ( $\pm$ 11.6)
Age at first calving in months	27.8 ( $\pm$ 2.3)	27.1 ( $\pm$ 1.8)
Recruitment in percentage	39 ( $\pm$ 8)	34 ( $\pm$ 16)

## 4.2 Success factors

The success factors are presented in Table 3 with the identified success factors presented and marked in which step of analysis the success factor was identified in. Two success factors were combined in all three steps while three of the success factors were only confirmed in the third step. This displays that two success factors were identified in all steps and could therefore be considered to be credible. However, the success factors only identified in the third step used another methodology and the factors are therefore also conclusive. Success factors provided from all three steps will be presented with quotes while the success factors from the third step will be presented with diagram, considered they are based on answers from the interview guide.

Table 3. Showing categories which were identified in the analysis and showing what analyse method that provided each result called success factor.

Success factors	Within (1)	In-between (2)	Answer from interview guide (3)
Motivation to improve and to identify opportunities and challenges	X	X	X
Attitude to economy and profitability linked to the practical daily operation	X	X	X
Importance of preventive work			X
Choice of sources for finding new information			X
Knowing the roughage percentage in the diets			X

### Success factor: Motivation to improve and to identify opportunities and challenges

This category was identified in the analysis steps *in-between* and *between* the interviews in group A, but did not occur in the same extent in group B. Group B however did return to improvements but did not mention challenges and opportunities. Improvements were mentioned in both groups and were mentioned in the context of wanting to improve and actively looking for areas needing improvement. What differed between group A and B was that group A used other terms such as being able to see the opportunities and challenges as a driving force. This quote from group A shows an example of this:

*“Well, I guess it’s sort of, maybe, that you try to be good, you have to be good at everything”*

In group B improvements were mentioned as a measure to maintain the farm and not fall behind with the production and maintenance. Farmers from group B mentioned:

*“you can lose heart if you have to be really, really dedicated all the time”*

*“I try to keep things as good as possible with what we have at the moment”*

While in group A improvements were mentioned more in the context of wanting to improve to reach better results and wanting everything to be as good as possible. In group A a competitive instinct and a willing to win was also identified in the analyse *in-between* but not in majority, this was not observed in group B. Furthermore, it suggests that group A have a will and a driving force to improve and develop, not just manage and survive trough challenges and opportunities. This quote is an example of this from group A:

*”well, I like it when there is some action,  
just doing the same thing in the same place year after year,  
there has to be some action in the company as well,  
otherwise it gets boring”*

The success factor was further supported by returning in the third step of the analysing process. Group A mentioned in majority (5/7) that the goals and driving force came from wanting to develop and improve the farm business. These are quotes from group A:

*”Everything we do is to be done as well as possible”*

*”To improve everything”*

While group B (4/7) mentioned goals and driving force in the context of staying in business, keeping the production going and survive:

*”It feels like nowadays many people stress around, trying to achieve so much,  
and I think that maybe you have to allow yourself to just be where you have found some sort  
of balance for a while, before you maybe push ahead again, because otherwise I think in the  
end it will be too much and too complicated and difficult.”*

The result in the third step thereby coincided with the success factor identified in the two previous analysis, step one and two. The result is thereby supported by three of three analysis steps.

**Success factor: The attitude to economy and profitability linked to the practical daily operation**

Terms regarding profitability and economic appeared in both the analysis of *within* and *in-between* in both groups, however, to a larger extent in group A. Group A mentioned terms such as costs, budgeting and rough estimations. While group B mentioned terms of salary, sustainable business and large loans as a driving force, together with an interest in economic. What separated group A from group B, was that group A mentioned economic and profitability to a larger extent, furthermore, the majority of group A mentioned this. Group A also had a mindset of how economic and profitability affects the daily operation of the business. This quote is an example from group A:

*”You know, in this industry, people like to complain about Arla, if only we could raise the  
price of milk by 20 öre, but if you can cut your costs by 20 öre and then the price of milk goes  
up, you will have earned 40 öre. But if you just sit with your arms folded, maybe things will  
get a bit worse all the time”*

