What is Customer Value?
The Importance of Customer Relationship in the District Heating Industry

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Master of Science Thesis INDEK 2017:93
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Vad är kundvärde?
Betydelsen av kundrelation i fjärrvärmebranschen

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Abstract

The demand for district heating in Sweden has started to stagnate. It is partly because of its customers starting to look around for other heating methods, especially geothermal heating. District heating companies must find new ways to create customer value in order to gain and retain customers. They also need to become better at communicating the full value of district heating.

When analyzing customer value in the district heating industry, simplicity and reliability have been identified to be highly important. Further research also proved that district heating companies that operate on a local market generally earn a higher customer satisfaction. This derives from the fact that they more easily obtain a good customer relationship which is something that is lacking in the industry today.

In order to achieve better customer relationship, there are barriers that companies of district heating need to overcome. For example, they need to find ways to instill a sense of local presence among their customers which has shown to be of high value. Furthermore, something more needs to be added in their product offering in order stay competitive on the heating market. Heat has become a commodity and it is not sufficient when trying to achieve a high degree of customer satisfaction. Lastly, the average citizen has a limited knowledge about district heating and its environmental sustainability. We argue that more resources dedicated to marketing and information about the district heating would be beneficial for companies operating in the industry.
In order to improve customer value and strengthen customer relationship, three proposals have been presented; district heating shares, a retirement fund and an automatic price model.

**Key-words:** Heating market, district heating, heat pump, customer value, value proposition, customer satisfaction, pricing, marketing
Sammanfattning


Enkelhet och tillförlitlighet har identifierats som två väldigt viktiga faktorer vid analys av kundvärde i fjärrvärmeindustrin. Vidare fanns att fjärrvärmebolag som verkar på en lokal marknad generellt genererar högre kundnöjdhet. Detta härrör från det faktum att de generellt lyckas bättre i att bygga en bra kundrelation vilket är något som tycks saknas i branschen idag.


Med strävan efter att förbättra kundvärde och att stärka kundrelationen så har tre förslag presenterats: fjärrvärmeandelar, en pensionsfond och en automatisk prismodell.
Nyckelord: Uppvärmningsmarknad, fjärrvärme, värme pump, kundvärde, värde proposition, kundnöjdhet, prissättning, marknadsföring
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Förord
Vi vill tacka vår huvudhandledare på Pöyry Management Consulting, Robert Bergqvist, som erbjöd oss detta examensarbete. Han stöttade oss under arbetet genom att bidra med information och idéer för att föra arbetet framåt. Via Robert och hans kontaktnät fick vi möjlighet att intervjua chefer på många stora företag och utveckla arbetet vidare.
Vi vill också tacka Anna Moritz på Pöyry Management Consulting för hennes stöd.
Ett stort tack riktar till vår handledare på KTH, Fabian Levihn, som med sin goda insikt i fjärrvärmebranschen gav oss kvalificerade råd när vi behövde det. Fabian delade också med sig av sina kontakter så att vi kunde intervjua dem.
Vi vill speciellt tacka de företagsrepresentanter som vi intervjuade för att de tog sig tid och var villiga att dela med sig av sin kunskap.
1 Introduction

The aim of this chapter is to give an introductory description of the thesis. It is broken down into a background, problematization, purpose, delimitations and the thesis’ expected contribution.

1.1 Background

Throughout history, the access to heating has gone from being a luxury phenomenon to an absolute necessity. This has resulted in that the perceived value of having a stable and reliable heat distribution to one’s household has changed tremendously. Communicating the value of different heating methods has consequently become a great challenge for companies operating in the energy sector. District heating is no exception. Since its entry on the Swedish heating market in the late 1940s, it has grown to become the most common heating method in the country. Today, there are several energy companies that provide district heating to the Swedish population (Sjöström).

To be able to be competitive on a market, a company’s strategy should revolve around creating and delivering value to its customers (Golub et al., 2000). Historically, this has not been a priority among companies of district heating. The customer has just been someone at the end of the supply chain who they to a large extent break contact with as soon as the heat has been delivered. Even though this has started to change, there is still much more than can be done in this matter.

Today, there are a number of heating methods available. Depending on personal factors such as geographical location, financial situation and environmental interest, certain methods may be more suitable than others. This paper is primarily going to focus on district heating and how it can be competitive against other heating methods such as geothermal heating, through meeting customer value and strengthening the customer relationship.

1.1.1 Current State of District Heating and Heat Pump Markets

The heating market is today one of the biggest energy markets in Sweden. The need for heating and warm water in homes, facilities and industries make up one fourth of the total energy consumption, corresponding to 100 TWh, or about 100 billion Swedish kronor (Sköldberg & Rydén, 2014).

District heating has increased as a heating method by 50% from 1990. Today it accounts for slightly more than half of the total heating demand in Sweden (Svensk Fjärrvärme, 2015) and 90% of the multifamily houses are heated by district heating. The use of electric heating has decreased by 25% since 1990. This can be explained by the installations of heat pumps which utilizes the electricity more efficiently as they transmit heat. The installations of new heat pumps continue but the rate has decreased in the last five years due to signs of market saturation. In 2013, there were over one million heat pumps of any type installed in Sweden. 96% of these were installed in one- or two-dwelling buildings. District heating only provides heat to 12% of these houses. 83% of the area in multifamily houses were heated by district heating in 2013, and 72% of facilities (Eklund & Friberg, 2015).
The total delivery of district heating to end consumers in 2015 was 48.8 TWh, where 23.5 TWh was delivered to multifamily houses and 5.2 TWh to one- or two-dwelling buildings. The remainder was delivered to industry and various facilities (SCB, 2016).

