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Department of Economics

Brand equity in the industrial purchase decision

- A case study of the Swedish market for agricultural machinery.

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Abstract/ Summary

High brand equity is a great asset for companies that operate their business in a free and competitive market. Brand equity can arise from both product-related and non-product related attributes and may be viewed from many different perspectives. This study examines which different attributes that contribute to enhance brand equity from customers point of view at the Swedish market for agricultural machinery.

The study have been developed using a comprehensive literature search in order to investigate the field regarding brand equity and brand image. The literature review results in one product specific and one non-product specific approach in order to examine factors that contribute to enhanced brand equity. This takes the form as one survey-based approach regarding the non-product related attributes which is examined by interpreting the extra value added by different attributes. A telephone interview was conducted and just over 120 respondents who operate a farm in the south part of Sweden answered the survey.

The product related attributes, where the brand as such is included as one attribute are examined through a Hedonic pricing model. The hedonic pricing model is estimated for different soil cultivators due to fewer objective differences between different brands compared to for example planters.

Results from the survey based part show factors that customers perceive as contributing to enhanced brand image, respectively factors that not will affect the overall impression of a manufacturer. For example it is shown that the perception of an innovative company enhances the overall impression respectively financing alternatives in connection with the purchase offered by the manufacturer or dealer will not enhance the overall impression.

From the hedonic pricing model it is possible to examine to what extent some different product related attributes affect the sales price. For example, an increase in tractor requirement by one horse power results in a price increase of 650 SEK. In addition it is revealed that a soil cultivator manufactured by Väderstad-Verken is characterized by a higher price compared to some other brands.

Sammanfattning

Ett starkt varumärke är en stor tillgång för det företag som bedriver sin verksamhet i en fri och öppen marknad. Varumärket kan förstärkas av både produktrelaterade och icke produktrelaterade faktorer och kan mätas från flera olika perspektiv. Den här studien utreder vilka olika faktorer som bidrar till ett starkt varumärke från kundens perspektiv på den svenska marknaden för lantbruksmaskiner.

Studien har utarbetats med en omfattande litteraturgenomgång för att undersöka det område som rör brand equity och brand image. Litteraturgenomgången resulterade i en undersökningsbaserad metod för att mäta icke produktrelaterade faktorer som stärker ett varumärke och en så kallad hedonisk prismodell som mäter produktrelaterade faktorer. Den undersökningsbaserade delen genomfördes med hjälp av telefonintervjuer och drygt 120 lantbrukare verksamma i Svealand och Götaland deltog i undersökningen.

Den hedoniska prismodellen mäter hur produktrelaterade attribut där varumärket i sig utgör ett attribut påverkar priset på kultivatorer. Valet av kultivator som undersökningsobjekt berodde på att det är relativt få objektiva skillnader mellan olika tillverkar åtminstone i jämförelse med såmaskiner.

Resultaten från den intervjubaserade delen visar på faktorer som kunderna tycker stärker helhetsbilden av ett företag likaväl som några faktorer som inte alls anses bidra till detta. Till exempel anses uppfattning om att ett företag är innovativt stärka helhetsintrycket. Därtill anses inte finansieringsalternativ erbjudna av tillverkaren eller återförsäljaren i samband med köp stärka helhetsbilden. Den hedoniska prismodellen visar på hur några olika produktattribut påverkar det pris som kunden är villig att betala för produkten. Till exempel bidrar en ökning i dragkraftsbehov med en hästkraft till en prisökning om 650 SEK. Dessutom visade det sig att en kultivator tillverkad av Väderstad-Verken inbringar ett högre pris i jämförelse med några andra konkurrenter.

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1. Introduction

In this chapter the reader is presented with the purpose of the study and with the related problem background of our subject. The meaning of brand equity and its relevance is discussed and clarified. Furthermore a description of the industry for agricultural machinery as such is consolidated in order to provide the reader an insight of relevant industry characteristics. The description of the industry ends with a clarification of Väderstad-Verken and its business. At the end of the chapter a problem formulation and aim for the study is stated.

1.1 Branding

In order to establish and develop a company's brand equity it is important to know which of the main factors the equities of a company's brand consists of. A general definition of brand equity is "the added value with which a brand endows a product" (Farquhar, 1989, p.24). A brand can be of interest for four different actors in the market (Melin, 1999, p36). These are the legislature, the owner of the brand, the consumer and the brand from a competitor's point of view. Therefore it is important to decide from which perspective the evaluation is conducted. It is of great importance to a brand manager to be aware of the factors that generate brand equity in order to differentiate the product from the competitors (Chan Su Park, Srinivasan, 1994). Enhanced brand equity from the customers' point of view results in that a company can charge a higher price for their products and maintain their current market share (Chan Su Park, Srinivasan, 1994).

A strong brand results in several advantages when it comes to a company that seeks to be successful in the market (Kotler, 2003). For example it is easier for a company with an established brand to legally protect innovations related to their products. In addition it is easier to maintain a loyal set of customers with a strong brand. Furthermore a strong brand makes it easier for the company to establish long-term relations with dealers and distributors. This is especially an advantage when launching new products.

The brand in itself affects the price a company can charge for its products. Given that this in turn contributes to the revenues it is important for a company to be aware of its brand value. A lot of a company's decisions are based on these values and in order to be able to make the right decisions it is important to be aware of the brand value. There are a range of methods that previously have been used in order to estimate brand equity (Kamakura and Russel, 1993). Based on the assumption that different products are priced regarding the utility bearing factors they are constructed of a hedonic pricing model can be used in order to measure the importance of these different factors (Rosen, 1974). The word hedonic implies the degree of satisfaction or the different characteristics of a good that generate utility for the consumer (Assarsson, 1991).

Different kinds of survey-based methods are perhaps most frequently used when it comes to measure brand equity (Chan Su Park, Srinivasan, 1994). By examining customer preferences and actual choice behavior an analyst is able to gain insight into the brand equity of different manufacturers'. This type of investigations is usually performed either by surveys or interviews.

1.2 The Industry for agricultural machinery

The demand for agricultural equipment in Europe is large and there are expectations of future sustained growth. In 2011 there was an increase of 35 per cent in sales of tractors and agricultural machinery in Europe (www, Nilehnteknik, 2012). According to manufacturers' forecasts, growth appears to be maintained even during 2012. CEMA who is a professional body for equipment manufacturers in Europe with 23 members from 9 countries suggests that sales will increase by further 5 per cent this year. The mission of CEMA is to represent the industry for agricultural machinery in Europe and their business has been going on for around 50 years. They strive to represent the entire industry from large multinational companies to small or medium sized enterprises. According to CEMA, sales of machinery for tillage operations are expected to increase in 2011 by 38 per cent (www, cema-agri, 2012).

The industry for agricultural machinery in Europe consists of more than 4500 manufacturers'. The production value exceeded 28 billion in 2008. 135 000 person are employed directly and further 125 000 persons in the distribution network and maintenance. Across the industry that include more than 450 different types of machinery where machinery for tillage and planting represent a considerable part (www, cema-agri, 2012).

1.2.1 Väderstad-Verken

Väderstad-Verken was founded in 1962 by Rune Stark in the village Väderstad in Sweden (www, Väderstad, 2012, 1). The company is still completely owned by the Stark family and today the second generation controls the business. The company has specialized in equipment for tillage and planting. The factory is still located in Väderstad but it is now a multinational company that operates in more than 30 markets through 13 completely owned subsidiaries except the Swedish office. In 2011 the recruitment of personnel was more than 100 people and the turn-over exceeded 1,7 billion SEK. A 35 % increase compared to the previous year.

Customer orientation is a central part in the day to day business "The farmer's business is our business" (www, Väderstad, 2012, 2). This is reflected in the business idea which describes the company's goal to supply modern agriculture with highly efficient machinery and methodology. In order to reach this objective in such smooth and effective way as possible Väderstad-Verken invests considerably in research and development both in terms of expanding existing product range and in terms of establishment of their business in new markets.

Väderstad-Verken is a large Swedish company in the engineering industry. They produce agricultural equipment such as planters and cultivators and is nowadays one of Europe's leading companies in this business sector (Elderud, 2007). Väderstad-Verken is continuously working in order to extend their product range and launch their products in new markets. Such development will be facilitated by a strong and well-established brand (Kotler, 2003).

The previously mentioned business idea highlights that customer focus is a central part for Väderstad-Verken. Therefore knowledge about brand equity from the customers point of view is of interest. Large engineering companies are often interested in the value of their brand so this type of studies has been conducted several times before, especially in the car industry.

1.3 The problem

In order to create and maintain a company's brand equity it seems essential from chapter 1.1 that the company has to be aware of which factors that contribute to brand equity. In the market for agricultural equipment there are several companies that offer the same range of product categories as Väderstad-Verken does. In this type of non-monopolistic market it is essential for a company to be able to measure the brand equity they possess for example in their pricing strategy and choice of strategy when launching new products (Kotler, 2003).

Agricultural machinery from different brands in a specific product category are from an objective point of view often constructed with the same set of components and hence they fulfill the same purposes. Since objectively the same type of machinery are sold for different prices to a different extent there seems to be something else than the objectively measured physical product attributes that customers are willing to pay for.

Since several companies are established and offer products for same purposes knowing what brand specific attributes that makes them attractive may explain differences in price and sales volume. By developing the product attributes that are most strongly related to the customers' willingness to pay preferences the company can charge a higher price without decreasing the market share and through this increase the turn-over for the company. In order to reach this it is essential to be able to measure the added value that a certain brand offers the company's products. Thereby it is important to be aware of how customers evaluate non-product related attributes that affects the perception of a brand.

Many studies have previously been conducted in order to measure brand equity for different companies operating in different sectors (Keller, 1993; Walley et al., 2007; Fetscherin and Toncar, 2008). This study examine some of these methods in order to measure which factors are perceived to contribute to added value for agricultural machinery.

1.4 Aim

A strong brand is a great asset for companies operating in a free and competitive market. Brand equity can arise from both non-product related and product related attributes. Non-product related attributes are non-tangible factors such as personal perception about dealer and manufacturer that not vary based on the specific product that the customer possesses. Product related attributes are for example traction requirement and weight that will be affected by the specific product regardless of brand. The study is based on the following objectives.

- Which non-product related attributes contribute to added value of the brand for manufacturers' of agricultural machinery for tillage and seeding.
- How does the market evaluate the brand besides specific product related attributes on soil cultivators.
- How do farmers and contractors in the Swedish market evaluate different manufactures of agricultural machinery based on their non-product related attributes.

1.5 Outline

The following is a summary description of the outline for this study. After the introduction chapter follows a literature review and different theoretical perspectives regarding brand equity. The literature review serves to clarify what previously has been written in this subject and support the authors in their choice of theoretical perspectives for this study. The method chapter describes different scientific approaches and which of them that is applied for this study. Chapter 5 describes the empirical study and how the collection of data has been performed, both for the survey-based part and, for the Hedonic pricing model. Some relevant results are also presented in chapter 5. These results are discussed and analysed in chapter 6. Finally comes a chapter with conclusions that serves to answer the objectives for this study clarified in chapter 1.4. A schematic description for the study is illustrated in figure 1.

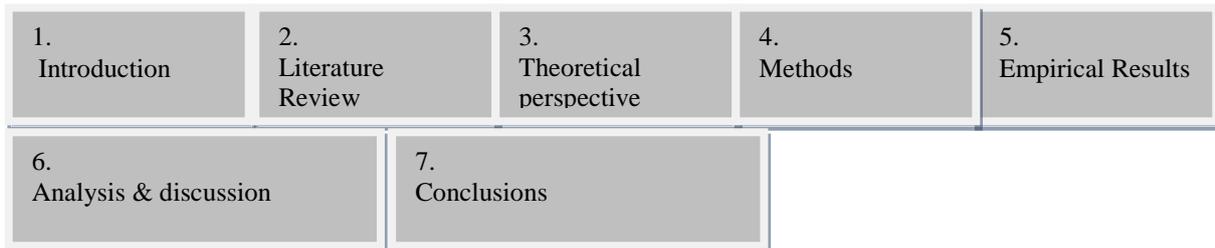


Figure 1. Illustration of the outline of the study.

2. Literature review

This chapter provides the reader with a comprehensive literature review of relevance for the problem in order to let the reader know what previously has been investigated regarding brand equity. The literature review also aims to clarify useful theoretical perspectives that are presented in chapter 3 and in the end generate hypotheses that can be tested in order to answer the objectives of this study.

2.1 Brand equity

There are many definitions of *brand equity* since the meaning of the term has been debated in many different articles. An early definition of brand equity is “the added value with which a brand endows a product” (Farquhar, 1989, p.24). Kotler (2003, p.422) in his turn defines brand equity as “The positive differential effect that knowing the brand name has on customer response to the product or service”. In reality this is shown by different customer responses to identical products from different brands. The amount that customers are willing to pay extra for one brand rather than another identical product of a different brand is one type of brand equity.

Aaker (1991) stated a widely accepted definition of brand equity. The meaning of the definition is that brand consists of several factors that can either increase or decrease customer perceived value of the product or services supplied by the company operating under the particular brand. The factor that either increases or decreases the value originates from the products brand name or logo.

A third definition of brand equity is listed in an article regarding valuation of brand equity in the context of the German automobile market (Fetscherin & Toncar, 2008). This definition originates from a study by Lassar et al, (1995. P.13) “The enhancement in the perceived utility and desirability a brand name confers on a product”. This results in the fact that a company can charge a price premium and increase the demand for their products and receive higher margins if the company has high brand equity. The definition of brand equity used in by Fetscherin & Toncar (2008. P. 135) is “The intrinsic value that a brand adds to the tangible product or service”. They assume that the differences between identical products are reflected by the brand equity. These differences are often in price observed in sales volume, market share and profits.

High brand equity is a method for companies to maintain a competitive advantage relative to other companies (Kotler, 2003). One advantage is that companies with high brand equity are in a good position when negotiating with distributors since customers expect certain brands to be available in the retail shelf. Brand equity generating factors from consumers’ point of view may for example be that a certain brand is associated with good quality and performance etc. This results in a leverage position for companies with strong brands. This in combination with the fact that companies with high brand equity often have a higher perceived quality enable the firm’s ability to charge a higher price. High brand equity often contributes towards high credibility and therefore it is easier for companies to launch new models. In addition a strong brand provides a more beneficial position in case of occasional price competition on the market.

A position on the market that has been generated due to brand equity will not be maintained automatically. Therefore a brand has to be continuously managed in order to sustain its position (Kotler, 2003). It requires constant maintenance and if necessary, improvements of

the brand equity building factors. This can for example be created by regular investment in R&D and successful advertising. A company that possesses high brand equity should be able to affect the financial part of the company (Keller, 1993). High brand equity should result in higher margins and not be affected by price increases so much due to a more inelastic demand curve.