Group A had a commitment to know the costs on the farm and to identify areas to save money. Furthermore, group A was aware of the farms in and outputs together with the costs of different

areas on the farm. Group B mentioned terms as viable business, salary, survive and paying off loans, which is more a long-term mindset and general terms regarding economic and profitability. This quote shows an example from group B where large debt is a driving force:

*"You have this pressure on you all the time when you have big debts, so that's a driving force"*

This success factor appeared within two questions from the interview guide and their specific answers. One question asked if the respondent did anything different from others in the same business. To this group A (4/7) answered that they calculated the costs for machines on the farm. The costs for machines, in group A, needed to be known and buying machines were not obvious if the calculation did not add up. In group A cooperate with machines occurred to increase the usages and lowering the cost for each farm. This quote is an example from group A:

*"But when we do calculations for machinery, we can't get the machine to be profitable, when you're sitting there counting, so I don't know if we can't do our damned figures or what the heck the problem is"*

However, in group B cooperation with machines were mentioned in a low range and the costs for machines were not specified. Group A also mentioned that they know what work hours the farm requires with its costs while group B mentioned that they were not directly willing to take risks:

*"We want to be able to make a comfortable living out of it, both of us, you know, and be able to take out more salary and more time off, that's what I think, we shouldn't have to work ourselves to death, we should be able to have someone who does more of the work and we should be able to live a decent life, that's our main goal really, growth in itself is not one of our goals"*

The other question which supported this success factor in the interview guide was the answers to the question regarding what factors that affects the decision making in the farm business. Group A all mentioned a calculation or that the economic should be known before making a decision. These are two example of this from group A:

*"You count every penny" "Yes, I do a lot of counting, working out if an investment is financially feasible with its depreciation period and sustainability, yes, I do that, without fail"*

*"Well, it's financial feasibility, that's the number one priority, if it's not, you can't think that, how shall I put it, if you don't have enough hours or time or enough livestock for what you are doing, then usually it won't be profitable, it has to be full"*

Group B also mentioned this but not to same extent. The answers in the third step coinciding with the other two analysis steps and the result is thereby noticed in three of three steps.

### Success factor: The importance of preventive work

Both group A and B mentioned that they performed preventive work on their farms, however, one aspect separated the groups. Group A considered, in majority, preventive work as important or very important. While group B did not mention this factor in majority. This success factor was only identified in the third step of analysis and the answer to the question regarding preventive work is presented in Figure 5.

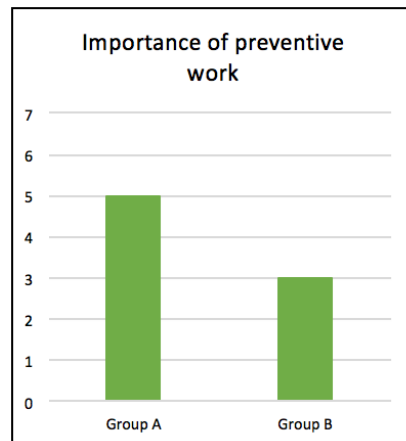


Figure 5. A diagram over the results from the answers between group A and B.

### Success factor: The choice of sources for finding new information regarding the milk business

Both group A and B mentioned in majority that they were interested and updated on what was going on in the milk business, both in Sweden and worldwide. The follow up question, about how they received the information, separated the groups where group A in majority mentioned the internet, and group B mentioned social media but not in majority. This success factor was identified in the third step of analysis and the answer to the question regarding channel for information is presented in Figure 6.