In Figure 1, district heating deliveries through the years 2000 to 2015 are displayed (SCB 2000-2015). Overall, the deliveries have stayed on a constant level, with only a few peaks because of extra cold winters.

![District heating delivery, TWh](image)

Figure 1. District heating deliveries in Sweden 2000-2015

It has become more frequent that district heating companies introduce price models and contracts for power, rather than just for energy use. Energy peaks in the system are costly.

1.2 Problematization

The demand for district heating in Sweden has started to stagnate. This is partly because customers choose to switch to geothermal heating by which they believe they can lower their energy costs (Lygnerud, 2011).

In recent years, the competitive environment in the Swedish heating market has intensified. This is due to new heating methods that have entered the market, especially new types of heat pumps. Customers transition from district heating in the belief that they can reduce their energy cost and in addition, become less dependent on one heat distributor. District heating companies fail to communicate the full value of district heating which leads to a deteriorated relationship with the customer. This consequently causes district heating companies to lose customers.
1.3 Purpose
The purpose of this thesis is to investigate customer value in the district heating industry and how a better relationship with the customer can be achieved.

1.3.1 Research Questions
Two research questions have been formulated:

RQ1: How can a district heating company more accurately meet customer value in order to become more competitive on the heating market?

RQ2: What are the barriers regarding customer relationship in the district heating industry?

1.4 Delimitations
Although it plays an important part in decision making and implementation of district heating and heat pumps, government rules and regulations are limitedly considered in this report. Moreover, a geographical delimitation has been set to the Swedish heating market.

1.5 Expected Contribution
The contribution of this report is to communicate what customer value is in the heating industry and how to aid district heating companies in a competitive environment, especially against geothermal heating. Moreover, the industry is reminded about the importance of the customer relationship. The report aims to narrow the gap between customers and district heating companies.

As a general case, this report can provide leads in how an incumbent company can hold its position in a competitive environment.
2 Method

In this section, the methodology used in the study is presented and critically discussed. It is reviewed to ensure adequate reliability and viability.

2.1 Research Design

An initial problem formulation was presented to us by Pöyry Management Consulting which we later redefined in order to make it more specific and accurate for academic purposes. We defined the purpose and two main research questions were then formulated based on the purpose. Due to the explorative nature of the research questions, a qualitative approach was used. In qualitative research, an answer to a question is typically sought after by understanding the research problem from the perspective of the people that are involved. The collected evidence should give an insight to the problem and help to develop new ideas. The investigation produces findings that are not determined in advance (Mack & Woodsong, 2005). By using a qualitative approach, we could better examine a human phenomenon and conception in the means of soft values, opinions and ideas. It also gave us the possibility to produce additional findings that were not initially anticipated in the study. The study progressed iteratively, due to knowledge and material being found along the way (Northeastern University, 2005).

In the early stage of the work process, a work breakdown structure (WBS) was created to get an overview of the different tasks that had to be done and in what timeframe. Next, an extensive literature study was conducted in order to get a broad understanding of the subject matter. This was crucial for the sake of preparation and the performance of the interviews with industry representatives and private individuals for households on a later stage.

The collected material from the interviews was compiled and sectioned in favor for the purpose of the report. The findings were analyzed and compared, and where applicable, backed up and explained by theory earlier reviewed.

During the process of data collection and analysis, possible solutions to the research questions were discussed between us as researchers, and at a few occasions shared with the supervisors and modified for increased utility in practice.

When the project reached its final stage, findings and conclusions were presented orally as well as submitted as reports to Pöyry and KTH. Final conclusions, solutions and suggestions were then communicated to the companies with whom interviews were performed.

We had two supervisors at our disposal; one at Pöyry and one at the Royal Institute of Technology (KTH). They supported us through the work process by, for example, providing us with valuable contacts within the energy sector and arranging opportunities for interviews.
2.1.1 Interview Method

Interviews provide an understanding of social phenomena that cannot be obtained from quantitative methods (Gill et al., 2008). Hence, interviews were conducted to get both personal opinions from individuals who have experience from the industry but also to get a deeper understanding of certain market related topics.

Conducting interviews with industry representatives was crucial in order to get access to empirical knowledge and experience within the field. Since the paper’s focus is on customer value, we decided to do interviews with executives primarily within customer related areas such as sales and marketing.

The interviews were constructed in a semi-structured way so that the interviewees could think and talk freely about a particular subject (Galvin, 2014). This approach is not as controlled as structured interviews, but the questions were nonetheless standardized. The characteristic of the semi-structured interview is conversational with the aim to delve deep into a topic. The questions asked were descriptive. This was because we wanted the interviewee to describe and provide insights on relevant subjects (Harrel & Bradley, 2009).