As shown in figure 2 a company that faces an inelastic demand is not affected so much in terms of reduced quantity when prices increase. An elastic curve however, results in a much larger drop in quantity when the prices increase with the same amount. An inelastic demand may be due to the fact that there are few alternatives to the company's product or that the costumers have difficulties in changing their buying behavior. This event can partly be a result of high brand equity (Keller, 1993).

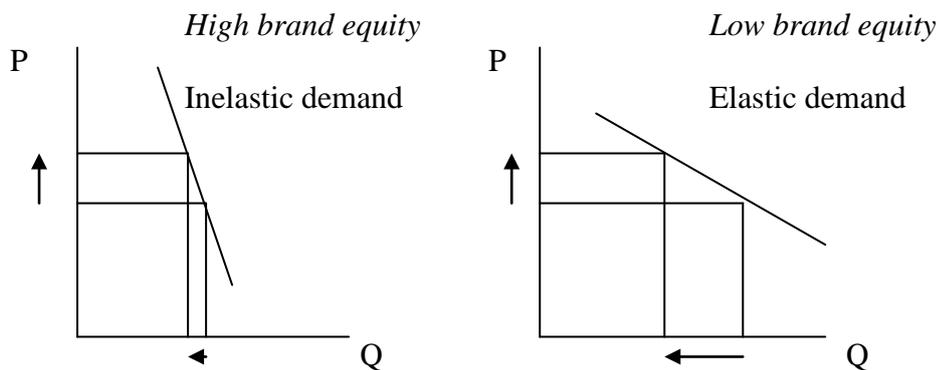


Figure 2. How brand equity leads to differences in price elasticity.

Brand equity can be discussed from the perspective of manufacturers, retailers or consumers (Atilgan, et.al, 2005). Fetscherin & Toncar (2008) argue that the perspective is divided into two different points of view, namely the company-based perspective and the consumer-based perspective. The company-based perspective is sometimes labeled the financial perspective and it measures brand equity in a top-down approach. It uses information from the company's previous income statements, cash flows and balance sheets. This approach however assumes that a relationship truly exists between brand equity and profitability. That makes it difficult to include marketing mix aspects such as product attributes and price.

Unlike the company-based perspective the consumer-based perspective measures brand equity with a bottom-up approach (Fetscherin & Toncar, 2008). Consumer-based brand equity can be valued in many ways. Most models with this aim collect primary data from consumers through interviews and surveys through which brand equity can be interpreted based on how it is perceived by the consumers. Instead of simple surveys, conjoint surveys may also work in order to measure brand equity (Walley, et.al, 2007). Based on peoples' overall evaluations the value of each attribute can be measured.

Another meaning of brand equity has been clarified as: "A brand is said to have positive or negative customer-based brand equity when customers react more or less favorably to an element of the marketing mix for the brand than they do to the same marketing mix element when it is attributed to a fictitiously named or unnamed version of the product or service" (Keller, 1993. P.8). It can further be described as characteristics associated with the brand that determine how customers react and respond, to marketing of the brand. The first part, characteristics associated with the brand, can be described as differential effects which are determined by comparing consumer responses to the marketing of a product or service from a

known brand and to an identical fictitiously named or unnamed product or service. *Brand knowledge* is defined in terms of brand awareness and brand image. *Response to marketing* can be defined as customer- perceptions, preferences and behavior arising from marketing mix activity.

The marketing mix has its origin in a theory by Jerome McCarthy, it is labelled “the four Ps” of marketing (Kotler, 2003). This model consists of the four Ps and they are: Product, price, promotion and place as seen in figure 3, for example this can be used when trying to decide the optimal price for a product or service and where to sell it and how to promote it.

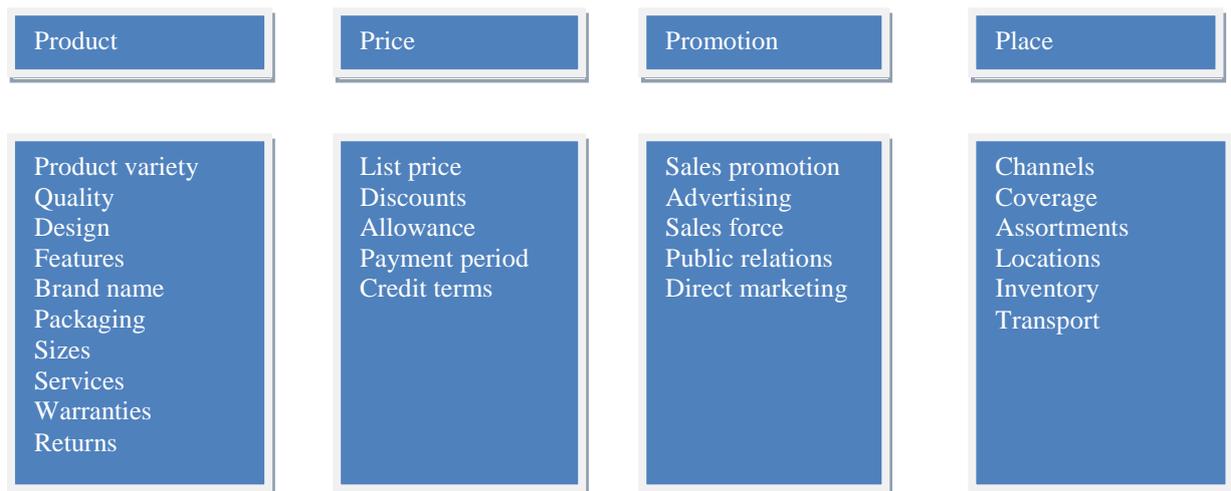


Figure 3. Four P components of the marketing mix (Kotler, 2003). Own Processing

2.2 Brand image

Brand image is defined as “the impression in the consumers’ mind of a brand’s total personality (real and imaginary qualities and shortcomings). Brand image is developed over time through advertising campaigns with a consistent theme, and is authenticated through the consumers’ direct experience” (www, businessdictionary, 2012). A shorter definition of brand image is: “perceptions about a brand as reflected by the brand associations held in consumer memory” (Keller, 1993, p.3).

Brand associations are all the other information linked to the memory of the consumer (Ibid). Depending on how *favorably, strong and unique* the brand associations are the more they are able to distinguish how to contribute to the brand equity. There are different types of brand associations that consumers have in their mind. Brand associations are divided into three major categories; *attributes, benefits and attitudes*.

Attributes characterize the service or product with different features (Ibid). For example what the customer thinks about service or product, and what is included in the purchase process. Attributes can also be categorized in different ways namely as *product related* and *non-product related attributes*. A definition of product related attributes is “the ingredients necessary for performing the product or service function sought by consumers” (Keller, 1993, p.4). This means that product related attributes relate to the physical composition of products or services. The *non-product related attributes* are the external effects related to the purchase of the product. Examples of non-product related attributes include *price information, packaging, user imagery and usage imagery*.

Price information is viewed as a non-product-related attribute because customers relate much more than only the product or service to the price (Keller, 1993). The brand itself can be associated with a certain price value ratio and can be viewed as an attribute by customers. The same goes for the *packing*. It is a part of the purchase but it does not normally affect the performance of the product or service. The *user and usage imagery attributes* originate from a consumer's own contact and experience with the brand, from other users of the brand, or via advertising or other information from the company behind the brands.

Benefits are the personal values a consumer can associate with the product attributes (Ibid). The benefits can be divided into three categories: *functional, experiential and symbolic benefits* (Park, Jaworski, and MacInnis 1986). The *functional benefits* correspond to the product related attributes and are often the actual advantage of the service or product (Keller, 1993). A need for problem reduction is also desired and is included in the functional benefits. An *experiential benefit* also corresponds to the product related attributes and describes the feeling of using the product. These benefits satisfy the experiential needs of the customer. The *symbolic benefits* are external benefits such as personal expression or social approval, i.e. the value of prestige and exclusivity of the brand.

Brand attitudes are defined as the consumers' evaluations of the brand (Ibid). This is of substantial importance because brand attitudes affect consumer behavior. One model for brand attitudes that is widely accepted is a multi-attribute formulation where brand attitudes form a function of associated benefits and attributes that associate with the brand.

2.2.1 Brand equity in B2B relations

It is important for companies to create customer value. Porter (1985) has proposed a way of identifying how to create customer value in the *value chain*. A company has to be able to handle many activities at the same time in order to create its products. In Porters value chain, nine activities are considered to be strategically relevant (Porter, 1985). Five of these nine are primary activities and the remaining four are support activities. The five primary activities in the value chain are: Inbound logistics, operations, outbound logistics, marketing and sales and last service. These activities are something the firm must examine in order to be aware of the cost and the performance of the activities. Since the firm's product passes through all of these activities, the product should gain some value in every step of the chain. This result can later be used for benchmarking against either other companies or either internal activities inside the company. Since the brand is an important source of competitive advantage, knowledge of branding is an important factor for the management team of a firm (Walley et al, 2007). Brand is an important factor which is included as marketing and sales activities in Porters value chain.

Results from the study conducted by Walley et al (2007) is that branding can play an important role in the industrial purchase decision. The literature review and interviews in that study especially found five important attributes that affects the purchase decision; brand name, price, dealer proximity, quality of dealer's service and buyer's experience of the dealer. It was for example possible to determine that brand accounts for 38.95 per cent of the purchase decision beside the price and service as accounted for 25.98 respectively 14.90 per cent. An overall finding of the study that was conducted in UK is that farmers are brand loyal both in their purchase of machinery and spare parts. This implies that there is a low degree in variation of brands that farmers do their purchases from.

2.2.2 Importance of R&D and innovations

In order for a company to be effective on the market, a clear marketing strategy is required (Mizik, Jacobson, 2003). Two processes lead to a successful and competitive outcome. The first process includes all the procedures used to increase and create customer value. Both when it comes to processes and products, innovations and production system are example of factors that contribute to customer value. The other process is how to appropriate value in the marketplace. Both these processes need to be combined in order to succeed in a competitive outcome.

According to Mizik and Jacobson (2003) it is the R&D section that builds a lot of value to the company. Many different sections of a company contribute to the creation of value but the R&D stands for most of it when it comes to innovative solutions. This is the cornerstone of value creation. Technological innovations make it feasible for the company to either produce new products or just update existing products in new ways. Both processes and products can be innovated and create value, something that customers will perceive as added value to the product by the brand (Mansfield et al. 1977).

Through a well-worked web page, companies are able to generate both economic value and also customer value by adopting well defined strategies. Page and Lepowska-White (2002) stated in their study that consumer value can be built in online companies. They refer to this as *web equity* and this originates from traditional brand equity with brand awareness and brand image. One way of measuring web equity is to find out if the web page differs from its competitors. For example how customers interpret information on the web page and how easily they can compare information with other web pages that belong to competitors regarding products and services.

2.3 Brand loyalty

A customer can be brand loyal to a certain company, to varying degrees. Customers brand loyalty towards different companies, brands and stores can according to Kotler (2003) be divided in four different categories.

1. Hard-core loyals: "Consumers who always buy the same brand".
2. Split loyals: "Customers who sticks to two or three different brands".
3. Shifting loyals: "Customers who shift from one brand to another".
4. Switchers: "Customers that is not loyal towards any brand".

(Kotler, 2003, p.294)

Depending on the allocation of the four types of brand loyalty on a market the company has to work differently. For example if a market consist of many hard-core customers the company may experience problems when trying to increase their market share. On the other hand, the company can ask their brand loyal customers about the company's strengths (Kotler, 2003). Split loyal customers may reveal information regarding products or brands that are comparable with the company. By studying shifting loyalty the company can learn about its weaknesses and try to correct them. Many factors play an important role in why customers act the way they do. Hence, it is important for companies to really understand the underlying reasons for certain decisions.

3. Theoretical perspective

Chapter 3 illustrates chosen theoretical model for this study that end out in hypotheses in order to answer the objectives.

3.1 Theoretical Model

A proposed theoretical model for this study is “different dimensions of brand knowledge” (Keller, 1993). That is a conceptual model of brand equity from the perspective of the individual consumer or customer. Brand associations can be classified into three major categories of increasing scope namely; attributes, benefits and attitudes (Keller, 1993). These categories can be further split according to the qualitative nature of the link between them. “Attributes are those descriptive features that characterize a product or service – what a consumer thinks the product or service is or has and what is involved in its purchase or consumption” (Keller, 1993, p.4).

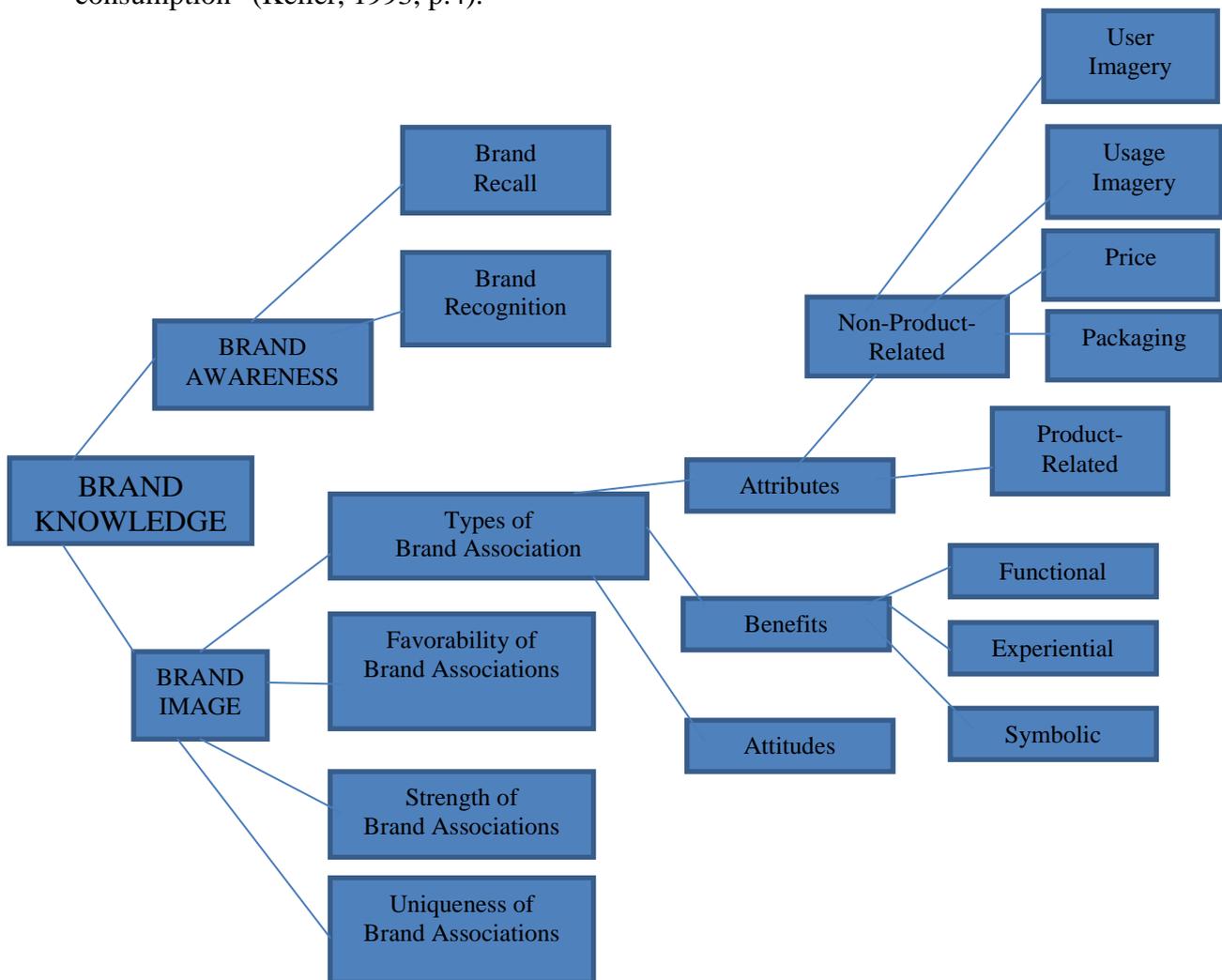


Figure 4. Model for conceptualizing, measuring, and managing customer-based brand equity (Keller, 1993) own Processing.