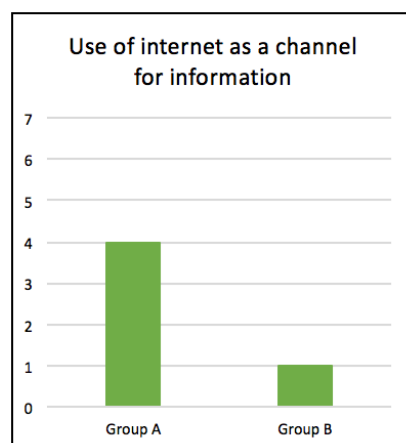
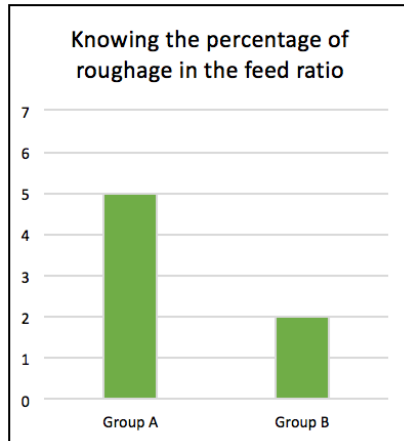


Figure 6. A diagram over the results from the answers between group A and B.

**Success factor: Knowing the roughage percentage in the feed ratio**

Group A were able to answer how large amount of the ratio for the dairy cows that were roughage, either by knowing or by calculating. While in group B some did not know and some did not give an answer even though the question was clear. This success factor was identified in the third step of analysis and the answer to the question regarding knowing the percentage of roughage in the feed ratio is presented in Figure 7.



*Figure 7. A diagram over the results from the answers between group A and B.*



## 5 Discussion

This chapter discuss the findings together with the literature presented in the chapter conceptual framework. The definitions of profitability used in the study together with the applied method will also be discussed together with its affect on the results. In the extent of the study it is difficult to draw conclusions considering the data collected, however, it is possible to discuss the result and raise questions about why or how, and speculate together with the literature.

### 5.1 The definition of profit

The definition of profit was defined by result not including depreciation and interest rate, which provided a certain type of farm businesses selected for the study. This definition of profit was performed by LRF-konsult and the definition affected the result regarding what farms that were selected for the study. Larger farms were found in group A (see Table 1) and a reason for this could be that these farms have a larger income from milk and a higher number of cows to divide the fixed costs over, it is a situation regarding efficiency. However, farm size in relation to profitability could not be concluded in this study since that would require a measure regarding efficiency. To be able to calculate efficiency in relation to profit, another aspect need to be considered such as divide the profit over the number of cows or hours performed on the farm for instance. If an efficiency measure had been used it would be reliable to draw conclusions regarding farm size, however, as mentioned this is not possible with the provided farms regarding the measure of profitability used in this study. The definition of profitability being defined before depreciation and interest rate and not consider the rate of debt could also be a reason for large farms to be found in group A (see Table 1). The level of debt in the companies could have been of interest, which would be known either by asking the respondents or by using the measure including the costs for interest rate. This could be of interest to know what is the driving force or how the farmers feel about large investments. It was an active choice from the interviewer not to ask the respondents about their level of debt, since the study aimed to capture personality and management capacity. The question about debt could have affected the interview and making the interview in economical terms, which were not the purpose of this study.

Incorporated companies together with private companies occur in both groups and these different company forms can have an affect since it differs on how to calculate the salary. Incorporated companies calculate the salary as a cost before the result while in private companies the result include salary. If the companies have employees those cost are calculated for before the result, moreover, the company owners own salary can be managed in different ways as mentioned. The salary in the companies are not regulated by LRF-konsult, the values are reported from the farmers and used in the calculation, meaning these figure can vary in large scale starting at zero. Discussing the salary with the farmers would have been interesting, to found out how they manage, if there is another family member paying or what the actual outtake of salary was from the farm business. The different company forms and outtake of salary could be considered as an error source when reading the results from this study.