There are different types of questions one can ask depending on what kind of answer one is aiming for. Since the aim of the interviews for this paper was to get the interview objects to speak freely about a subject, Harrel & Bradley (2009) argues that ”grand tour”- questions are best suited. These are broad questions that encourage the interviewee to speak and elaborate.

A total of eleven individuals were interviewed. Six of those were managers distributed over four major district heating companies, three were private individuals who are or once were customers of district heating and one was a manager at a major geothermal heat pump manufacturing company. A real estate broker was finally interviewed to confirm what buyers of a house or apartment look for and expect and what values they initially have.

Interview questions were sent to the interview objects a few days in advance to let them know about the subject matter. The duration of the interviews lasted for about one hour and each interview was recorded with the interviewee’s permission and later transcribed for practical reasons.

2.1.2 Literature Review Method

A systematic literature review was conducted which existed of reviews of reports, scientific articles and books. A systematic review includes a well-defined, systemic search plan with the aim to collect all relevant information on a specific topic (Uman, 2011). Since this literature review is based on defined research questions, a systematic approach is best suited.

Search tools that were used were KTHB Primo and Google Scholar. The goal of the literature review was to build a theoretical foundation on which the analysis and discussion could be based upon. It was also necessary in order to conduct fruitful interviews.
To be able to build an understanding of the theory regarding customer value, an extensive study on the subject was conducted. However, due to the broadness of the subject, it had to be narrowed down so that only the most relevant parts could fit in the report. First, a study about the mechanics of different heating methods was carried out. Next, an extensive review of how customer value is created and what companies can do maximize it was done. In the same area of research, the definition and meaning of a company’s value proposition is briefly presented in the report. However, having a solid value proposition is of little to no value if a company cannot communicate it. Therefore, basic concepts of marketing were also reviewed. Lastly, theoretical concepts of pricing were studied in order to get an understanding of the connection between price and customer value.

Main key words used in the literature search was: 'district heating', 'customer value', 'value proposition', 'pricing', 'customer satisfaction', 'monopoly', 'marketing', 'geothermal heat pump'

2.2 Reliability and Validity
Reliability and validity are two concepts that test the trustworthiness of a study. Reliability deals with to what extent a study is giving the same results despite being conducted at different places or points in time. Validity is concerned with whether the research was conducted in such manner that it can properly explain the research problem (Roberts et al., 2006).

There are plenty of ways to enhance reliability in a research study. For example, recording and transcribing interviews in order to receive an exact documentation is one way of achieving it. However, due to the fact that a sound recording omits visual idiosyncrasies such as facial expressions and body language, it is not a perfect method. It is consequently up to the interviewers to observe such things to the best of their ability, and mention it to the reader if considered to be of value. Primary sources, such as the interviewees in this paper, increase the validity since they are generally more accurate than secondary sources (Merriam, 1998).

When deciding upon interview design, a standardized, semi-structured approach were chosen. This was partly because it encourages the interviewee to be more elaborative, which has been discussed earlier in this report, but also because it was of great importance that every interviewee was asked the same questions as this enhances the reliability of the study (McLeod, 2014).

If the reader intends to replicate the interviews, example questions are listed in Appendix II. However, note that since the interviewees in this study are kept anonymous, answers from other interviewees are likely to differ.

All subjects that were interviewed at the companies were managers and therefore in adequate positions to represent their company’s views. Their experience increases the likelihood of accurate answers which in turn increases the validity of the interviews.

The larger the sample size, the more probable is that it better reflects the answers of the population, which increases reliability (Creative Research Systems, s.f.). A total of seven
representatives from four different companies were interviewed, representing different geographical areas. One company and one representative defend the interests of heat pump producers. The study could have benefited from having more individuals arguing for heat pumps. However, since the study is mainly focused on district heating, we argue that one representative from a major heat pump manufacturer is sufficient to make a fair comparison.

Three private individuals/tenant chairmen were interviewed, representing the needs and values from the customer’s perspective. One of them recently installed a heat pump, one has had one for 15 years and one has district heating and is not planning on switching to another heating method any time soon. Two of the interviewed were tenant chairmen for different buildings on the same street. Since they are both located in the same geographical area and belong to the same socio-economical group, the comparison between them is of high validity. It would have been desirable to have interviewed more since the study strongly focuses on customer value, and with more interviewees, we could have understood customer values more accurately.

In favor of validity, qualitative interviews or studies are less sensitive to a small sample size than what a quantitative study is, if the right people are interviewed (Eisenhardt, 1999), which we argue is the case.

2.3 Research Ethics
As researchers, we interacted with people who have shared their or their company’s knowledge and insights with us. The well-being of the participants was of top priority, and to not risk harming them or abuse the information we received, it was necessary to follow ethical guidelines. The Swedish Research Council presents four requirements that must be followed in order for a study in social science to be ethically correct in Sweden (Gustafsson et al., 2011), principles that have been used in the report.

- The information requirement: The interviewee is informed about the purpose of the study.
- The consent requirement: The interviewee has agreed to be studied.
- The confidentiality requirement: The gathered information is treated confidentially.
- The good use requirement: The gathered material is only used for the stated purpose.
3 Literature Review
The aim of the literature review was to compile secondary sources to serve as a compliment to primary sources. Theories and models were critically assessed and reviewed in order to attain a firm groundwork on which the discussion, analysis and results could be based upon.