The model is useful for this study since it is possible to connect results from various authors in the literature review and include them in the model. Due to this structure it is possible to include most aspects that the researchers previously have found to contribute to enhanced brand equity in the model.

The classical marketing mix model is included in the definition of customer-based brand equity (Keller, 1993). “A brand is said to have positive or negative customer-based brand equity if consumers react more or less favorably to the product, price, promotion, or place of the brand than they do to the same marketing mix element when it is attributed to a fictitiously named or unnamed version of the product or service” (Keller, 1993, p.8).

The marketing mix is the collection of marketing tools that the manager is able to use in order to meet their marketing objectives in the target market (Kotler, 2003). The most essential marketing mix model consists of the so called 4 P:s namely product, price, place and promotion. Hence, establishing brand awareness and a positive brand image in consumer memory creates different kinds of brand equity depending on which element in the marketing mix that has been under consideration (Keller, 1993). Therefore response to marketing can be defined as perceptions from the consumer’s point of view arising from marketing mix activities. As seen in figure 3 chapter 2.1, different pricing strategies are included in the marketing mix as a part of the second P. These are list price, different kind of discounts, allowance, payment period and credit terms. Therefore offered financing alternatives in connection with the purchase could be a brand equity generating factor that originates from the category *non-product related attributes*.

Favorable beliefs and attitudes for the brand that are illustrated as different types of brand associations in figure 4 are often reflected in repeated buying behavior (Keller, 1993). Thus repeated buying behavior and brand loyalty are included in the model as well. Hence brand loyalty is evidence that a brand possesses customer-based brand equity.

Marketing communication may be helpful in order to create user- and usage imagery attributes as illustrated as non- product related attributes in figure 4 (Keller, 1993). Brands can sometimes benefit from different secondary associations and enhance its customer-based brand equity due to factors that are not directly connected to a specific product or service that the company supplies. Secondary associations may arise from primary non- product- or service- related attributes. This can for example be a positive association with the company itself, country of origin (e.g German as a well- reputed car manufacturer), distribution channels, a celebrity spokesperson as promoter for the company or an occasional event that somehow favors sales for the company.

Mizik and Jacobsson (2003) argue that research and development activities that end up in innovative solutions contribute to added value to a firm. This combined with five important attributes that contribute to added value in the industrial purchase decision namely; brand name, price, dealer proximity, quality of dealer’s service and buyer’s experience of the dealer may be included as attributes in the model as well (Walley et al, 2007). These factors affect different stages in Porter’s (1985) value chain. The value chain originate from the fact that companies operating in a free and open market only can win by creating and deliver superior value. To succeed with this a company needs to adopt the concept of a value chain and try to deliver customer value in each stage.

Studies about how to create economic value and customer value in on-line companies found that value can be created by having good web-page strategies (Page, Lepowska – White, 2002). The word web-equity was introduced that originates from brand equity with brand awareness and brand image. They found that high usage of a web-page may create economic value for the company. A professional and easily navigated web-page from the customer’s point of view will enhance perceived customer value. Both these factors are of course linked

together since if the web- page is useful and easily navigated this will contribute to a higher rate of usage.

An additional model that has been widely used when it comes to measure the value of different product- related attributes is the hedonic pricing model (Rosen, 1974; Assarsson, 1991; Fetscherin & Toncar, 2008; Lundell & Östlund, 2010). According to Kotler (2003) companies often claim that their products are differentiated, in order to be different from their competitors. In the case of agricultural machinery there are several brands and they having a lot of similar attributes. The price of this machinery depends on the attributes and the relationship between them can be described with a hedonic pricing model.

3.2 Hypotheses

Like the German automobile article (Fetscherin & Toncar, 2008) and the case study of the UK tractor market (Walley et. Al., 2007) this study uses hypotheses in order to test the theoretical model. All hypotheses originate from the theoretical model previous in chapter 3, since the study of the UK tractor market aims to examine “the importance of brand in the industrial purchase decision” the hypotheses in that study will be applicable for this study since purchase of agricultural machinery is classified as an industrial purchase.

Hypothesis 1

Farmers and contractors are brand loyal in their choice of agricultural machinery.

Hypothesis 2:

Farmers and contractors are brand loyal in their purchase of spare parts.

Hypothesis 3:

Following factors are important brand attributes in the relationship with dealers:

- 1) Distance to dealers
- 2) The experience of the dealer
- 3) Service- and after sales support

Hypothesis 4:

These factors determine to what extent the company creates customer-based brand equity:

- 1) The company is associated with innovations
- 2) Advertisement is clear and accurate
- 3) If customer use the webpage
- 4) If the webpage is professional and easily navigated
- 5) Use and perceived quality of financing alternatives
- 6) Relationship towards the company (sales representatives).

Hypothesis 5:

A hedonic pricing model reveals a positive relationship between the brand and other product-related attributes as independent variables and the dependent variable sales price.

4. Method

The method chapter clarifies different approaches that can be adapted in a scientific study. Further this chapter describes the method that has been used for this study. The method for data collection is presented to the reader in order to provide an insight and understanding of how this study is performed.

4.1 Scientific approach

Research can be divided into two different approaches (Arbnor and Bjerke, 1994). The first is research from an explanatory point of view called “explanatik” and the second is research from an understandable point of view called “hermenutik”. There is not a fixed separation between these approaches. Hence it is difficult to group certain kinds of scientists into just one of these approaches. Therefore grouping can seem irrelevant, but it has been shown that grouping is relevant in order to clarify fundamental similarities and differences between our method approaches.

The “explanatik” scientists reject any fundamental difference between natural science and social science (ibid). In real terms, they assume that methods prove their value in classical natural scientific research. These methods are applicable to material of social scientists. Of course the methods have to be adapted to the particular study, but logicians assume the explanation to be identical for areas of study. On the other hand scientists that make a distinction between methods of classical natural scientific research and social science is often called “Hermeneutiker“ or interpreters. They argue that the methods applicable for one of these science fields, despite modifications, will be unsuitable for the second field. They base their assertion on the fact that there is a crucial difference between explaining the nature and try to understand the culture (Arbnor and Bjerke, 1994).

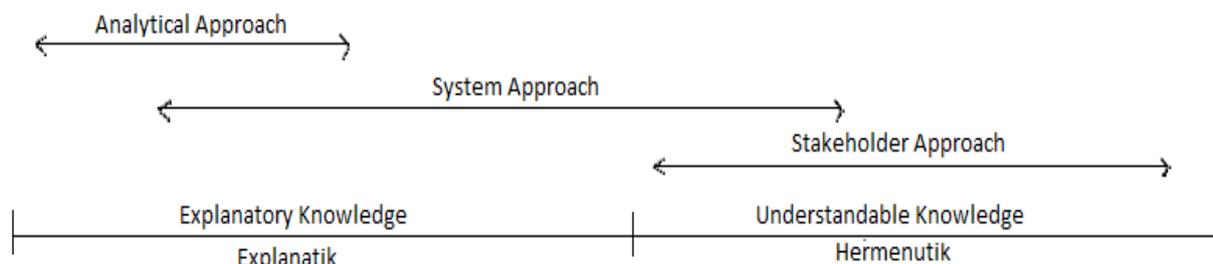


Figure 5. Scientific Approaches (Arbnor, Bjerke, 1994) own processing.

Figure 5 shows the difficulties in trying to view both approaches as strictly separate. The explanatory approach (to the left in figure 5) is often built up of quantitative research analyzed by mathematic and statistical estimations. The research subject is often divided and analyzed into smaller components where they are merged with its entire context. The hermenutik approach is completely opposite from the explanatory. Research from a hermenutik point of view aims to understand a particular situation instead of constructing a model that is applicable in a number of other studies.

4.1.1 Qualitative or quantitative method

In all types of research it is important to decide whether to choose a qualitative or quantitative approach (Jacobsen, 2002). The qualitative approach aims to produce a detailed and accurate description of the research subject. This approach is more dynamic and what exactly is being examined can be adjusted during the process. The main reason for that is the ability for the respondent to provide “free answers” instead of the limited, fixed alternative answers.

Quantitative methods are often criticized as operating with a methodological individualism. The individual is seen as the one generating more complex social phenomenon. Jacobsen (2002) does not want to see quantitative and qualitative methods in contrast to each other. Rather than arguing that qualitative methods are holistic and quantitative are individualistic, he places the methods at different locations on a scale. As illustrated by the system approach arrow in figure 5.

The quantitative approach is applicable when prior knowledge of the research object is adequate so the problem can be formulated in a relatively clear manner (Jacobsen, 2002). The prior knowledge is a prerequisite since categorizing is needed before collection of data. The respondent must experience the questions and relevant answer choices in order to take the survey seriously. The method is useful when describing the extent of a certain phenomenon. When constructing a questionnaire it is of great importance that the aim of the questionnaire is specific and distinct in order to be able to construct the questions in an understandable way (Troost, 1994). As a result, all questions should contribute to the objective.

4.1.2 Reliability & validity

When a researcher uses a quantitative approach for his study it is important that the questionnaire fulfill the requirements of reliability and validity both in its structure and at the situation of responding (Troost, 1994). Reliability means that the study is stable i.e. the surrounding situation is equal for all respondents so that there will be no differentiation in their experience. This ensures that the answers are not influenced by random factors and the respondents' occasional change in mood. In order to summarize the questions, they must be delivered in the same manner and conducted under the same circumstances for all respondents.

Reliability can be categorized into four components (Troost, 1994):

Congruency (similarities in questions that aim to serve same purpose),

Precision (the answers should be registered in the same manner or in the way in which the respondent answers if it is a survey- based interview)

Objectivity (minimize differences in how different interviewers register answers)

Constance (the attitude or phenomenon would not vary over time)

Validity and reliability can be related to each other (Troost, 1994). For example, if the questions are formulated in a way that causes a lot of respondents to misunderstand the question then both reliability and validity will be low. But in the same case, reliability can be high because it is possible to measure something else that was intended with the survey from the beginning. Validity of the questions is to what extent the answers can be used in order to answer the aim of the study. If, for example, the researcher is interested in the economic situation of individualism, the questions that just focus on personal income regardless of any surrounding factors will not fulfill the requirements of validity. There can, for example, be a person with relatively high annual income but this person is perhaps responsible to provide

for a family that consists of five members. Hence the economic situation can be rather stressed even though there is high income. As a result, if the questionnaire does not include factors such as family situation the results will not be valid.

4.1.3 Statistical approach

The term *regression* was coined in a paper by Francis Galton in 1886 (Gujarati & Porter, 2009). Galton found that if tall parents have tall children while short parents tend to have short children. When the average height of children born of parents of a given height was being studied it appeared that the height tended to move or *regress* to the average of the entire population. Hence the first regression analysis was conducted.

A regression analysis is a way of finding relationships between one or more variables (Sen & Srinivasan, 1990). This is used for two reasons: it can predict the future out of historical data and it can measure the strength between the different variables. Rosen's model (1974) is a general model that analyses the supply and demand of the attributes for differentiated products. Regression analysis can be used in a linear regression model for marketing studies in order to estimate components that affect the value of the firm (Allen, et. Al, 2005), for instance to what extent different components affect the demand function of the product from a particular firm. The general function for this purpose is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_n X_n \quad \text{Equation 1.}$$

In equation 1, Y is the quantity demanded of the firms' product (Allen, et. Al, 2005). α is the term for the intercept, X_1 to X_n are the different components that affect the demand function such as advertising, product price, disposable income of consumers and so on. β_1 to β_n are the values that the regression aims to estimate. In a simple linear regression, β represents the marginal effect which one change in unit in the independent variable (X) has on the dependent variable (Y). This describes how one variable relates to another.

In a simple regression model there is only one independent variable X (Allen, et. al, 2005). In practical applications it is often important to include two or more independent variables, i.e. a multiple regression model. Regression analysis is calculated in statistical computer programs such as Minitab, SPSS or Excel.

4.2 Method for this study

From an objective point of view it seems that goods from different brands can be sold at different prices even though they fulfill the same purposes. Based on this the brand must have a value in itself that customers are willing to pay extra for (Fetscherin & Toncar, 2008).

From the theory chapter it is clear that brand equity originates both from product- related and non-product related attributes. A survey-based method is used in order to measure how non-product related attributes affect the brand equity (Walley et al, 2007). In addition the hedonic pricing model has previously been used in order to measure brand equity in the German automobile market (Fetscherin & Toncar, 2008). This method can explain the economic value of different product related attributes. A hedonic pricing model has also been used in order to determine influencing factors on prices of farmland (Lundell & Östlund, 2010). It was of a background of sharp price increase of farmland during a more than 20 years period. The hedonic pricing model has its strength in its ability to determine how much in percent a particular factor affects the market price.

4.2.1 Method for Data Collection

This study uses both primary and secondary information. Primary information is used for the survey-based part of the study. This information is gathered through telephone interviews in order to examine how customers value different brands in the agricultural machinery sector, as well as how customers evaluate different, non-tangible, brand-related attributes. That data is needed in order to perform an evaluation of the sector for agricultural machinery in Sweden and provides the authors with insights in to which of these attributes and to what extent they contribute to added value for the product. The survey-based part will be performed through questions constructed out of the hypotheses in chapter 3.