### 5.2 Method discussion

The chosen method was important to fulfil the aim and a central part of the study. A qualitative method focusses on soft values such as a person's experience and perception (Bryman & Bell, 2015), providing more comprehensive data about the farmer and the intention of the farm business. There are pros and cons when choosing method, and a con with a qualitative method is the large amount of unstructured data being collected, compared to a quantitative study with structured data (Bryman & Bell, 2015). With a qualitative study the number of participants,

farm businesses in this study, will be fewer than in a quantitative, which means that the result is applicable to those with similar conditions. The number of respondents need to suit the timeline of the study and thereby also the amount of collected data needed to be considered. The number of respondents were aiming at a total of 20 with 10 respondents in each group to reach saturation and reliability in the collected data, however, due to limitations in the list of respondents the number ended up being a total of fourteen divided to seven in each group.

When using a semi-structured approach, the data is to some extent organized compared to unstructured interviews and it is possible to analyse the data in some given way according to the broad topics used in the interview guide. The respondents were booked by self-selection, another selection that could have been used is random selection. Pros with self-selection was that an interview could be booked with whoever answered the phone and had time for an interview. Cons with that selection is that the selection was to some extent controlled.

The analysis process could have been done in several other ways and the interviews consisted of extensive data. With the data being comprehensive and coding is only one method to perform an analysis, the data could be used for further analysis and other purposes.

### The interviews

The interviewer becomes the research tool and the definition of a good interviewer is an expert within the field of the study and in human interactions (Kvale & Torhell, 1997). Despite the interviewers lack of experience of the interviewing technique, the interviews were performed according the list written by Kvale & Torhell (1997) (see Figure 2). During the interviews objectivity was needed and the respondents were not in any way judged. The choice to use quotes in the results were to strengthen the identified factor, choosing quotes requires a subjectivity in handling the collected data.

### Partial report

As a part of the process a partial report was orally presented with preliminary result at “Gotland Grönt Centrum” where people with interest in the area from the agricultural business, were invited to listen and comment the results. The inputs were then considered when writing the discussion chapter in this report.

### 5.3 Ethics

Bryman & Bell (2015) presents ethical guidelines and these were considered throughout the study. The ethical guidelines comprise; the request of information about the study, the consent which is voluntary, confidentiality and anonymousness when handling data and also the purpose of the study as distinct and trustworthy. This was important to fulfil to provide a good relationship between the interviewer and the respondents and also to give the respondent a good experience of participating in a study. When conducting this study, it was important that the participants felt safe and trusted the reliability in the study. The respondents should feel secure to wanting to share personal and sensitive facts about their work and farm business, to provide the full understanding and a reliable result. In this study all respondents were handled anonymously and it was each respondent decision if they wanted to share their participation with others. Gotland is a fairly small area and those involved in milk production have a sense about each other, that makes it even more important to leave out any personal fact, regarding location or family. This was not a problem in the study since the data was grouped between A and B and then further degraded to smaller fragments. The interviews were recorded which could made the respondents a bit unsure, but the respondents were informed that the recorded data were only to be used within this purpose and would be deleted when the study was

completed. The study used data from LRF-konsult and Växa Sverige and it was voluntary for the respondents to participate. From LRF-konsult it was only necessary for the respondents to give an oral approval but to get access to the data from Växa Sverige they needed sign a proxy giving the interviewer access to their herd data. The data from Växa Sverige was only used in this study and the proxy only accessing the data needed.

## 5.4 The results

How is “the motivation to improve and to identify opportunities and challenges” a success factor?

Wanting to identify areas of improvements to perform better and wanting to see possibilities and use the challenges as a driving force, could be an example of both an attitude or a personality trait. Since an attitude is about a perception and liking or not (Kahneman & Sugden, 2005), this success factor coinciding more with a personality trait considering the factors including in the *Big five*-theory (Olver & Mooradian, 2003). The success factor coincides particularly with the factor regarding *openness* to experiences. The success factor corresponds with the fact that a manager’s personal characteristics are important and influence the capacity of the managers (Rougoor *et al.*, 1998). This is further supported by Hansson (2008) that concluded personality to be important in terms of profitability. The results are in line with the findings of Ferguson and Hansson (2013) as they suggested different reasons for farming and together with values providing insight in how prone the manager is to make strategic plans or keep farming rather unchanged. In this first success factor there was a difference in how prone group A and group B were to see and use challenges and opportunities in their role as a farm manager.