3.1 Marketing
Marketing is a crucial part of the value adding process and has a substantial importance to what a product or service is. Bartels et al. (1965) defines marketing as follows: "Marketing is the process in a society by which the demand structure for economic goods and services is anticipated or enlarged and satisfied through the conception, promotion, exchange and physical distribution of such goods and services." It is a complex subject which includes producers, consumers, various middlemen and even governments. Bartels et al. (1965) propose three important points marketing managers should consider in their decision making; first, an understanding of the marketing system - its dynamics and mechanics so appropriate choices can be made. Secondly, an understanding of the market environment in which the business is operating. And thirdly, focus on consumer welfare and the maximization of profit.

One commonly known marketing concept is the “four P’s of marketing” which is going to be explained next.

3.1.1 The Four P’s
The four P’s of marketing, or the marketing mix, was developed by Edmund Jerome McCarthy in 1960 and has become one of the most used marketing models over the last decades (Harvey et al., 1996). Much of its popularity lies in its simplicity as it only contains four, easy-to-remember elements: product, price, place and promotion. It is a framework that aids marketing managers when developing both long-term and short-term marketing strategies. (Goi, 2009) compares the marketing mix to baking a cake; the baker can change the proportion of the ingredients depending on what kind of cake it wants to make. The marketing mix is based on the same principle; depending on the product, the different elements in the marketing mix receive more or less attention.

Over the last years, the four P’s of the marketing mix have become a target of criticism from marketing scholars. It is said to be too simple and too production-oriented rather than customer-oriented. It is also meant to be seen from a manager perspective where marketers play the central part. This, however, contradicts the very foundation of marketing where the customer is supposed to be the main focus (Goi, 2009). Another criticism against the model is the fact that it does not work well in the context of business-to-business, or B2B. Ettenson et al., (2013) argues that first of all, it puts too much stress on product technology even though it is no longer a means of differentiation, but a cost of entry. Secondly, it focuses too little on delivering superior value to customers.

3.1.2 Marketing versus Selling
Even though marketing and selling are two closely related concepts, it is important to distinguish the two. As depicted in figure 2, the focus of selling lies on the actual product while marketing is about customer needs. This ultimately leads to two different ways of
making profit: through the number of products sold or/and by making the customer satisfied which hopefully will make them come back and buy more (Harvey et al., 1996).

Marketing usually begins when the production process is completed. The responsibility of the sales department is to sell whatever has been manufactured in the production facility. The selling process then converts the product into money. With this being said, an alignment between selling and marketing has to be achieved in order to make the most out of a company’s business (Bhasin, 2017).

Selling can take the form of either personal or non-personal selling. Non-personal selling is carried out without physical interaction, for example through telephone or e-mail. Personal selling is the opposite; there is a direct, physical interaction between the buyer and the seller. McElroy et al. (1990) argues that personal selling must fulfill two conditions: first, a direct interaction between the buyer and the seller. Secondly, the seller must exert some degree of influence on the buyer.

3.1.3 Traditional Marketing and Relationship Marketing
Marketing can be divided into two categories: traditional marketing and relationship marketing. Even though both have their advantages and drawbacks, relationship marketing is said to be more effective overall due to its customer-oriented nature (Castro, 2015). Nevertheless, both categories will be briefly presented in this section.
Traditional Marketing

Traditional marketing, or transactional marketing as it is sometimes called, encompasses all types of marketing that does not include direct contact with the customer. It is the oldest type of marketing and is done through either mail, telephone, broadcast or print. Because of its simplicity, it is used by almost every company that sells products or services. But, which of those four channels a company uses is entirely dependent on the marketing budget. Large-to mid-sized firms tend to use all four channels in one way or another while smaller companies with limited budget often do their advertisement solely via newspapers or radio (Traditional Marketing, 2012).

Relationship Marketing

In contrast to traditional marketing, relationship marketing is about building a long-term relationship with the customer by providing information and being responsive to its needs. You can say that while traditional marketing focuses on increasing the number of individual sales, relationship marketing is about building an emotional connection with the customer (Olenski, 2013). This is why it is said to be superior to traditional marketing; the customer is more likely to come back and buy more if it has an emotional connection to the brand. Because of this, relationship marketing is done with a longer time frame in mind as the goal is to secure sales in the future (Castro, 2015).

3.2 Customer Value

One major challenge for businesses is to understand what their customers value. That is, what features and product specifications are important to the customer (Hashim & Laily, 2016). Despite spending large amounts of money on customer research, many companies are unaware of the reasons why they gain and lose customers. The reason for this is that they tend to ask the wrong questions when conducting customer surveys. Too much focus is on the company’s own products. Therefore, they fail to gather information about competitors which is key in a competitive market. One example of this is Cadillac. Despite having a solid customer base in 1980s, its perceived customer value decreased due to competition with BMW, Mercedes and Lexus. They ended up losing market share because its competitors improved faster, even though they scored high in customer satisfaction surveys. This shows that a company’s perceived customer value is highly dependent on the offering of its competitors, in other words; an understanding of the market is key.