The secondary information needed in order to perform the hedonic pricing model is collected mainly from different types of industry related publications. This is the same method that is used in the study regarding brand equity in the context of the German automobile market (Fetscherin & Toncar, 2008). This data is used to complement all the independent variables included in the hedonic pricing model in order to perform the regression analysis.

When constructing the hedonic pricing model the authors first have to decide which product attributes except the brand that are hypothesized affect implicit prices of soil cultivators. Soil cultivators were chosen since there are number of different manufacturers selling this product category with few “objective” differences in terms of how they are constructed. Hence the authors decided not to conduct the research regarding planters since that product often widely differs in the construction due to different manufacturers. It is easier to find comparable cultivators from different brands unlike planters that often differ between manufacturers’. For example it is not easy to find a planter from a random company with objectively measured same product related attributes as the Väderstad “Rapid”. The Swedish magazine “Redskap 2003” respective “Redskap 2005” accounts for a substantial part of the historical data material. On the basis of these magazines the authors have identified the product characteristics that seem to be relevant for the implicit prices of cultivators in order to create the database that is used for the regression analysis. In addition to the data relevant for 2003 and 2005 actual information for 2012 is collected from web pages and retailers of the different brands. Actual list prices have mainly been collected from dealers.

A quantitative method is adapted both for the hedonic pricing model and the survey-based part of the study. The hedonic pricing model measures how different product attributes affect the sales price, especially if it is possible to find any statistically significant relationship between brand and sales price since brand equity is the extra value added by the brand to the product (Chan Su Park, Srinivasan, 1994). A list of different characteristics on cultivators will be constructed based on empirical and quantifiable data. The actual manufacturer’s retail price is a function of these different attributes or characteristics. This is a way of finding out the relationship between the characteristics and the price. It is important to keep in mind that the hedonic pricing model provides an objective assessment of the market value. Hence, the survey-based part is a collected, subjective assessment of the value (Assarsson, 1991).

In terms of the scientific approach, this study is written from an *explanatory* point of view. The database that the regression originates from is gathered from real observations and comparisons between different cultivators where the measurements are objectively measured.

There are several methods for gathering information regarding people’s knowledge and attitudes toward different areas (Ejlertsson, 1996). This information can be collected either via

a face-to-face interview or a telephone interview. In quantified studies, a standardized interview is preferred where most of the questions have been designed in advance. A survey consists of a set of questions with mostly fixed answers and the respondent fills in the questionnaire by himself. However, a lot of information about surveys is also applicable on telephone interviews with standardized answers. In this study a questionnaire will be read to the respondent via telephone in order to increase the response frequency.

The survey-based part aims to measure customer opinions and attitudes towards different attributes and brands. Therefore, a scale system that assesses to what extent the respondent agrees to a certain statement is applicable (Eljertsson, 1996). There are several different scale types in order to measure attitudes. Some are more common than others. Perhaps the best known scale for measuring attitudes is the so called “Likert scale”. This scale consists of a number of statements within the same subject that the respondent should agree or disagree to on a five- or seven grade scale. Respectively extremes are named as strongly agree and disagree strongly. This study uses a five grade Likert scale. The choice of a five grade scale instead of a seven graded was decided due to convenience since the survey is performed through telephone. Too many alternatives tend to be too complex for the respondent via telephone compared to if they have the answer sheet in front of them (Ibid).

Regarding standardization and structuring of the questionnaire, it is important that these are met. Standardization means to what extent the questions and the situation are the same for all respondents (Troost, 1994) i.e. there is no variation; it is the same for all. This is a result of a high degree of standardization; a low degree of standardization is almost the opposite. With a low degree of standardization the respondent can ask questions, the order in which the questions are asked can vary etc. A high degree of standardization is needed in order to keep the variation low. If the questionnaire is highly structured, this could mean one of two things: either the questionnaire supplies fixed alternative answers, or in other cases, a questionnaire with high structure can be very structured i.e. the questions are only regarding the subject and no irrelevant information is included. Troost (1994) uses the term “structured” when describing the entire data collection and not when handling single questions. This is useful during telephone interviews since they are not suitable for complex and extensive interviews. A quantitative research method is generally more demanding in terms of standardization of questions and answer choices compared to a qualitative method that normally is allowed to be more flexible.

From the literature review we can see that people are willing to pay more for a product offered by a company associated with a strong brand compared to an identical “non-branded” product (Kotler, 2003). Hence, a situation arises that could be answered with a quantitative research method. According to Jacobsen (2002), there should not be any meaningful differences between the results from a survey-based method or short interview with standardized answer choices.

The survey-based part of this study collects data through short telephone interviews. This method is promoted by Bo Stark (2012) since Väderstad has experienced weak response frequency in previous survey-based studies.

In all types of survey-based research methods it is important to put a lot of effort in construction of the questions (Eljertsson, 1996). There are many rules of thumb that the researcher should try to stick to in the query structure. For example the questions must be clear and sharp so they just can be interpreted in one way. Time and room variables must be

precise, leading questions and issues of a sensitive character should be avoided. With sensitive issues, referred to, for example questions regarding income, alcohol habits, criminality, and sexual relationships and so on. Issues of this nature may lead to unwillingness to answer to the particular question or worse still create a negative perception towards the entire survey as such.

Testing the survey in advance would eliminate the risk of misunderstanding since questions that appear to be unclear and those that can be interpreted in more than one way can be revised (Ibid). Such pilot study is strongly recommended in quantitative surveys and the questionnaire for this study was therefore tested in advance on some farmers in order to improve the questions.

The German Agricultural Society (DLG) has for the last years published a report regarding which companies that supply the agricultural sector with machinery possesses highest brand equity (www, DLG, 2012). They construct it as an image barometer and present different variables and factors that has generated this position at the market. The questions are not product related but further brand specific. For example they conclude that the tractor manufacturer Fendt possesses the highest brand image among other tractor manufacturer.

When the characteristics of different products and different brands are evaluated it is common that some of the products have attributes that other products do not have. These different types of attributes that either exist or not can be included as dummy variables in the regression (Assarsson, 1991). If the attributes do exist they get the value 1, while if the product does not have the mentioned characteristic it gets the value 0. These are the only values a dummy variable can take. When data is being sorted into mutually exclusive categories, the dummy variables are used. In a multiple regression these qualitative independent variables can be included. These qualitative variables pertain to nominal data, which is why they can only take the values 1 or 0. The dummy variables will be included in an additive way as all other independent variables (X_1 to X_n).

In Assarssons' (1991) application of the hedonic pricing model when estimating pricing index for motorcycles, dummy variables are used for some different features. For example are dummy variables included in order to explain if it is a cruiser motorcycle or a sport motorcycle, 1 implies cruiser and 0 implies sport he also uses dummy variables in order to include type of power transmission in the model where 1 implies cardan and 0 implies chain. Fetscherin and Toncar (2008) use dummy variables in their regression to separate the brand of the cars they use when assessing brand equity in the German automobile market.

Equation 1 in chapter 4.1.3 shows the general regression model for estimating how different factors affect the demand function of a firm. The model that Assarsson (1991) used in his study in order to examine how different product characteristics affect the price will be applicable for this study as well. That equation is stated below.

$$P = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_n X_n \quad \text{Equation 2.}$$

4.2.2 Method for analyzing of data

The hypotheses have been constructed based on the theoretical model in order to answer to the objectives for this study. Therefore hypothesis testing uses a constructed test variable will be performed and the results are presented in chapter 5. The objective of this type of experiment is to determine whether a particular parameter value is appropriate or not

(Jonsson, Norell, 2007). The data collected from the survey-based part yields different parameter values to a particular question such as mean and standard deviation. With a normally distributed variable it is then possible to test the so called null hypothesis. In statistical terms this can be described as an assumption that μ is equal to μ_0 . Hence we get:

$$H_0 : \mu = \mu_0$$

The test function or test variable that is used in order to test the hypothesis is illustrated as (Jonsson, Norell, 2007):

$$T = \frac{\bar{X}_n - \mu}{S_n / \sqrt{n}}$$

Observed value of the test function is gained by changing μ in the formula above to the observed mean value in the present sample. If the null hypothesis is rejected the expected value of μ should be greater than an in advance chosen value and the expected value of the test function greater than zero. The limit for rejection of the null hypotheses is determined by the level of significance. Level of significance describes the probability to reject the null hypotheses when it is probable. Commonly used are 0,05 (5%), 0,01 (1%) or 0,001 (0,1%) level of significance (Jonsson & Norell, 2007). Some risk of rejecting the zero hypothesis when it is probable must therefore always be taken at this type of hypothesis testing of course the chosen value of α should be low. A level of significance up to 0,1 (10 %) can be accepted.

When H_0 is constructed in this way it is valid to use the mean for the sample as test- variable (Jonsson, Norell, 2007). In order to determine the intervals for the mean it is necessary to determine the probability of rejecting a true H_0 . This type of hypotheses testing will be used in chapter 5.

The results from the hedonic pricing model are analyzed and revised due to the characteristics of the variables that may affect the results. If two or more of the independent variables are highly correlated with each other, a case of *multicollinearity* can arise (Allen, et. al, 2005). This situation can be explained using equation 2 in chapter 4.2.1. If, for example, there is a linear relationship between the two X variables “advertising” and “sales campaigns”, the parameter values are not unbiased. When this event occurs it is not possible to estimate the coefficients since the data does not provide any information of the effect that one independent variable has on another independent variable that is being kept constant.

In a case of multicollinearity it will only be possible to estimate the effect that both independent variables together have on the dependent variable P, not the effect of each one. There will probably be some occasions of multicollinearity in the initial regression model for this study. Since all factors that the researchers hypothesize to affect the price of cultivators are included from the beginning as product characteristics there will probably be some events of linear relationships in between them. In product information brochures there are often information about working width, number of tines and distance between tines. It is not possible to deny that there is a linear relationship between them. Initially variables are included from the beginning and from there the model will be revised and analyzed in chapter 6.

The initial regression model includes all brands and models available from chosen source which is the Lantmannen publication “Redskap 2003” respectively “Redskap 2005”. They write about all brands that are available in the Swedish market even though some of them are rarely sold. Each extra brand added in the model results in one extra independent variable due to use of dummy variables for brand. Hence the model becomes more uncertain and the risk

for multicollinearity increases as the number of brands increases (Sen & Srivastava, 1990). Therefore the model will step by step be reduced to finally include only the brands most frequently sold in the Swedish market. That is the same method as adopted by Fetscherin & Toncar (2008) in their study regarding brand equity in the context of the German automobile market.

Our reference person at Väderstad is Bo Stark who is *Sales Director (Nordic Countries)*. Our University supervisor is Professor Hans Andersson at the Department of Economy, Swedish University of Agricultural Science.

4.3 Delimitation

The questions for the interviews are defined in a way so that as few questions as possible do not address product related issues. Also the interviewed farmers are those that operate a farm bigger than 200 hectares in the southern part of Sweden, from Stockholm to Värmland via Örebro and Västmanland and further south. Statistics Sweden has provided contact details to these companies that ended up in a number of 1851. The interviews include 100 to 150 respondents due to the magnitude of this study in addition this should be enough in order to make statistical conclusions. The random selection tool is used in order to choose the sufficient number. The hedonic pricing model consists of only soil cultivators. The main reason why soil cultivators have been chosen is because they basically are built in the same way regardless of brand.

5. Empirical results

This chapter explains the data used in order to answer the objectives for this study. The survey-based part serves to answer to which non-product related attributes that contributes to enhanced brand equity. The Hedonic pricing model is used in order to determine how different product related attributes affect implicit prices of agricultural machinery. First it is described how the statistical material has been collected then the results are presented.

5.1 Survey- based study

All relevant statistic results that the interviews provided are accounted for in this part. In addition some respondents made some extra comments on our statements these are partly presented here but even more useful in the analysis chapter.

Each question is connected to the answer alternatives on the five grade Likert scale so the results show to what extent each non- product related attributes contribute to enhanced brand image. First the respondent answers to a question regarding which attributes that he or she thinks contribute to added value for the company. Subsequently they will answer to how the particular brand that they made their last purchase from fulfils this. This part of the study is based on interviews in the same way as DLG performs their annual image barometer. The Statistics Sweden provides contact details to the respondents as previously mentioned.

The interviews strive as far as possible to answer which non- product- related attributes contribute to added value for a product. Hence the questions are constructed in a way so the results not should be product specific. Therefore questions like power requirement and maintenance have been excluded since the answers tend to be product specific rather than brand specific (Keller, 1993). That type of attributes is included in the hedonic pricing model instead. The questionnaire for the survey is listed in appendix 1.

As mentioned in the method chapter, ten farmers were interviewed as a pilot group in order to examine how the farmers reacted to different questions so the questionnaire could be revised. Some of the questions had to be deleted and reformulated before the main survey- based part for the study could begin. Some questions that were deleted turned out to be too product related hence they could not serve its purpose in order to examine non-product related attributes that contribute to enhanced brand equity. Some other questions turned out to be possible to interpret in different ways.

In all type of surveys it is important to be aware of the ethical aspect as mentioned in the method chapter. This is not a very big issue in this survey since there is not much inconvenience related to the purchase decision of cultivators. The question that is classified as sensitive is the one regarding financing since not all farmers are comfortable in their situation whether they need financing for their machinery. However, the question used in the survey is formulated so the respondents can answer the question whether or not they have used financing alternatives. Second issue related to ethics is that all respondents are not comfortable in revealing their age. After the interviews have been performed it is not possible to relate the answers to a particular respondent, even though the majority did not care at all about whether the interviews is performed in an anonymous manner or not.

The telephone-interviews were carried out between the 12th and 23rd of April 2012 and took approximately 10 to 15 minutes per respondent. Each question was connected to a number of predetermined answer alternatives. Questions designed in order to evaluate the importance of

different features was connected to alternatives constructed as the five grade Likert scale where 1 implies disagree 3 is neither agree nor disagree and 5 corresponds to agree.

The geographic area in which the respondents operate their farms is divided into six smaller areas characterized by different farming conditions and production sectors. The same classification as used by Agriwise has been adopted (www, Agriwise, 2012). Out of the 121 respondents, the geographic distribution of them is shown in figure 6.