The personality or personal characteristics is not alone the reason for reaching profitability, even when the conditions are advantageous, profitability could fail if the managers are not capable of prioritize and divide the time between the areas of a farm (Rougoor *et al.*, 1998). The manager can therefore not only possess this particular success factor and expecting to be profitable. Several characteristics would probably be needed to fulfil the management capacity and profitability, however, this identified success factor is one of them according to this study. It can be difficult to change or motivate a personal characteristic if it does not come naturally to a person (Olver & Mooradian, 2003). A personality can, however, be identified in a meeting between an advisor and a customer, and the meeting and advisory tools can thereby be adjusted to optimise the exchange between customer and advisor.

This identified success factor and having high profit have a connection, but the cause and effect of this need to be considered. If this identified personal characteristic is the reason for having high profit or if it is an attitude arising whit high profits, by being successful and feeling confident in the production. The difference is difficult to identify by using only the collected data, and to get the full answer more questions regarding this need to be asked and supported further by literature on the subject.

How is “the attitude to economy and profitability linked to the practical daily operation” a success factor?

Being aware about the economy in a farm business, know how different areas in the production affects the economic outcome and know the farm businesses marginal, is according to the author, an evaluating way of managing a business. Previous literature supports this, Cadez & Guildings (2008) concluded that having a plan, a budget and follow up results will give an awareness on the current situation. That makes it possible to react and act in a suitable way regarding external factors, such as a changing milk price.

The changing milk price is expected to continue, meaning that this mindset regarding economy, knowing the marginal of the production and apply this in every day work could be an important aspect for profitable dairy farming. Rougoor et al. (1998) mentioned managerial capacity as being able to do the right effort in the right way. By knowing the costs and to know where and when the costs need to be reduced in order to stay profitable. With that awareness about the production it is possible to affect the decision making process, where all cost should be known and also the use, to ensure that the decision is economical defensible and profitable. This success factor is a known management factor from previous literature, and it is a factor that affects the work in short-term (Hansson & Öhlmér, 2008) and the short-term work is easy to affect in the daily work. Group A mentioned this way to managing where they consider economy in the daily operation, while group B mention more long-term economy. The short-terms which rise from group A also affects the long-term, however, the effect is more easily changeable trough the short-term (Hansson & Öhlmér, 2008). A manager who can use less input, lower the production cost and gain higher profits will improve the efficiency and thereby also the profitability (Galanopoulos *et al.*, 2006), and this could be done by a manager who knows the cost of the production and the in and outputs. This however, requires a manager who are motivated by higher profits which could be connected to the personal characteristics identified in the first success factor. This was suggested by Hansson (2008) which concluded that the managers’ personality affects the business and their decision making process. An example of group A knowing their costs is the mentioning of calculations of farm machines and cooperation to increase the efficiency of machines and lower the cost for each farm.

There is a connection between how economy are managed within the companies and in the daily operation, however, the cause and effect are not certain. Could it be that the high profits make it motivating to study the costs and economy in the production or could it be that high profits are an effect of being interested and in an active way of working with economy. What is the cause and effect in this can not be concluded by using the collected data. However, it is possible to assume that the later suggestion is likely on account of the previous presented literature and discussion, even though the first suggestion should not be excluded. The success factor is of interest for advisory purposes since it provides information about how group A use economy in a short-term in the daily operation compared to group B. By identify costly key figures in the daily operation and work in a short-term the profitability can in long-term be improved (Hansson & Öhlmér, 2008).