Figure 3 explains how customer value is created. It all begins with understanding the customer and its needs in a well-defined market. Then, it is time to focus on what attributes the customer value the most and advertise accordingly. Once company strategists understand market-perceived value and its implications on the company’s competitiveness, they can use this information to create the most value for their customers which consequently leads to profitability, growth and shareholder value (Gale, 2009).
Another way of recognizing value is to take price into consideration. The model depicted in figure 4 shows the relationship between value and price and how different products are perceived differently depending on these two factors. It is important to understand the interaction between price and value since it is essentially the only two factors customers care about. The model tells us that if you have a reference product with the reference price and value of both 100, you can plot all other products in the market in relation to the reference product (Golub et al., 2000). It also tells us that products with higher price does not always possess higher value.

As shown in the figure, two products are plotted against the reference product. Product A has a relatively high price with an above-average score in value. Product B on the other hand has a lower price than Product A but scores higher than Product A in value. This means that the company behind Product B has a competitive advantage over the company behind Product A.
3.2.1 Customer Satisfaction
Making the customer satisfied is central in every type of business. It depends on various elements such as product quality, service, viability, cost etc. The concept of customer satisfaction is however not absolute, but relative. Many theories have been developed over the years trying to explain it (Yüksel & Yüksel, 2008). In this report, only the most relevant to our case will be briefly presented in the following paragraphs.

The Kano Model
The model was introduced in 1984 by Noriaki Kano and demonstrates the connection between customer requirements and customer satisfaction. It consists of five categories on a set of axes where the y-axis represents satisfaction and the x-axis represents the realization of customer requirements. The five categories are Performance, Threshold, Excitement, Indifference and Reverse (Verduyn, 2014). The model is presented in Figure 5.
When analyzing the model, one can see that by simply focusing on delivering basic/threshold attributes does not increase customer satisfaction after a certain point. A product needs something more to be able to differentiate itself from the competition. Another characteristic of the Kano model is that excitement attributes eventually becomes performance attributes, while performance attributes tend to become threshold attributes (The Kano Model. A Means of Analyzing Customer Desires., u.d.). This phenomenon is evident in various innovative industries such as telephones, computers and vehicles as new technology slowly becomes something that customers take for granted in new product generations.

3.2.2 Value Proposition
A common definition of value regards the price-quality ratio of a product or the difference between perceived benefits and perceived cost. Value is created when product attributes match specific customer needs (Kambil et al, 1996). A value proposition describes how a company's offer differs from that of its competitors and why customers buy from that company. If a company serves the customers' needs better than their competitors in one or several ways, it has a chance to enjoy increased profits (Lanning, 2000).

Products can be differentiated in various ways; features, design, service and support, location, timing, product mix, linkage between functions, reputation or a combination of these. Customers ultimately base their decisions on the benefits a product offers, not its characteristics per se. Products with higher quality do not necessarily create a higher value proposition (Lindic & Marques da Silva, 2011).
3.3 Pricing

Few factors have such a considerable impact on profitability as the price of a product (Hinterhuber, 2008). It is often the first thing customers look at when they make a buying decision. Setting a price on a product is a complex process that involves many different aspects; customer value, costs, competitor prices etc. There is also a great difference between setting a price on a new product and an existing product where the former is far more complex than the latter (Monroe & Bitta, 1978).

Pricing is also affected by the characteristic of the market. This has a massive impact on the price. Markets like the energy market are usually characterized as natural monopoly markets. A brief introduction to this concept is presented further down.

3.3.1 Strategies and Models

Pricing is essentially about making decisions about what strategies and models to use in a specific market environment. This sub-chapter examines the most common used strategies and models used when setting prices.

There are three main pricing strategies:

- Cost-based pricing
- Competition-based pricing
- Customer-value based pricing

Cost-based pricing is basically about setting the price floor. What price does a product need to have in order to cover costs from marketing, production, distribution etc.? The information and data needed is often easily accessible, but the strategy does not take customers and competition into account which is its greatest weakness. Competition-based pricing, however, is about assessing competitors’ prices and adjust accordingly. It determines the price ceiling to a large extent (Hinterhuber, 2008). Customer-value based pricing is perhaps the most complex as converting customer value into a monetary amount can be difficult. However, Ingenbleek et al. (2003) argues that this strategy is superior to the others since it is applicable in most situations, whether the competitive instensity is low or high.

3.3.2 Natural Monopoly

Markets that only contain one actor is by definition a monopoly market. Natural monopoly has a similar but slight different meaning; if the entire market demand can be satisfied by a single firm at lowest cost, that firm enjoys a natural monopoly. However, it is important to note that it is not the number of actors on the market that decides whether it is a natural monopoly or not, it is the relationship between supply and demand that determines the characteristic. If there are more than one actor on a market with natural monopoly, the smaller ones are likely to diminish through failure or merger with other firms (Posner, 1969). The heating market is a typical natural monopoly as there are often only one distributor. Local firms are usually under the control of the government and are not allowed to make profit (Vattenfall, 2017).
Figure 6 explains how a natural monopoly appears. The industry quantity demand is represented on the x-axis while the price is placed on the y-axis. If the industry demand is \(x_1\) units, one company will produce that quantity to an average price of \(y_1\). If, on the other hand, three companies would produce \(x_1\) units each, the average cost of each company would reach \(y_2\). This creates the curved line of average cost; as more companies come into play, the average cost will consequently go up. Therefore, it is more advantageous that only one firm produces the goods as the demand can be more effectively met (Pettinger, 2012).