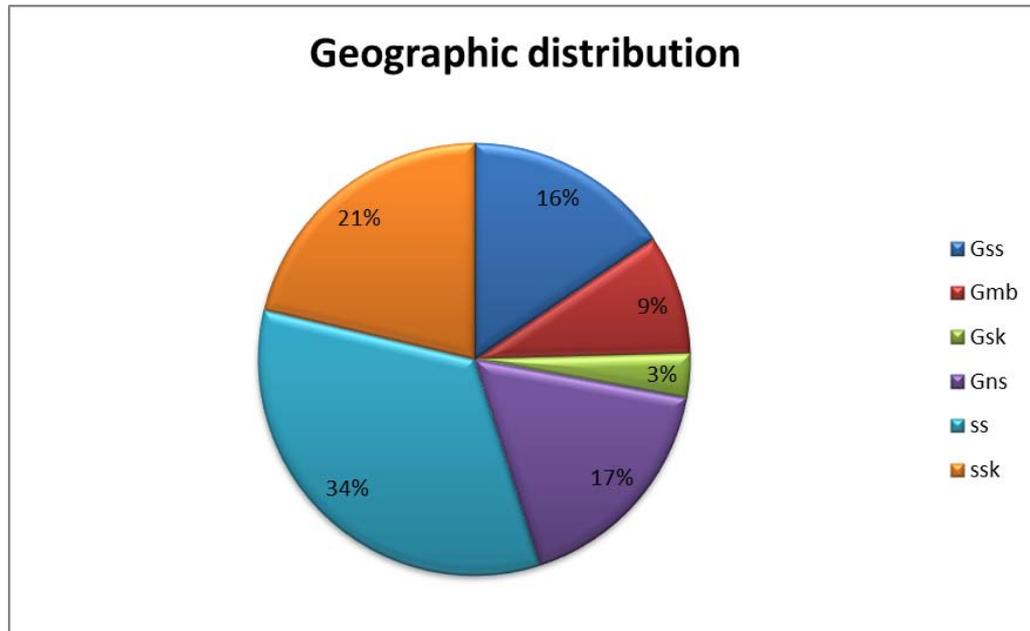


Figure 6. Geographic distribution of respondents.

The different abbreviations used in figure 6 are the meaning of some different geographical places in Sweden:

- Gss Götalands södra slättbygder
- Gmb Götalands mellanbygder
- Gsk Götalands skogsbygder
- Gns Götalands norra slättbygder
- Ss Svealands slättbygder
- Ssk Svealands skogsbygder

Aspects and hypothesis 1:

H1: Farmers and contractors are brand loyal in their choice of agricultural machinery

H0: Farmers and contractors are not brand loyal in their choice of agricultural machinery

In order to test the hypothesis regarding brand loyalty, four questions were formulated in order to determine whether the respondents are brand loyal or not. Subsequently, it is found that just two of them are needed in order to get an idea whether farmers are brand loyal or not. Questions regarding how brands affect their purchase decision and how their actual own collection of machinery looks like were formulated from the beginning. First the respondent was asked which his or hers latest machinery purchase of tillage and planting equipment was. After that they were asked if they will buy the same brand next time. From table 1 we can see that they will. However, this question is not sufficient since a specific product may determine their decision. For example the Väderstad Rapid is constructed in a specific way and therefore customers will buy this the next time since there are just a few alternatives if they like the

concept of that machine. Hence, there is no question about brand loyalty. Therefore a question regarding their brand diversification of their machinery as a whole was asked. The issue is summarized as:

$$H_0: \mu \leq 3$$

$$H_1: \mu > 3$$

In order to decide the value of μ for the different factors, four different categories of brand loyalty is used:

1. Hard-core loyals: “Consumers who always buy the same brand”
2. Split loyals: “Customers who sticks to two or three different brands”
3. Shifting loyals: “Customers who shift from one brand to another”
4. Switchers: “Customers that is not loyal towards any brand”

(Kotler, 2003).

Since the question regarding if the farmers machinery in general is bought from the same manufacturer appeared to not be significant, the null hypothesis could not be rejected.

Factor	Mean (\bar{X}_i)	Expected Value (μ)	Amount	Standard deviation (S)	T Value	Significance α
Will choose same brand next time of purchase	3,793	3	121	1,087	8,024839	0,1%-level
Machines bought to great extent from one brand	3,058	3	121	1,479	0,431373	Not significant

Table 1. Expected value $\mu > 3$ indicates that farmers are brand loyal (Jonsson & Norell, 2007).

It is not proven that farmers and contractors at the Swedish market for agricultural machinery are brand loyal. Since it is not possible to prove that there is a low variation in machinery brands among Swedish farmers, the null hypothesis regarding brand loyalty cannot be rejected.

Aspects and hypothesis 2:

H1: Farmers and contractors are brand loyal in their purchase of spare parts

H0: Farmers and contractors are not brand loyal in their purchase of spare parts

In order to test this hypothesis the respondent were asked to answer to what extent he or she uses original spare parts on the five grade scale. The respondent can be considered to be brand loyal if he or she uses the original wear and spare parts to a greater extent than unauthorized parts. Therefore the issue can be summarized as:

H0: $\mu \leq 3$

H1: $\mu > 3$

Factor	Mean (\bar{X}_i)	Expected Value (μ)	Amount	Standard deviation (S)	T Value	Significance α
High usage of original spare parts	4,124	3	121	1,249	9,899	0,1 %-level

Table 2. Expected value $\mu > 3$ indicates that farmers are brand loyal in their purchase of spare parts, at least shifting loyal (Jonsson & Norell, 2007).

This test proves that Swedish farmers are brand loyal in their purchase of spare parts. Hence the null hypothesis cannot be rejected.

Aspects and hypothesis 3:

H1: The quality impression of the relationship with the dealer will jointly be affected by

- Distance to dealers
- Personal experience of the dealer
- Service and after sales support

H0: The quality impression of the dealer will not be affected by:

- Distance to dealers
- Personal experience of the dealer
- Service and after sales support

In order to test this hypothesis the respondent was asked to answer to what extent he or she agrees to the statement that the quality impression of the dealer is affected by the factors listed above (Distance to dealer, personal experience of the dealer and service and after sales support). According to Jonsson and Norell (2007) 3 is a useful expected value since that proves H0. On the five grade scale 3 does at least implies that the respondent do not really know if a particular factor matters or not. Hence we get the following results:

H0: $\mu \leq 3$

H1: $\mu > 3$

Factor	Mean (\bar{X}_i)	Expected Value (μ)	Amount	Standard deviation (S)	T Value	Significance α
Distance to dealer	3,736	3	121	0,9289	8,715685	0,1 %-level
Experience of dealer	4,421	3	121	0,6423	24,33598	0,1 %-level
Service and after sales support	4,694	3	121	0,5139	36,25997	0,1 %-level

Table 3. Expected value $\mu > 3$ indicates that the particular factor affects the quality impression of the dealer

Table 3 shows the internal relation between the factors that affects perceived quality in the relationship with dealers. Service and after sales support is for example the factor that received highest mean value among Swedish farmers. However all appeared to increase the quality perception at a 0,1 % level of significance.

Aspects and hypothesis 4:

H1: The following factors contributes to higher perceived quality of the manufacturer

- Innovation
- Clear and common marketing
- Access to website
- Informative and easy to navigate website
- Possibility to get in touch direct to representatives of the manufacturer
- Offering financing in connection with the purchase

H0: The following factors are not expected to contribute to higher perceived quality of the manufacturer

- Innovation
- Clear and common marketing
- Access to website
- Informative and easy to navigate website
- Possibility to get in touch direct to representatives of the manufacturer
- Offering financing in connection with the purchase

In order to test this hypothesis the respondent was asked to answer to what extent on the five grade scale that he or she agrees that the factors listed above contribute to an enhanced overall impression of the manufacturer. Since a respondent that answers three on the question does not really know if he or she agrees with the statement the issue can in this case be summarized as:

$$H0: \mu \leq 3$$

$$H1: \mu > 3$$

Level of significance is calculated in the same way as previous cases.

Factor	Mean (X)	Expected Value (μ)	Amount	Standard deviation (S)	T Value	Significance α
Innovations	3,843	3	121	0,8267	11,21689	0,1 %-level
Marketing	3,347	3	121	0,9722	3,926147	0,1 %-level
Access to website	3,132	3	121	1,384	1,049133	Not significant
Easily navigated website	4,132	3	121	1,072	11,61567	0,1 %-level
Relations to manufacturer	3,802	3	121	1,188	7,425926	0,1 %-level
Financing	3,149	3	121	1,470	1,114966	Not significant

Table 4. Factors affecting the overall impression of a manufacturer

Table 4 shows the results from the questions that examine which factors that enhance the overall impression of the manufacturer. Access to website and financing alternatives in connection with the purchase will not increase the overall impression.

5.2 Comparison brand specific questions

From chapter 5.1 it is proven which non-product related factors that enhance the overall impression of a manufacturer of agricultural machinery. Three of them concern the relationship to the dealer that indirectly affects the perception of a brand. These are:

- Distance to the dealer
- Personal perception of the dealer
- Service and after sales support

In addition four non-product related factors are found to contribute to direct enhanced overall impression of the manufacturer. These are:

- Whether the company is perceived as innovative
- Clear and commonly seen marketing
- Easily navigated web page
- Good relations to representatives of the manufacturer

Based on these seven factors found to play a role in terms of enhancing the overall impression of a machinery manufacturer, the respondent was asked to answer how he or she believed that the company they had made their last purchase from fulfills these seven different factors. Since these seven factors are non-product related it does not matter which specific product that the farmer relates to the brand. The five grade scale is used which makes 35 to be the highest possible value a company can receive. 58 respondents answered the questionnaire based on machinery from Väderstad. 18 respondents answered on behalf of Kverneland and 30 respondents for Överum. Machines of other brands did also occur but they just received up to five respondents each which made it not possible to draw any statistical conclusions from them. How the three brands; Väderstad, Överum and Kverneland are related to each other based on received value from the seven non-product related questions is presented in figure 7.

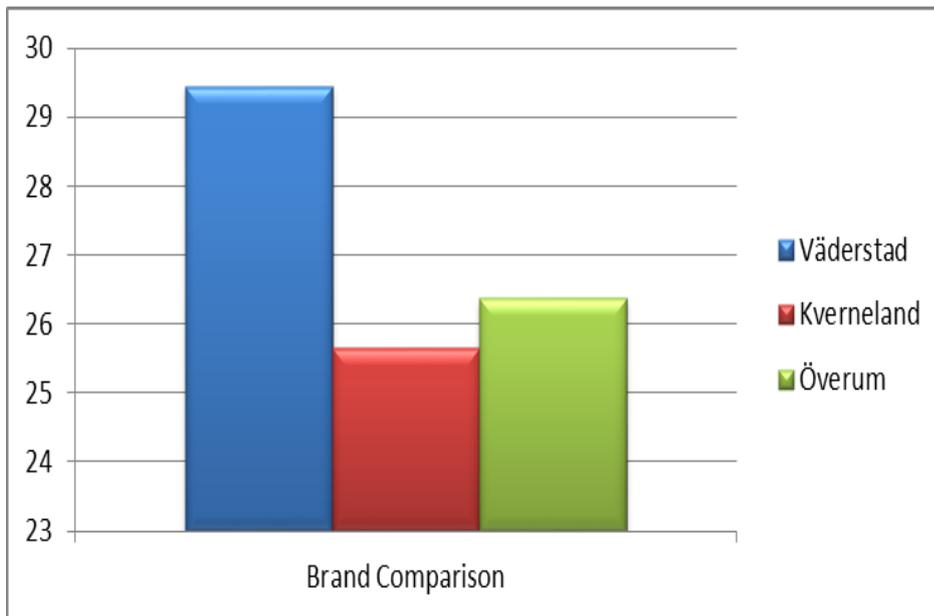


Figure 7. Comparison Väderstad, Kverneland and Överum

The result in figure 7 derives from received mean value regarding each of previously mentioned seven factors. They are presented for each brand in figure 8 to 10. In these figures it is possible to deduct received value for each of the seven factors. The maximum value on each question is 5. Generally a value above 4 is classified as very good when many respondents did not want to answer with a 5 since they argued that everything always can become better.

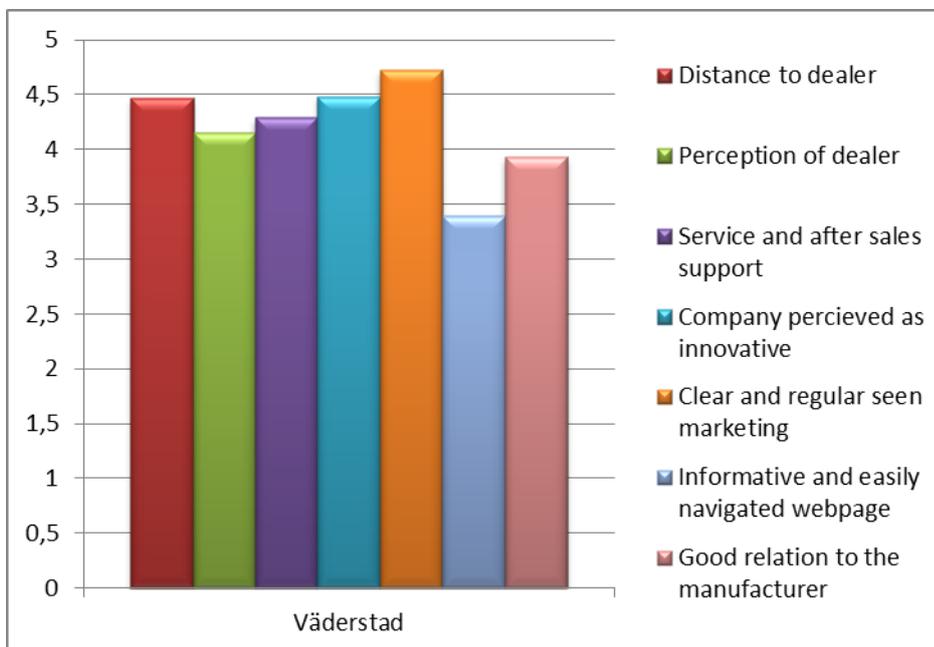


Figure 8. How Väderstad fullfills different brand equity generating factors

Väderstad receives highest mean value when all seven factors that is proven to enhance the brand equity of a manufacturer of agricultural machinery are summarized. Received mean value among the 58 respondents on each factor are presented in figure 8. It is for example possible to see that most respondents agree to that Väderstad has clear and regular seen marketing. In addition the factor whether they have “informative and easily navigated web

page” receives lowest mean value among the respondents that answers on behalf of Väderstad.