### How is the “importance of preventive work” a success factor?

Group A mentioned the importance of preventive work while group B mentioned the preventive work but not the importance of it. A suggestion from Manevska-Tasevska et al. (2016) is that the difference between success and failure is the effort of planning, implementation and control, which could be the case between group A and B. Planning, implementation and having control regarding maintenance on the farm could have a positive effect of farm performance since the maintenance can be done in a planned way and the cost could be controlled. If not having control, maintenance would need to be done when occurring which could imply solving acute problems to keep the production going. This could require expensive service hours or production loss if not solved in time. The mental part in this is also important to consider, the feeling of not having control and only handling acute problems could be mentally exhausting, which can have a negative effect in long-terms.

Mastitis is costly and the prevalence of mastitis have a negative effect on farm profitability (Hansson, 2007b; Nilsen *et al.*, 2010). Mastitis could be reduced by using preventive actions and have a positive effect on profitability. Farmers who consider preventive measure to be important may have an advanced awareness of the costs for example mastitis. However, there was no distinct differ in SCC or animal health costs/kg ECM between the two groups (see Table 2), this suggests that the groups did not differ to a large extent in the preventive work. The same was supported in an efficiency study by Hansson & Öhlmér (2008) where less efficient farms could not become more efficient by adopting the animal welfare practices of the most efficient farms, because the differences were too small. This suggests that the differences between the farms are more likely the mindset rather than the priority of preventive work on the farms. Therefore, the cause and effect need to be considered in this success factor. Group A could have been more confident about their production, even though they were not told to be in group A, but rather their own perception about being successful. Or, group A might prioritize preventive measures in a different way in the daily operation. Contacting a veterinary, culling cows with high SCC, checking hygiene routines and milking equipment are actions that are common on high technical efficient farms (Hansson *et al.*, 2011). Therefore, there could be a difference in the preventive work, but that was not observed in this study, even though questions about preventive efforts were asked in the interviews. This success factor can be useful to motivate preventive work on farms. Preventive measures have a positive effect on profitability as well as by providing the manager an impression of control.

### How is “the choice of sources for finding new information” a success factor?

It was evident in both groups that farmers used their social network to a large extent and used their social network for sharing experiences and knowledge. That farmers tend to use their social network rather than management tools was concluded in a study by Öhlmér et al. (1998). To have knowledge and awareness about the current market is a key factor towards profitability (Narver & Slater, 1990), however, both group A and B had this, but the difference was in how they gained this information. By using internet, it is possible to assume that recent, daily news can be reached, news from abroad and news from several sources compared to channels other than internet such as magazines or industry publications, information from the dairy or TV and radio.

Concerning this success factor there is a connection between group A and the use of internet as a source for information. The cause and effect of this is difficult to define whether group A have the need to gain further information and as a result found solutions and facts giving them opportunity to gain higher profit. Or that having high profits increase the activity to stay up to date on the market and what is new. Important in use of any source of information is to have a

critical approach when gaining information. This success factor can be used to encourage farmers to see how others in the business manage, not just the neighbors but abroad and perhaps in other business areas.

#### How is “knowing the percentage of roughage in the feed ratio” a success factor?

Feed cost is one of the largest expense on a dairy farm (Patel, 2012; Patel *et al.*, 2013). This success factor did not take the farms feed cost into account, instead focus was on the awareness of the feed as a source of input. The roughage percentage in the feed ratio for dairy cows have changed over the years together with the increase in the cow’s milk performance and the cow thereby requiring high nutritive feeds. This success factor is based on the awareness about the roughage percentage in the feed ratio. Group A did know the percentage or calculated this when asked, which provides an insight that group A have a knowledge about the feed ratio and the feed stuffs. By knowing what the feed stuffs consist of and use the inputs as efficient as possible, will effect the economic efficiency (Hansson & Öhlmér, 2008). This proposes to avoid purchasing expensive feed stuffs which might not fulfil its purpose. Knowing the roughage percentage also suggests that farmers in group A work with the ratios regularly, however, putting major effort in feed ratios and checking feed quality is associated with low technical efficiency (Hansson *et al.*, 2011). Having a higher roughage percentage, of high nutritive quality, have a positive effect on the profitability (Patel *et al.*, 2016) from the provided answers no differences in the roughage percentage could be observed. One explanation could be that the groups use the same advisory service and have similar ratios among the farms.