Figure 6. Graphical representation of natural monopoly. Based on Pettinger (2012).

3.4 Heating Methods

District heating and heating by heat pumps, particularly geothermal heat pumps, are discussed in this paper. The aim of this chapter is consequently to give the reader an understanding of the basic mechanics of each method.

3.4.1 District Heating

The heat produced in a district heating system is produced either in a plant designed for combined heat and power, CHP, or in a plant designed only for heat production. Both electricity and heat are generated in a CHP, allowing for higher efficiency. The fuel input to plants in Sweden 2015 was 75% to CHP and 25% to the heat only plants (SCB, 2016).

District heating is a delivery of heat of scale. It is fuel efficient and has an advanced cleaning filtering of combustion gases. It has the potential to leave the lowest carbon footprint out of any heating systems based on combustion. The reliability of a district heating system is high. Prevention systems, automated detection, thermal mapping, GIS and other tools ensures this (Sayegh et al., 2016).

The materials combusted to produce heat at a district heating plant differs around the world. In Europe, 2009, fuels were coal (34.8%) and natural gas (39.4%) (Sayegh, et al., 2016). In the Nordic countries, the fuel has generally a lower environmental impact since more renewable materials are used in the process. The combustion materials used in heat
plants in Sweden 2015 was mainly biomass (42.7%), municipal waste (24.5%), fossil fuel (8.3%), heat pumps (8.4%) and industrial waste heat (7.6%) (SCB, 2016). Notable is that the partition of renewable sources used for district heating has increased in the last decades. In 2005 the use of fossil fuel was 19%, and municipal waste was only 13% (SCB, 2006).

Climate and population density are factors that decide how suitable a district heating system is for an area. In warmer countries, heating is not necessary during the bigger part of the year. However, warm water that is used in daily life, the "baseload", will always be needed. The investment of a district heating system relies much on the population density to be profitable. In cities with high density, a network system can connect many customers and achieve lower material cost, lower heat losses and high profit through a large customer base (Danfoss, 1998).

Process
A plant only used for the production of heat heats the water through combustion and sends it to the customer via the distribution network. In a CHP, as depicted in Figure 6, steam is produced for the electricity generation in the turbine. The cooling that is required in the plant is achieved by transferring away the heat. The heat is then used for the district heating.

The heated water is distributed to the customer in insulated pipes. They are made of an internal steel pipe covered by foam insulation and a waterproof external layer of polyethylene. In energy-dense areas, the heat losses are 3% or less. Accumulators should have volume enough to manage a heat demand of 12 hours (Danfoss, 1998). From the accumulators, the heat is then transferred to the tap water and radiators of the house through heat exchangers. The heat metering is situated in each building and establishes what has been delivered by calculating the heat volume. It also estimates the efficiency of the different units by measuring the temperature drop in the return flow. Low return temperature is strived for and is a sign of efficient use of heat. The system can also be used
for cooling. However, in Sweden 2015, cooling only accounted for 0.9 TWh which is considerably less than the heating demand (SCB, 2016).

### 3.4.2 Geothermal Heat Pumps

In Sweden, there are more than one million heat pumps installed, most of them in one- or two dwelling houses. Electric heating and heat pumps account for one third of the heating needed in Sweden (Värmemarknad Sverige, 2014). When the millionth pump was installed in 2010, Sweden possessed half of all heat pumps installed in Europe. This chapter explains the heat transferring method of the geothermal heat pump.

**Process**

In short, heat from the earth is extracted by the geothermal heat pump. The pump transports more thermal energy to the user than what is required to run the pump in terms of electricity. The relationship is measured by the coefficient of performance (COP). The COP of heat pumps ranges between 2.5 and 5.5 depending on the cooling and temperature levels of the lower source (geological ground), the properties of the working fluid and the temperature range of the upper source (Sayegh, et al., 2016).

There are four closed-loop exchange systems; vertical, horizontal, spiral and pond. The borehole for vertical system ranges between 45-75 meters for residential applications and up to 150 meters for industrial (Self et al., 2012).

Just like in the system of district heating, a heat exchanger is required indoors for conventional heat pumps. However, a unit with a fluid with a low boiling point is required. The fluid is vaporized and compressed which makes the fluid hotter. Through the condenser, the heat is transferred to the heat exchanger while the condensed fluid returns down the pump and the cycle is repeated. The above-ground heat pump moves the fluid through the buried pipe where the fluid absorbs heat from the soil, rock or ground water.

The heat pump can provide both heating and cooling. Generally, geothermal heat pumps work well between outdoor temperatures between 5°C and 30°C. Geothermal heat pumps are most frequent in USA, Sweden, Germany, Switzerland, Canada and Austria. Since 1994, the global annual growth for GHP has been about 10% (Self et al., 2012).