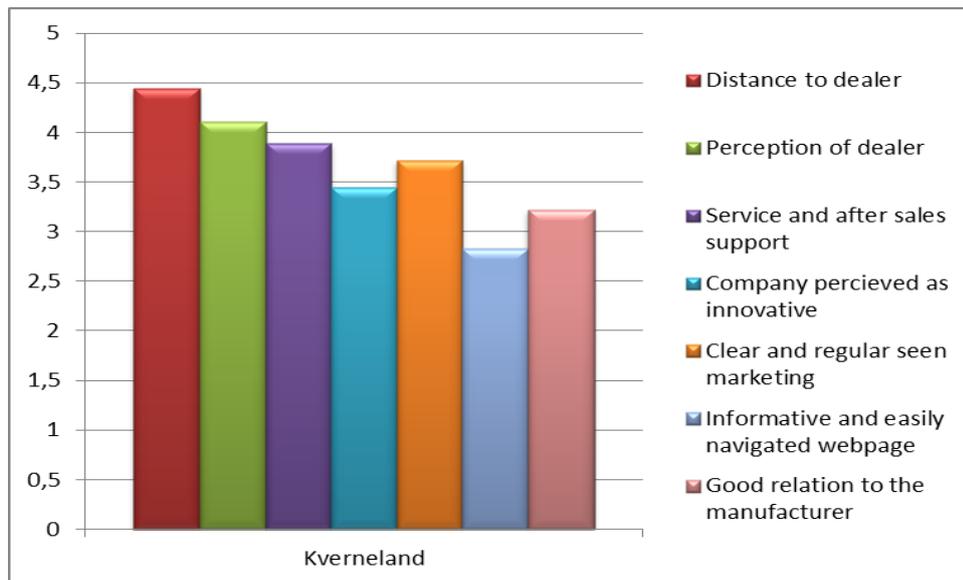


Figure 9. How Kverneland fulfills different brand equity generating factors

Kverneland receives lowest mean value in this comparison. This means that they in comparison among Väderstad and Överum generates lowest customer perceived brand equity. Figure 9 shows received mean value on each factor among the 18 respondents that answered on behalf of Kverneland.

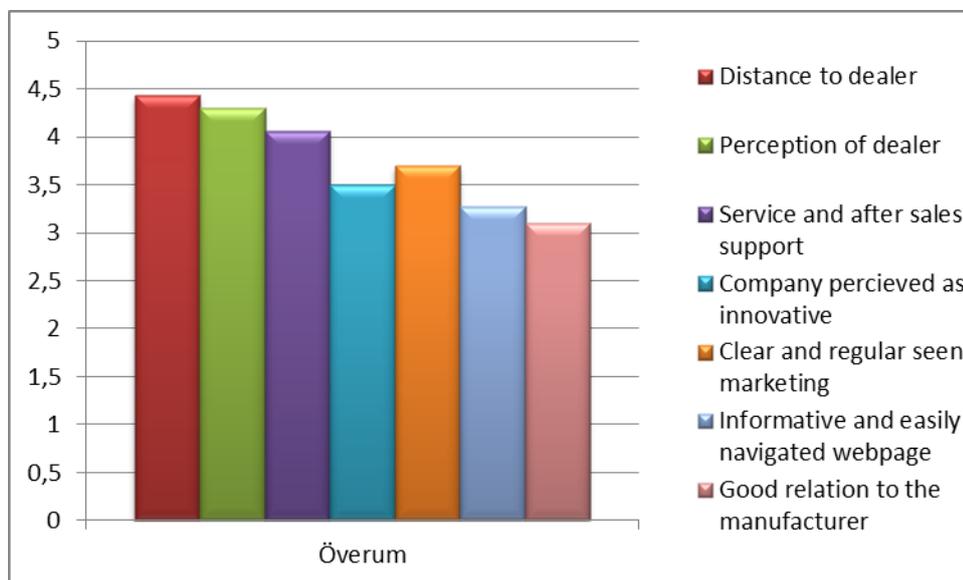


Figure 10. How Överum fulfills different brand equity generating factors

Överum receives a little bit higher mean value among the 30 respondents than Kverneland and less than Väderstad. The results in figure 10 show how they fulfill the seven different factors that are assessed. It is for example possible to see that Överum receives higher mean value on the three factors related to the relationship with the dealers among the four other factors that are assessed.

5.3 Hedonic pricing model

The characteristics that are illustrated as independent variables in the regression analysis is: Power demanded (tractor power measured in HP), weight of machine (measured in kg), number of models that the particular brand supply (often different sizes in the relevant product category), maximum working depth (measured in cm), number of tines, working width and transport width (measured in cm). In addition a range of dummy variables have been used for some characteristics in the same way as Assarsson (1991) did, described in chapter 4. Dummy variables are used for roller (1 for with, 0 for machines without roller), it is also used if the machine has processing plates or not in front of the tines (variable 1 for plates and variable 0 if there is no plates). Dummy variables are also used in order to describe from which year the data is relevant (2003, 2005 or 2012) and which brands that represent different observations. Market suggested retail price (MSRP) serves as the dependent variable P in the function. This part of the study is in contrary to the survey-based part focuses on product related attributes. The constructed database used for the hedonic pricing model is presented in appendix 3.

The regression analysis is conducted in order to predict the outcome which in this case is the “*market suggested retail price*”. The intercept is the value the dependent variable adopts when all the independent variables equal zero. Based on the independent variables coefficients, the intercept can be both positive and negative. The intercept serves as a starting point for the calculations made on P .

A statistical method labeled ordinary-least-squares (OLS) is used in order to estimate the regression coefficients. Regression coefficients are just estimates of the real parameters collected in the database. These coefficients are determined so that they minimize the residual sum of squares. When the regression has been made it needs to be interpreted and this is made through some key parameters. These are the coefficients, the intercept, p -value and the R^2 value.

The dependent variable price is affected by all the explaining coefficients, and the value shows how much each of them affects the dependent variable. These values can also take both a positive and a negative value, to see how much this affects the dependent variable the coefficient is multiplied with the value of the variable.

All explaining coefficients show how much they affect the dependent variable. These coefficients can also be both positive and negative. In order to determine how much this variable affects the dependent variable the coefficient is multiplied with the dependent variable.

The statistical level of significance for each of the variables is the *p-value*, which is a value of how much we can trust that the variables are correct. Normally significance level are been categorized in different levels. The most common levels are 1 per cent, 5 per cent and 10 per cent.

The *R-Sq* value states how reliable the model is. It measures to what extent a future outcome can be predicted out of the model. This value is somewhere between 0 and 1. If the value is 0 then the model does not explain any existing variation. If the value is equal to 1, the model explains 100 per cent of the variation in the dependent variable. In other words the *R-Sq* value states how high the coefficient of determination is.

In table 5 the initial results are presented when the regression is made using all existing variables. This model explains a large share of the variation due to a high *R-Sq* value. However the model cannot be considered to fulfill its purpose due to high *p*-values which indicate that the variables are not statistical significant. In addition, some of the *VIF*-values indicate multicollinearity in the model.

Variable	Coefficient	P-value	VIF
Intercept	186198	0,632	-
Hp	1184,6	0,001	14,230
Weight (Kg)	29,11	0,070	21,279
Number of models	291	0,966	3,350
Max working depth	-5113	0,172	20,203
Number of tines	1168	0,784	22,323
Tine placement	-2286	0,510	21,204
Transport width	-224	0,837	2,890
Working width	-304,0	0,194	11,885
Plates	161925	0,019	6,312
Roller	-9139	0,805	7,529
2012	121276	0,001	6,323
2005	-21273	0,529	6,203
Amazone	71333	0,366	6,530
Väderstad	-6563	0,844	3,224
Lemken	20729	0,699	8,318
Horsch	67003	0,166	10,195
Kongskilde	10944	0,796	5,223
Kverneland	78141	0,270	2,660
Kuhn	226746	0,043	6,113
Farmet	51239	0,516	3,381
Doublet Record	106637	0,168	8,887
Grégoire-Besson	-58542	0,357	4,226
Kerner	32995	0,631	2,581
Dal-Bo	69502	0,495	5,635
He-Va	4299	0,931	2,671
S = 41516,7			
R-Sq = 97,9%		R-Sq(adj) = 94,8%	

Table 5. Original regression results.

In order to establish a good model some of the variables are removed and deleted to the extent that is possible. The model has to have a high *R-Sq* value which indicates a high level of explanation. Low *VIF* values indicate no problem with multicollinearity and significant variables. The multicollinearity problem is often solved by reducing the number of *x*-variables in relation to observations. Problems with multicollinearity declines and the model becomes better (Sen & Srivastava, 1990).

Since the model did not fulfill the requirement of a good model with all of the *x*-variables included, the model was modified. It was modified by both adding variables to the already existing model but also by removing variables from the model. Methods exist for this procedure (Ibid). Either variables are added one at a time until the model fulfills the requirements or by removing variables with high *p-values* from the model with all variables until the model becomes satisfying. This could be done with help of a correlation matrix where the correlation and the *p-value* are listed for all variables. By removing variables one by one from the model it is easier to control the model so no variables with obvious impact on the aim or the hypothesis is excluded.

If a variable that is hypothesized to be important has a high *VIF-value* this problem might be solved by examining the correlation matrix to see which variable it correlates with. Then if the variable it correlates to, is been removed the *VIF-value* on the important variable might have dropped to a level that is acceptable (Ibid). This procedure can be repeated until the model is considered to fulfill the VIF-values for the different variables.

Variable	Coefficient	P-value	VIF
Intercept	-75426	0,084	-
Horse power	642,1	0,000	2,451
Weight (Kg)	46,406	0,000	1,608
Tines / meter	-11580	0,111	1,450
Max working depth	342	0,794	2,382
2012	133675	0,000	1,534
Väderstad	39631	0,076	1,270
Lemken	-26362	0,284	1,584
Horsch	18247	0,381	1,814
Other brands	-	-	-
S = 43708,2	R-Sq = 95,3%	R-Sq(adj) = 94,2%	F-value = 86,27

Table 6. Regression results with modified variables.

The model was modified by changing the way all manufacturers are listed in the regression. The major manufacturers available on the Swedish market are shown and the rest of the manufacturers are categorized in “Other brands”. In addition, the variable that indicates if the cultivators are from the year 2005 is removed. After the regression with all the existing variables has been modified the new regression model is estimated, and only three quantitative variables has a *P-value* under 0,1.

This model has a R-Sq(adj) value at 94,2 per cent and the *F-value* is high, 86,27 and is significant on a one per cent level. None of the VIF-values suggest any problem with multicollinearity. Both *Horse Power* and *Weight* are significant at one per cent level and the constant is significant at a ten per cent level and the number of tines per meter is almost statistically significant at the ten per cent level.

In the modified version of the original regression the variable *Tines / meter* has replaced the variables *Number of tines*, *Tine placement* and *Working width* which results in a better model with less multicollinearity.

6. Analysis and discussion

In this chapter the results in chapter 5 are analysed and linked together with the theoretical model in chapter 3 and the hypothesis stated at the end of chapter 3.

6.1 Survey- based study

The meaning about brand image can be explained by how a brand is perceived based on the associations customers keep in their memory (Keller, 1993). He divided also brand associations into three major categories namely; attributes benefits and attitudes. Attributes was in turn divided into product related attributes and non- product related attributes. Since the survey-based part of the study as far as possible should avoid focusing on a certain product the questions were formulated in a way that should try to avoid that the respondent answer differently to the questions regarding which specific product category they associate the brand with. Hence this part should as far as possible answer to which one of the non-product related attributes that contributes to enhanced brand equity.

Hypothesis 1:

According to Kotler (2003) there are various degrees of brand loyalty and he divided brand loyalty into four different categories, namely:

1. Hard-core loyals: “Consumers who always buy the same brand”.
2. Split loyals: “Customers who sticks to two or three different brands”.
3. Shifting loyals: “Customers who shift from one brand to another”.
4. Switchers: “Customers that is not loyal towards any brand”.

His theoretical model combined with the findings of Walley et al (2007) that brand may play an important role in the industrial purchase decision results in the hypotheses that Swedish farmers and contractors are brand loyal in their choice of agricultural machinery. The hypothesis origins from the statement in the theoretical model that brand image results in repeated buying behaviour.

***H1:** Swedish farmers and contractors are brand loyal in their choice of agricultural machinery*

***H0:** Swedish farmers and contractors are not brand loyal in their choice of agricultural machinery*

From the two questions formulated in order to test this hypothesis it is not possible to reject the null hypothesis since farmers did not agree to the statement that they to a great extent buy their machinery from the same manufacturer. However, it is important to keep in mind that phenomenon of behaviour like brand loyalty can be difficult to assess through a questionnaire since people in general sometimes wants to act in a particular manner but they are not consistent with this at the actual time of purchase. Brand loyalty can be classified as such a phenomena of behaviour. For example a parallel can be made towards the Swedish food industry. In surveys a lot of consumers claim that they always buy meat from livestock raised in Sweden but actual sales statistics reveal something else.

Many spontaneous comments on the questions regarding brand loyalty revealed that the respondents realized that the questions served to answer whether farmers are brand loyal or not even though this not was mentioned by the interviewer. From the discussion above it is therefore possible to infer that they adjust their way of answering. This may be a reasonable reason to why it is not possible to reject the null hypothesis.

Hypothesis 2:

H1: Farmers and contractors are brand loyal in their purchase of spare parts

H0: Farmers and contractors are not brand loyal in their purchase of spare parts

This hypothesis serves to answer if farmers are brand loyal in their purchase of spare- and wear parts. Those that do not buy original parts state that since they are able to find better quality parts from other brands they buy from them instead. Just a single respondent answered that the price is an important factor. It should however be kept in mind that questions about price due to Eljertsson (1996) can be classified as sensitive. One farmer that as of today operate a cultivator from Horsch states that it is the function, not the price that makes him to buy spare parts from other brands. It is possible to reject the null hypothesis to a level of significance of 0,1 %. An important aspect is that the dealer often has original spare and wear parts in the shelf and it may further be the fact that the dealer more than the brand of the parts affect the purchase decision.

Hypothesis 3:

H1: The quality impression of the relationship with the dealer will jointly be affected by

- *Distance to dealers*
- *Personal experience of the dealer*
- *Service and after sales support*

H0: The quality impression of the dealer will not be affected by:

- *Distance to dealers*
- *Personal experience of the dealer*
- *Service and after sales support*

From the results of the interviews it is possible to infer that all three factors listed above affect the quality impression of the relationship with dealers. Hence the null hypothesis for all factors is rejected. The questions were formulated in a way so that it is possible to see how the different factors are related to each other and which of them customers assess the highest value to and vice versa. The interrelation illustrated in figure 11 shows the mean value received when farmers are asked to assess to what extent they agree that a particular factor contribute to higher perceived quality in the relationship with dealer. Hence, a higher mean value indicates that the particular factor is more important than the others.