There is a connection between knowing the roughage percentage and group A in this study, which provides a perception about the importance of feed as a factor. However, it would be interesting to investigate the costs in this success factor for further understanding. If knowing the roughage percentage is the cause for high profits or having high profits provides the confident to give a number of the proportion, is not evident. The figures of the percentage were not crosschecked with the feed ratios. This success factor is partly connected to the success factor about knowing the farms costs and its affect on the daily operation. This success factor could be used by advisory services to help farmers to reduce costs regarding feed and to use inputs efficient, by knowing the feed stuffs on the farm and optimize the ratio according to production and economy.

#### Connections between farm situation, key figures and profitability

In Table 2, key figures on farm production from the herd database is presented, however, it is important to consider the possibility to draw any conclusions from those figures. Farm situation figures (Table 2) that differs are *diversity* and *having family involved*, such as a life companion. Diversity is a way of spreading the risks and being able to use the inputs where they are most needed (Hansson, 2007a), and during a low milk price these other areas of the farm can maintain the income. These figures are based on the years of 2012 – 2015 which represent that these farms been managing during several years. However, these farms needed to have 2/3 of their income from milk production, thereby they were dependent of the milk production. There could still be a difference depending on where the other 1/3 comes from, if it is an area with good economic results especially during low milk prices this would affect the farm profitability. It should also be taking into account that calculating for only the milk production are in several ways complicated since farms often use equipment and resources in areas other than milk production.

It differs between the two groups in the figure explaining the *family situation*, between having your life companion involved in the work on the farm or not. This could have a connection to

the paid salary and if it is an incorporated company or a private company. It was not known in this study how many of each company forms were in each group, only that both forms existed in group A and B. Having another close family member involved could have a positive affect on the business development where the understanding for the production is shared and ideas and planning could be made together.

It also differs between the groups in the key figures in *herd size* and the *number of employees* on the farm. The larger herd size has a connection with group A but can, in this study, not be concluded to affect the profit. The measure of being profitable considering the definition made by LRF-konsult, does not make it possible to draw a conclusions regarding herd size. To be able to conclude those factors other variables related to the profit need to be considered, furthermore, an efficiency measure. By expanding the production with a larger herd size the production will have a lower cost per produced unit. The larger herd size in group A probably requires a larger workforce and the larger workforce is thereby probably not an explanation to high profits.

### Biological factors in the literature review not identified as success factors

The biological factors in the literature review that did not differ in majority between the groups and were not being identified as success factors are still important and should be considered in further studies. One factor being milk yield where the average was similar in both groups, however, milk yield in it self is not an assurance for profitability (Rougoor *et al.*, 1998). Milk yield per cow is important for the income and a high milk yield can predict the economic performance of the farm (Hansson, 2007b). Longevity was not identified as a success factor and because of the low awareness according to Bergeå *et al.* (2016) this factor is not common to talk about, therefore, it was motivated to use as factor since the awareness could differ between between the groups, that was not the result. Replacement is a large operation on dairy farms and management regarding herd turnover rate and rearing periods have an impact on farm profitability (Mourits *et al.*, 1999). These factors according raising heifers or herd turnover rate did not differ in majority between the groups. Since this did not differ between the groups it can be assumed that rearing heifers was managed in a similar way or that the questions about heifer rearing were not treated sufficient. Regarding the factor on housing there was no difference between the two groups, however, the larger farms were in group A but it was not identified as a success factor, taking the definition used for this study affecting the selection of farms to a wide extent, into account.