Geothermal heat pumps have substantially higher initial cost than conventional heating systems, but has a low operating cost which contributes to that the investment payback period is 6-20 years. The life span of a pump can be assumed to be 20+ years (U.S. Department of Energy, 2011).

Other types of heat pumps are air-to-air heat pumps and exhaust air heat pumps. The air-to-air heat pumps have a stricter range of temperatures in which it works efficiently. They are not as efficient compared to geothermal heat pumps, but the initial investment is much lower. The exhaust air heat pump recycles the heat that exists in the air in the ventilation system that is exiting the building.
4. Empirical Findings
In this chapter, collected empirical information is presented. It is divided into two sub-chapters to distinguish corporate findings from findings from private individuals. In order to organize findings from company representatives, sub-chapter 4.1 is divided into three sections; Customer Value, Marketing and Future Research.

4.1 Corporate Findings
This section consists of the empirical material gathered from company interviews. Customer value is presented from a corporate perspective, as well as marketing and challenges and future forecasts. The five companies that have been involved are listed in table 1 with their approximate revenue in 2016.

<table>
<thead>
<tr>
<th>Company</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>~7.000 MSEK</td>
</tr>
<tr>
<td>Company B</td>
<td>~150.000 MSEK</td>
</tr>
<tr>
<td>Company C</td>
<td>~300 MSEK</td>
</tr>
<tr>
<td>Company D</td>
<td>~3.000 MSEK</td>
</tr>
<tr>
<td>Company E</td>
<td>~15.000 MSEK</td>
</tr>
</tbody>
</table>

4.1.1 Customer Value
District Heating
Delivering customer value has not always been of great importance for district heating companies. Manager at company A says: “The district heating industry has a past where you looked at the customer as a point of liability in the system. They paid but that was about it — the customer was supposed to be grateful for having district heating. (...) Today it is the opposite; we comply with the customer. But it is still a long way to go for many district heating companies”. These quotes summarize well the relationship between district heating companies and their customers. The willingness to be closer to the customer is something that is starting to show in the industry. But there are obstacles, manager at company A says: “Our experience is that those we have a personal contact with are imminently positive towards district heating. (...) But the problem has been to communicate the value to the public.”.

Customer value is not something that is objective – it differs from one person to another. Determining what customers of district heating values is a big challenge. As Manager at company A states: “Customer value is complex. (...) Each customer wants different things; what car do I want? What clothes do I like to wear? We all value different things in life. Therefore, we work on being reliable. To let the customer know how we set our prices and that we have a long-term, stable pricing and treat every customer as equal as possible.”

Manager at company B says the following: “The customer must feel that they get value for their money, which is the most important thing. That is, however, not always clear—what is value? What they are seeing is perhaps only a continuous price increase. They forget that they get a high-quality product”.

Table 1. Company revenues 2016
Company C is smaller sized firm which allows them to have a flat organization on a local market. Manager at company C says: "We have an incredibly flat organization. But the customer value in our case is that we are a local actor. The one responsible for a local plant often lives in the nearby community which means that he meets his customers out on the town. To have decentralized organization means that the customers gets a local presence.”.

Another important factor that goes hand-in-hand with being present is availability. Company D is an energy company partly owned by a large city in Sweden. Here, 98% of the population gets their heat from district heating. Manager at company D says the following: “Customer value for us is to maintain a high degree of availability, that the customer can trust that we always deliver”. He also mentions the environmental issue and that the customers need to know that it is an important part of their business; “Then we have the environmental issue. The customer does not have to worry about that we neglect the environmental impact. We have a responsibility towards the society and we take it very seriously”.

In later years, companies have started to provide services related to district heating, everything to make the customer feel secure about their heating distribution. However, manager at company A addresses an issue that arises with this: “The customers must feel that district heating is adapted for them, but it cannot get to the point where we lose the advantages of economies of scale. That is a challenge.”

As stated before, being transparent is something that creates a feeling of trust, and it is safe to say that a certain degree of transparency is requested from customers. A lot has happened to this as well over the years. Companies have become better to report to their customers why the price is what it is, but there is still a long way to go. Manager at company B says the following: “We need to get better at explaining for the customer on what we base our prices on. There is a challenge in making it simple and understandable”. Prisdialogen is a model that allows companies of district heating to show their customers how they set and change their prices (Prisdialogen, 2017). This is one example of how the industry is becoming more transparent.

Another perspective on transparency is how to get the customer to know the differences in cost between district heating and other heating methods. “The customer pays what it considers to be a reasonable price”, as manager at company B states. The pricing method used in the industry has always been cost-based pricing. This has changed. The three largest energy companies in Sweden have now switched to value-based pricing where the prices are set in accordance to what the customers value. Today, to be transparent means to show if your company is competitive or not. To make the customer understand the differences between various heating methods.

**Heat Pumps**

When interviewing a manager for a large heating pump manufacturer, company E, a slightly different view on customer value is emerging. He argues that the choice of selecting district heating results in a lock-in for the customer. The sense of freedom is lost as you are forced to commit to one energy distributor. This is not the case with heating pumps.
He says: “One advantage of heat pumps is the independence. The number of electricity suppliers is far greater than the number of district heating suppliers. Often there is only one supplier of district heating.” In addition, the choice of investing in a heating pump is often motivated by the economical aspect that it is going to pay off over time. However, its profitability is highly dependent on the price on electricity which is difficult to foresee.