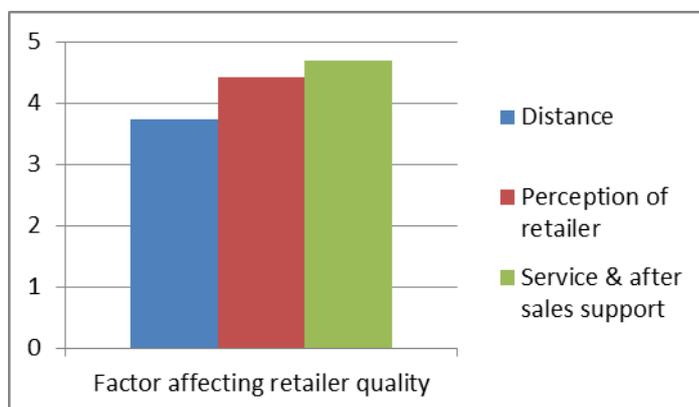


Figure 11. Interrelation between factors affecting quality perception of dealers.

Distance to dealer

According to Walley et al (2007) distance to dealer is one important attribute that contributes to enhanced brand equity in the industrial purchase decision. As seen in the result, Swedish farmers also value the fact that the physical distance to their dealer is relatively short. The null hypothesis for this factor as a non-contributing factor to the quality perception of the dealer is rejected. However, a general perception already on this first question is that the physical distance to the dealer does not seem to be very important compared to the other factors. One respondent states: “When I am sitting in the car, it does not matter if I have to drive 10 or 50 km further as far as the hospitality is sufficient enough”.

Personal perception of dealer

This factor is considered to be a very important factor for the quality impression of the dealer and received a mean value over 4,4 on the five grade Likert scale. Most of the surveyed farmers feel that there is more than one possible person to do machinery business with in their geographic area. If they do not believe that he or she is a smooth person to deal with nothing will hesitate them from to change dealer. In many cases people state during the survey that the personal chemistry towards the dealer is far more important than the actual brand of the machinery. Respondents often state the scenario when the dealer does not know how to operate and install the machinery in different conditions as the most annoying factor. As the machinery becomes more technical advanced and more expensive the requirements and expectations on the dealers level of knowledge increases. Many respondents believe that dealers not always keep up with this development. One reflection on this question was: “Young salespeople who themselves are working on-farm or has adequate practical experience of farming stands out as positive in this review”.

Service and after sales support

This was considered to be the most important factor that tends to increase the quality perception of dealers. Out of the 121 respondents this factor receives a mean value of nearly 4,7 out of 5. Many respondents named this as a quality generating factor even before the question is asked. This question refers not only to brand image created by the dealer since the after sales support in some cases are provided by the manufacturer itself. Regardless who provides the service this is considered to be a very important factor in order to create brand equity.

One respondent that as of today operates a Rapid planter from Väderstad assigned a high value on service and after sales support in the company. The farm is located at a remote geographic location and he told us about an occasion of down time during the peak season. The service technician appeared at his farm in less than 3 hours after the phone call. He went on to explain that as far as something works so well, the meaning of the other factors will be less important. However, most comments from other respondents indicate that all factors jointly affect the quality impression of the relationship with dealers as revealed in the statistical test as well.

Hypothesis 4:

H1: Following factors contributes to higher perceived quality of the manufacturer

- Innovation
- Clear and common marketing
- Access to website
- Informative and easy to navigate website
- Possibility to get in touch direct to representatives of the manufacturer
- Offering financing in connection with the purchase

H0: Following factors will not contribute to higher perceived quality of the manufacturer

- Innovation
- Clear and common marketing
- Access to website
- Informative and easy to navigate website
- Possibility to get in touch direct to representatives of the manufacturer
- Offering financing in connection with the purchase

The tables below show the variation in how the different factors contribute to enhanced brand image, calculated as the mean of the respondents answer. The highest mean value indicates the factor that is most important in terms of factors that increase the overall impression of the manufacturer.

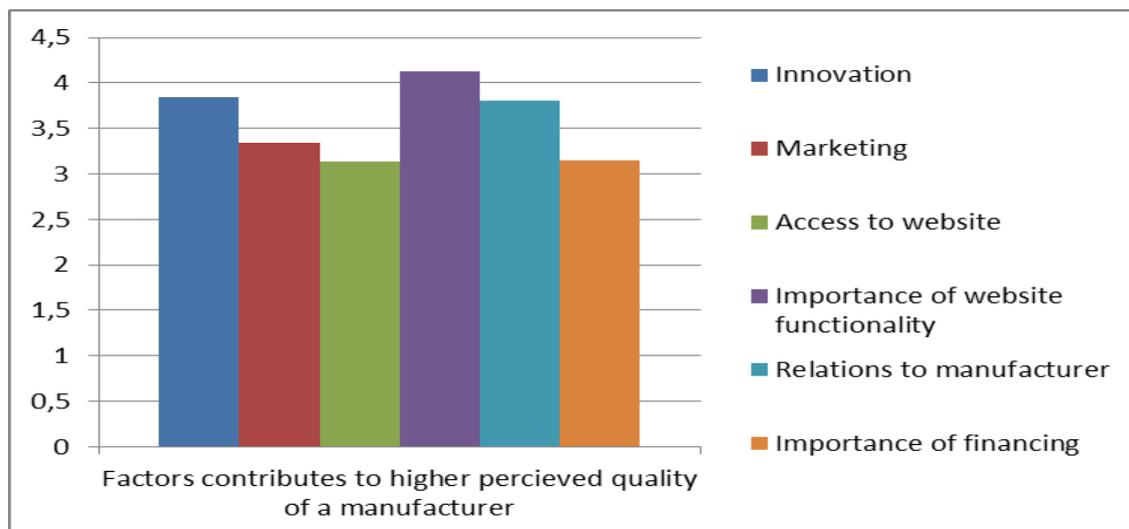


Figure 12. Results regarding hypothesis 4.

All factors listed in figure 12 are identified in the theory chapter as factors that are expected to contribute toward enhanced brand equity. However, from the results in chapter 5 it is not possible to reject the null hypothesis for all of them. Out of the 121 farmers that were asked it is not possible to reject the null hypothesis regarding access to website and offered financing alternatives in connection with the purchase as brand equity generating factors. This was not even possible on a 10 % level of significance for any of these both since there is too small difference between mean value and expected value used in the statistical test.

Innovation

R&D generate brand equity through innovations according to the theories in chapter 3. A question concerning innovations were asked in order to examine how the customers view

innovation in itself as brand equity generating factor for manufacturers' of agricultural machinery. The mean value on this particular question is 3,8 which indicates that many of the respondents agree to the statement that innovations is an important part of brand equity. It is not always apparent to customers whether companies put a lot of effort in R&D. However, since successful outcomes of such investments results in innovative solutions R&D and innovation are closely linked to each other. The innovations that actually reach the market are those that contribute to added value.

Even though a relatively high mean value on this question some respondents would not agree at all with this statement and just answered with 2 or even 1. Several of the respondents that assigned a low value to this statement argued that innovative companies that operates in a free and open market often rush the implementation of new products since it is important to be ahead of the competitors when launching new products. The rush might result in that not fully developed and tested products reach the market. Customers that experience problems with brand new machinery might obtain a negative perception towards the company.

Marketing

The theories regarding marketing as a brand equity generating factor is in this case derived from the user and usage imagery attributes in figure 4 in chapter 3. This factor arises from word of mouth from other users of the company's products or realized advertising campaigns by the company.

The questions are formulated in a manner such that just advertising conducted by the manufacturer may be assessed as a brand equity generating factor. Mean value for this factor as a brand equity generating factor is relatively low namely 3,347. Several of the respondents argue that they are not affected by advertising but it probably might have an effect on "others". In addition the agricultural sector in Sweden is relatively small which probably gives word of mouth an important role in the purchase decision. Hence, this may be relevant as a brand equity generating factor for this particular industry. Out of the perceptions of neighbors and farmer colleagues, farmers tend to have clear picture of the company's products when it comes to purchase. In addition, the agricultural sector is characterized by long term strategies in terms of investments due to a relatively high capital intensity relative to the profitability in comparison with other industries. This may be an additional factor why direct marketing does not play such an important role.

Access to website

According to the theories, a good web page with clear strategies may through the relatively newly interpreted word web equity contribute to brand image and brand awareness which are brand equity generating factors. This is also an important aspect for these types of companies to include in the marketing mix.

A common opinion among the respondents is that it is not crucial for a manufacturer to have an established web page. This could be a question about age. In the interviews we asked a question regarding their age. Some correlation could be seen regarding age and attitude towards questions regarding Internet and web pages. Another explanation could be that machinery today is so expensive that many customers prefer to gather information from the dealer. From the results in chapter 5 it is not possible to reject the null hypothesis for web page which means that this cannot necessary be seen as a brand equity generating factor in the market of agricultural machinery in Sweden. Rejection of the null hypothesis is not even possible at the 10 % level of significance.

The reason why access to web page received a relatively low value as a brand equity generating factor at the market for agricultural machinery in Sweden may be explained by the same reasons as why marketing received a relatively low value, even though this factor is statistically significant as a brand equity generating factor. Since word of mouth seems to be an important source of information in the market for agricultural machinery in Sweden other marketing channels as media advertising and access to web page play a less meaningful role. However, the respondents that assigned a high value to the web page view it as a prerequisite in order to conduct business. As mentioned earlier this is probably a generation related question.

Quality of homepage

According to the result of the survey-based part of this study it is appeared that if a company has a web page, it must be easy to navigate. It has to be informative and updated. A company that has a web page but fails to satisfy their customers regarding their demands on a web page will most likely end up with annoyed customers. This issue is especially highly graded but may also originate from how the question was formulated. In order to be objective and self-critical this question was very senior and it is possible to subsequently wonder who actually would disagree with this statement. This question might have been formulated in a leading way. It means that the respondents could figure out what answer the researcher were looking for and then graded the question based on what they think we want to hear.

Relations to manufacturers

A opportunity to direct offered relation to representatives of the manufacturer itself reduces the number of stages in the value chain, although the aim at every step is to create and maintain customer value. However, reducing one step in the value chain eliminates the risk that this stage does not contribute to an increase value at all. This might also make the value chain more effective when it comes to time of delivery etc. due to fewer stages between manufacturer and customer.

The question is formulated in a way to examine whether or not customers perceive the ability to get in touch directly to representatives of the manufacturer as a brand equity generating factor. The mean value for this question 3,8 is considered to be relative high on the five grade Likert scale. A general perception by the respondents is that dealer's technical level of knowledge not always is sufficient. There are some farmers that regardless what brand they had bought state that the sellers has a notable bad technology knowledge. As the machinery becomes much more costly and advanced from a technical point of view, a higher demand on the sellers are required. Sellers are today not sticking to this technical development. Conversely, the public perception regarding the manufacturer's own engineers and support are considerably high. General product training to all that mediate a company's products especially the dealers at other companies would result in higher perceived quality for the customers.

Importance of financing

From the theoretical model it is revealed that financing alternatives may contribute to enhanced brand equity via price in the marketing mix model. However, this factor received a relatively low grade. Hence, the null hypothesis regarding financing as a brand equity generating factor could not be rejected even at the 10 % level of significance. Many respondents answered that due to good relationships with their personal banker; they did not perceive financing alternatives offered by the manufacturer or dealer as a necessary feature.

Some of the arguments behind this statement are that dealers and manufacturers should not deal with financing since it is outside their area of expertise. The negotiating parts are not flexible enough compared to banks while others think it makes the entire process a lot more convenient. For some reason a lot of the respondent answered that they have never used the financing offered by the manufacturer or the dealer but they thought it was important that companies could offer it.

Even though the question is formulated in a way so the respondent just should answer to if they believe that financing in general contributes to brand equity this type of question may due to Eljertsson (1996) be categorized as a question of sensitive nature. This suggest that we do not know if all respondents' answer truthfully on the question regarding financing since it might be a sensitive topic for some respondents.

6.2 Hedonic pricing

This part of the analyze serves to answer to hypothesis 5 with help of the results from the hedonic pricing model.

Hypothesis 5:

A hedonic pricing model reveals a positive relationship between the brand and other product-related attributes as independent variables and the dependent variable sales price.

The original table with all variables received a R-Sq(adj) of 94,8 per cent. This R-Sq(adj) value takes into account the fact that the R-Sq tends to increase when more variables are added to the model, even though more variables not necessary contributes to an increased explanation level. This does the R-Sq(adj) compensates for. This means that the model explains almost 95 per cent of the variation for the market suggested retail price of the soil cultivators which is considered to be very high.

Variable	Coefficient	P-value	VIF
Intercept	186198	0,632	-
Hp	1184,6	0,001	14,230
Weight (Kg)	29,11	0,070	21,279
Number of models	291	0,966	3,350
Max working depth	-5113	0,172	20,203
Number of tines	1168	0,784	22,323
Tine placement	-2286	0,510	21,204
Transport width	-224	0,837	2,890
Working width	-304,0	0,194	11,885
Plates	161925	0,019	6,312
Roller	-9139	0,805	7,529
2012	121276	0,001	6,323
2005	-21273	0,529	6,203
Amazone	71333	0,366	6,530
Väderstad	-6563	0,844	3,224
Lemken	20729	0,699	8,318
Horsch	67003	0,166	10,195
Kongskilde	10944	0,796	5,223
Kverneland	78141	0,270	2,660
Kuhn	226746	0,043	6,113
Farmet	51239	0,516	3,381
Doublet Record	106637	0,168	8,887
Grégoire-Besson	-58542	0,357	4,226
Kerner	32995	0,631	2,581
Dal-Bo	69502	0,495	5,635
He-Va	4299	0,931	2,671
S = 41516,7			
R-Sq = 97,9%		R-Sq(adj) = 94,8%	

Table 7 From the result chapter.

As seen in the table the *Intercept* has a large value. This is important to keep in mind when all the other variables are analyzed. This is interpreted as of the starting point of the model is not zero but 186 198. Since not all of the variables are statistically significant not all variables are analyzed, but they are important to include in the model in order to receive as high R-Sq value as possible.

In the model that is developed after some modifications, only minor differences are shown regarding the R-Sq and R-Sq(adj) values. The original version of the Hedonic pricing model

approach has been useful in order to determine the effect these variables has on the sales price. Unfortunately not so many variables are significant.

Variable	Coefficient	P-value	VIF
Intercept	-75426	0,084	-
Horse power	642,1	0,000	2,451
Weight (Kg)	46,406	0,000	1,608
Tines / meter	-11580	0,111	1,450
Max working depth	342	0,794	2,382
2012	133675	0,000	1,534
Väderstad	39631	0,076	1,270
Lemken	-26362	0,284	1,584
Horsch	18247	0,381	1,814
Övriga	-	-	-
S = 43708,2	R-Sq = 95,3%	R-Sq(adj) = 94,2%	

Table 8. The modified model.