### 5.5 Future studies

Other aspects will be presented that could be considered in future studies, which have not been considered in this study. The *employees* being one aspect, if the farmer consider the employees to complete his or her skills on the farm and the mindset of having employees. This is a reflection about how dependent the farmer is of employees, but also the farmer's perception of what employees could contribute. Another aspect is the use of a *farm board*. A board for regular discussions about the farm with planning and following up. The board consisting of advisors with focus areas such as animals, cropping and economic. At last, the economical management in the daily operation and driving force and its importance for farm performance is interesting aspects which could be further investigated.

## 6 Conclusion

The study aimed at identifying factors that differ between dairy farmers with high and low profit. The definition was made by LRF-konsult and that was a part of the selection of farmers for the study, this definition and thereby the selection probably affected the result. Another measure considering an efficiency measure could have provided another mixture of farmers and farm sizes, where profitability would be based on number of cows or work hours in relation to the profit. The farms were located on Gotland which provides similar environmental conditions for dairy farming for the farmers in the study. The methods used were a review of previous literature and semi-structured interviews. The differences were identified as success factors and five factors were observed between the farms. The five success factors were; motivation to improve and to identify opportunities and challenges, attitude to economy and profitability linked to the practical daily operation, the importance of preventive work, choice of source for finding new information and the awareness of the roughage percentage in the feed ratio. These factors have a connection with high profit farms but it is important to consider the cause and effect. It is easy to get swept away by a solution called success factor, however, this study was performed with a small group of farmers in only one region. These identified factors need to be tested further with a larger group of respondents and also by implementation studies. Moreover, a study where farms adapt these factors and the study evaluate if the differences affect the farm profitability or not. This study was advantageously performed with a qualitative approach with positive response from the respondents and by combining animal science with economy in social science it is possible to use the best of two practices.



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## Appendix

### 1 Appendix: List of the original quotes

*”Allt ska bli bättre”*

*”Allting vi gör, ska göras så bra som möjligt”*

*”Det är nog lite det där kanske att man försöker va bra, måste vara bra på allt”*

*”så det är väl roligt när det händer något, stå och stampa på samma ställe år efter år, det måste hända något i företaget också, annars blir det tråkigt”*

*”Det känns som att många jagar så mycket idag, och jag tror att man kanske måste få tillåta sig att faktiskt vara där man känner att man hittat en balans, ett tag, innan man eventuellt jagar vidare, för att annars tror jag tillslut att det blir för mycket och för rörigt och för snurrikt”*

*”man kan tappa lusten om man ska engagera sig jättehårt hela tiden”*

*”Försöker hålla det så bra som möjligt med det vi har just nu”*

*”Du räknar på varenda krona” ”Jo jag räknar på mycket, att det är ekonomiskt försvarbart för den investeringen mot avskrivningstid och hållbarhet, det gör jag, stenhårt”*

*”Ja det är ju ekonomiskt försvarbart, det är nummer ett, finns det inte, det går inte att tro att, vad ska man säga, finns det inte timmar eller tid eller tillräckligt med djur i det man gör så blir det inte ju ekonomi på det i regel, det måste ju vara fullt”.*

*”Men när vi räknar på maskiner så får ju inte en maskin att gå ihop, när du sitter och räknar på det, så jag vet inte om hur fan vi räknar dåligt eller vet inte vad det är”*

*”Det ska gärna vara så i den här branschen att klaga på Arla, fick vi bara upp mjölkpriset 20 öre, men kan du kapa 20 öre i dina kostnader och så går mjölkpriset upp så har du tjänat 40 öre. Men sitter man hela tiden med armar i kors kanske det blir lite sämre hela tiden”*

*”Man har ju pressen hela tiden på sig när man har stora skulder, så det är ju en drivkraft”*

*”Att vi ska kunna leva bra på det båda två om man säger, och höja uttaget av löner och ledighet egentligen tycker jag, att vi inte ska behöva jobba ihjäl oss utan vi ska kunna ha någon som jobbar mer och vi ska kunna leva drägligt det är ett huvudmål egentligen, att växa i sig är inte mål för oss”*