In this case the coefficient for the *Intercept* has increased to -75 000. It is of significant since the p-value is below 0.1.

The variable *Horse power* indicates the horse power needed in order to be able to operate the machine. This has a positive value of 650 which is a bit strange because a high level of traction requirements is not something to strive for, but the result could be explained by assuming that machinery who require a lot of horse power in general are larger and consist of more material than machines that do not require as many horse powers. This makes them more expensive to produce for the company. The regression results has revealed the observations that soil cultivators that need a lot of horse powers generally are larger hence more expensive.

Weight, the same arguments can be used when interpreting this variable. The heavier machinery, more material is used and the company is forced to charge a higher price for the machine in order to cover the production cost.

Tines / meter, this is a variable that states how many tines each machine has per meter. This variable was constructed later on in the process. The earlier model consisted of three variables stating the total number of tines, the distance between the tines and the working width of the machinery. But because these three variables correlate with each other they are substituted with just one variable. This variable has a *p-value* of 0.111 but since it is an important variable and it is so close to the 0.1 limit it is included. The coefficient for this variable is -12 000 which is not something we expected since it is usually perceives as a positive factor to have many tines per meter. This may be explained by the fact that observations in the initial data base are characterized by several tines per meter are those that are smaller and adjusted for lighter conditions. Hence, the market suggested retail price is lower for these observations. The most expensive and powerful cultivators are often characterized by slightly less tines per meter.

Maximum working depth. Each soil cultivator has a maximum working depth. This depth may vary from 12 to 40 centimeters. This variable receives 342 as a coefficient but the variable is not significant enough to be analyzed.

The variable *2012*, indicates that if the soil cultivator is from 2012 that increase the sales price with 134 000 SEK. This variable is a dummy-variable and the soil cultivators used as basic

data were either from 2012, 2005 or 2003. The latter one turned out to be too correlated with all the models from 2005 and was therefore removed. All prices are relevant for the actual year from which the data are gathered. Hence, in the model inflation has not been taken under consideration. It should reasonably therefore be a difference whether the machinery are manufactured in 2005 or 2012. However the consumer price index has just increased by 12,31 per cent between 2005 and 2012 (www, SCB, 2012). At the same time the agricultural machinery price index has increased by 23,6 per cent (www, SJV, 2012). It is therefore reasonable that this independent variable generates the highest difference in market suggested retail price.

Väderstad is the only manufacture in this case which gets a significant p-value. This estimate reveals that a soil cultivator with an equivalent set of attribute is 40 000 SEK more expensive if it is a *Väderstad* soil cultivator. Given this result, hypothesis 5 is true. This implies that *Väderstad* do offer added value on their machinery.

7. Conclusions

The study examines how companies can create and maintain customer- perceived brand equity. The study concerns the market for agricultural machinery in Sweden. The theory chapter ended up in some hypotheses useful in order to examine the objectives for the study. Out of the hypotheses brand equity has been examined out of some different aspects. The majority of the hypotheses turned out to be true.

The study is based on the following objectives:

- Which non-product related attributes contributes to added value of the brand for manufacturers' of agricultural machinery for tillage and seeding.
- How does the market evaluate the brand beside product related attributes on a product for example soil cultivators.
- How do farmers and contractors at the Swedish market evaluate different brands of companies that are manufacturing agricultural machinery based on their non-product related attributes.

7.1 Non- product related attributes

This part of the chapter outlines the non- product related attributes, which in the statistical data analyze turns out to be brand equity generating factors from the customers point of view.

Good relations with dealers itself contribute to brand equity for the manufacturer. The statistical tests reveals that physical distance, personal perception and service and after sales support all contribute to higher perceived quality of the relations with dealer. According to the more than 120 respondents service and after sales support turns out to be the most important single factor at least most respondents chose to answer “fully agree” to the statement regarding this as a contributing factor to higher perceived quality. In comparison with the case study regarding the UK tractor market, our findings that these three factors affect the quality impression of dealers in the Swedish market for agricultural machinery appear to be reasonable. Similar findings regarding quality perception in the relationship with dealers was also made in the UK tractor market (Walley et.al, 2007).

Other non- product related attributes that appear to enhance the overall impression of the manufacturer are;

- The company is perceived as innovative
- Clear and common marketing
- Informative and easily navigated webpage
- Possibility to get in touch with representatives from the manufacturer

In turn the factors financing alternatives and whether there is an ability to gather information from a webpage or not, are not shown to enhance the overall impression of a company that operates in the Swedish market for agricultural machinery.

7.2 Product related attributes

From the estimated Hedonic pricing model it is possible to draw the conclusion that the market is willing to pay a higher price for a cultivator manufactured by Väderstad compared to the other brands that are included in the final model and are commonly used at the Swedish market. According to the model a Väderstad would be 40 000SEK more expensive than if the

same soil cultivator were sold in a non-branded version. Väderstad is the only brand where it is possible to draw any conclusions at a level of significance below 10 per cent.

The observations in the model regarding soil cultivators are relevant either for year 2003, 2005 or 2012. Therefore these variables are presented as independent variables. Observation from 2003 and 2005 turn out to be highly correlated with each other therefore the last version of the model only shows whether the information about a particular machine is relevant for 2012 or not. From that it is possible to see that a machine built in 2012 is about 135 000 SEK more expensive than those that are not from 2012. Hence the year of manufacturing is the single factor that contribute to the highest difference in sales price. Many models of soil cultivators that existed in 2003 still exists today. Technological changes that affects the sales price may occur but the entire difference in price could not reasonably be explained by this.

7.3 Brand Comparison

Based on the non-product related attributes that was proven to increase customer perceived brand equity it was possible to make a comparison between the machinery manufacturers; Väderstad, Kverneland and Överum. The table 9 below shows how respondents evaluate these brands based on 7 different factors.

	Väderstadverken	Kverneland	Överum
Number of respondents	58	18	30
Received points	29,4	25,7	26,3

Table 9 Received total grade brand specific questions.

A mean value on the brand specific questions above four is considered to be very good since a lot of the respondent answered that: “Yes this is a very innovative company but everything can always be better so I grade this factor with four.” Since seven different factors are assessed, a mean value above four on each factor gives a total grade between 28 and 35.

7.4 Further studies

This study examines whether a number of non-product related factors contributes to enhanced brand equity or not. Except the three factors that were assessed in order to see whether they contribute to enhanced quality impression in the relationship with dealers or not, six factors has been assessed in order to decide if they enhance the overall impression of the manufacturer. There would of course be possible to investigate whether several other factors may contribute to enhanced brand image as well.

By including more respondents in the study there would of course have been more farmers answering for brands that are less represented in the market. Thereby resulting in a more comprehensive summary of brands and how they are evaluated in relation to each other.

Regarding the hedonic pricing model assessing the brand and product related attributes this study just focuses on soil cultivators. The model is proven to be applicable on agricultural machinery so it would be interesting to see it applied on other product categories. The entire study has been performed concerning the Swedish market. However, used method would be applicable in other markets and it would be interesting to see if there are any differences in results.

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Appendix 1. Questionnaire

Questionnaire for the interviews.

1	What is age?
2	How long have you been working as a farmer?
3	Which is your main production type (animal or crop production)
4	In which geographic area do you operate
5	Have you invested in equipment for tillage and palnting the last 5 years
1	Farmers are brand loyal in their choice of agricultural machinery
a	My choice of brand was to a greater extent affected by coincidence
b	I will choose the same manufacturer next time I change the relevant product
c	I tend to buy machinery from the same brand
d	My choice of machinery is in a little extent affected by the brand, a judgment is made for each occasion
2	Farmers are brand loyal in their choice of wearing parts
a	I use original spare parts
b	I buy spare parts where they are cheap regardless of brand
3	Following factors affects the quality in the relationship with the dealer
a	The physical distance to the dealer is important
b	Personal oppinion of the dealer is important
c	Service and after sales support is important
4	These facors has possitive influences on the overall impression of a company
a	The company is perceived as innovative
b	Distinct and regular marketing exists
c	It is important with access to website
d	It is important that the web page is informative and easy navigated
e	The relationship towards the manufacturers representatives is important (for example on fair)
f	It is important that beneficial financing options is available
5	What type of machine and what brand did you last buy
2	Farmers are brand loyal in their choice of wearing parts
2 bb	I experience the price of wearing parts for this company to be reasonable
3	Following factors affects the quality in the relationship with the dealer
3 aa	The physical distance to the dealer for this company is good
3 bb	Perception of the dealer for this company is good
3 cc	Service and after sales support for this company is good
4	How important are these factors for your perception of the company as a whole
4 aa	I experience this company as innovative
4 bb	The marketing in this company is known as clear and regular seen
4 cc	I visit the company's web page regularly
4 dd	The company's web page is informative and easily navigated
4 ee	The relation towards the company's representatives is good
4 ff	I'm satisfied with the company's offered financing alternatives
	At 1-3 what could have been better

Appendix 2. Soil cultivators

The following soil cultivators have been used to build the hedonic pricing model. Information regarding some models derives from 2003 and 2005 but the majority of them are from 2012.

Amazone	Centaur 5001-2 Super
He-Va	Master-Tiller
He-Va	Triple-Tiller 5m
Horsch	Terrano 5 FX Chassis
Horsch	Terrano 6 FG (without extension)
Horsch	Terrano 5 FM
Horsch	Tiger 5 AS
Horsch	Tiger 5 LT
Horsch	Tiger 5 MT
Horsch	Tiger 6 DT
Kongskilde	Vibro Flex VF-6323
Kongskilde	Delta flex 6000 H
Kuhn	Cultimer 6500
Kverneland	CTC
Lemken	Karat 9/400 KA
Lemken	Karat 9/600 KA
Lemken	Kristall 9/400 K(U)2A
Lemken	Kristall 9/600 K(U)2A
Väderstad	CS-500
Väderstad	TD 600
Väderstad	Swift 560
Väderstad	TopDown TD500
Väderstad	CS-500
Lemken	Smaragd delburen
Amazone	Centaur 6001
Horsch	Tiger AS 4
Horsch	Terrano 6 FG
Kongskilde	Vibro Flex
Kongskilde	Vibro Till 2800-60
Farmet	Hurican HX600PSVN
Doublet-Record	Toptiller
Doublet-Record	Mega Dan Mk II
Grégoire-Besson	Eurocult EC-670/29
Kerner	Stjärnhjulskultivator
Väderstad	CsQ-510
Lemken	Smaragd delburen
Horsch	Terrano FG Stubbkultivator
Horsch	Tiger As 4m
Kongskilde	Vibro Flex 2800
Kongskilde	Vibro Flex 4021
Dal-Bo	Dinco Max
Doublet-Record	Toptiller
Grégoire-Besson	Eurocult EC-670/29

Appendix 3. Data for the regression

MSRP	Hp	Vikt (kg)	Antal modeller	Maximalt arbetsdjup	Antal Pinnar	Pinndelning	Transportbredd	Arbetsbredd	pinnar / m	Tallrikar	Vält	2012	2005	2003
500000	250	8500	4	25	24	21	300	500	4,80	0	1	1	0	0
522400	350	5500	3	30	25	20	300	500	5,00	0	1	1	0	0
339600	280	4550	4	30	20	25	248	500	4,00	0	1	1	0	0
408000	300	4450	7	30	16	31	300	500	3,20	0	1	1	0	0
352000	240	4100	4	20	19	30	300	570	3,33	0	0	1	0	0
523000	300	6050	3	30	17	28	300	480	3,54	0	1	1	0	0
665250	450	6150	6	35	21	23	300	500	4,20	0	1	1	0	0
550870	370	5500	4	35	15	32	300	480	3,13	0	1	1	0	0
749560	400	7500	6	35	11	46	300	480	2,29	1	1	1	0	0
689000	550	5500	1	35	17	38	300	640	2,66	0	0	1	0	0
234300	200	2350	4	25	23	23	300	500	4,60	0	0	1	0	0
387200	325	4100	9	25	19	31	300	600	3,17	0	1	1	0	0
546200	250	6496	2	30	21	31	300	650	3,23	0	1	1	0	0
448000	320	4200	3	30	15	33	300	500	3,00	0	1	1	0	0
319000	240	3747	4	30	14	28	300	400	3,50	0	1	1	0	0
429000	360	4557	4	30	21	28	300	600	3,50	0	1	1	0	0
259000	180	3030	3	15	9	44	300	400	2,25	0	0	1	0	0
329000	270	3446	3	15	13	46	300	600	2,17	0	0	1	0	0
545000	350	6100	6	25	25	20	300	500	5,00	0	1	1	0	0
798000	400	8850	5	25	22	27	300	600	3,67	1	1	1	0	0
340000	200	3500	5	15	29	19	300	560	5,18	0	0	1	0	0
450000	300	6700	4	25	18	27	300	500	3,60	1	1	0	1	0
350000	350	6100	5	25	25	20	300	500	5,00	0	1	0	1	0
95000	180	1660	8	15	9	45	300	400	2,25	0	1	0	1	0
547000	290	10200	5	20	30	20	300	600	5,00	0	1	0	1	0
321000	370	5350	4	40	17	24	300	400	4,25	0	1	0	1	0
256000	240	4100	4	20	19	30	300	570	3,33	0	0	0	1	0
99850	160	1500	4	15	21	23	300	475	4,42	0	0	0	1	0
196900	175	3420	4	12	39	16	300	600	6,50	0	1	0	1	0
228000	180	5400	4	12	21	28	300	600	3,50	0	1	0	1	0
300000	230	5300	6	15	23	33	299	760	3,03	0	0	0	1	0
186250	220	2930	5	20	11	43	300	470	2,34	0	1	0	1	0
192000	300	2175	8	15	29	23	300	670	4,33	0	0	0	1	0
240000	200	4700	5	15	14	30	300	420	3,33	0	1	0	1	0
170000	165	3400	3	15	26	20	300	510	5,10	0	0	0	0	1
95000	180	1660	8	15	9	45	300	400	2,25	0	1	0	1	0
290000	320	4600	5	20	25	30	300	750	3,33	0	0	0	0	1
206000	204	3300	4	40	20	20	300	400	5,00	0	1	0	0	1
175250	175	4750	6	15	43	14	340	600	7,17	0	1	0	0	1
88900	160	1230	4	25	21	23	300	475	4,42	0	0	0	0	1
243300	240	5010	2	20	14	43	300	600	2,33	0	1	0	0	1
300000	230	5300	6	15	23	33	299	760	3,03	0	0	0	0	1
148100	300	2800	8	15	29	23	300	670	4,33	0	0	0	1	0