An argument against heating pumps that often comes up is the need for maintenance. District heating is extremely reliable and requires a minimum effort from the customer to work. When you buy a geothermal heating pump for example, you stand on your own once you have made the purchase. Manager at company C says: “If you have a heat pump and it suddenly stops working, you stand there by yourself which is not the case with district heating.” Manager at company E has a different view on this issue: “The knowledge of heat pumps is significantly bigger today than it was ten years ago, especially among installers and plumbers. (...) The reliability and serviceability are very high today.”

Manager at company E continues to argue for the environmental benefits of using heat pumps; “They consume very little energy in relation to what they give. So, from an environmental point of view it is a very interesting choice. District heating is not always 100% environmental friendly. ” He does not hesitate, however, to present the idea of combining the two in order to achieve higher efficiency. Although, this solution is not always accepted by district heating companies.

4.1.2 Marketing District Heating

The managers at company A say that since they are a company of large size, one of their big marketing parameters is their brand. "We assume that everyone knows what we do, which is possibly not the case. We are shocked when we see how little people know. Maybe they don’t know that district heating is one of the best heating methods out there?" To inform people, they set up hotspots and meet people in the city. "It has a great impact. Traditional marketing, web site and flyers, does not work well in comparison". Personal contact gives positive responses, but it is also important to communicate to the public. “Although it is very few in total, we lose customers to geothermal heat pumps. That’s a sign of lack in communication. Few customers leave us on basis of economy”.

The key characteristics of district heating (simplicity, reliability and sustainability) are especially communicated in the marketing of the product. "We also have a good environmental profile, which most people do not know about. Only a very small part of the production is fossil driven", a manager at Company A says.

Regarding the competition against geothermal heat pumps, a manager at Company A says: "Salesmen for geothermal heating has been better to promote their product than the salesmen for district heating. People know what geothermal heating is but not district heating.” A manager for Company B says: "Not so much money is spent on marketing, we should reactivate the marketing from these low levels where we are now".
Company B uses a relationship oriented marketing, where they meet the customer on a personal level. It is effective but also a reason the company is not so visible in the public eye, one of the managers says.

Company C, which is a more decentralized actor than A and B, does not put much focus on marketing either. They try to be locally active and have personal contact with the customer. If an important customer is to build new houses, that customer is always contacted and informed about the business of Company C and district heating. A continuous contact is especially important with big customers. Furthermore, for Company C it is important to not lose customers, even if a customer transition to another heating method. "If a customer installs a heat pump, it is important to us to still be a supplier of heat to that building, we can deliver redundancy heat that is many times needed. Since 2014 we have actually only lost 6GWb of 980 GWb to geothermal heat pumps", says manager at company C.

Company D has a more active marketing than they had 10 years ago. Construction companies is a big customer segment. A manager at the company says. "A lot is being built right now, and we meet with them in an early stage to inform about district heating - what heating method do they want? We help them do the analysis. In 99 cases out of a 100, they realize that district heating is the best option, both economically and environmentally."

Manager at company A mentions that construction companies are their biggest customers. The customer always knows who to call when they need help. The company has a good relationship with them. In Stockholm, where the company has big business, it is easier to do marketing.

Since a district heating company is usually a solo actor in an area, some citizens see the company negatively as a monopolist. Therefore, company A is also trying to communicate that it is owned by the municipality to 50%, and thus generating profit to the city.

Heat Pumps
Company E wants to display commitment for the future and the environment to the customer, the manager says. Marketing is done through various media channels. Since the company is a large developer and producer of heat pumps, their direct customers are wholesale and construction companies, but Company E still do marketing aimed to the end user. The pumps are mainly installed in one- or two-dwelling houses.

The manager at Company A said that geothermal heating salesmen are better in doing marketing than salesmen in district heating, but the manager at Company E does not give the exact same picture; “Our marketing is not particularly different from that of other kinds of products”.

4.1.3 Challenges and Future Forecast
District Heating
Recycling energy from the customers is valuable for the environment and can strengthen the relationship with the customers, a manager at Company A says. But it is a challenge. “There are big technical difficulties with this. Older buildings are designed for very high temperatures of
district heating, and recycled heat from i.e. computer server rooms are very much lower. If the required temperature in the heating network could be lowered, more energy could be recycled. (…) With more buildings built in the network however, the temperature cannot be lowered without big technical advancement.”

To be able to remotely control a customer’s temperature and lower it certain hours would save energy and money which is an ambition for the future, the same manager continues. "We have a problem in making district heating modern. The design has not changed in a while.”

The increased energy efficiency of buildings and the newly built buildings compensate each other so that the heat demand stays on a constant level. But the stretch of the scope has a limit. "More than seven years ahead, it is uncertain what the construction rate will be.”, a manager at Company A says.

All companies agree that a good contact with the customer is important, but that it also seems to require resources. "The personal contact to the customer is rewarding, but it is also a challenge", a representative for company A says. Company B mentions that one challenge is "To communicate more in the digital world. Digitalization leads to new customer behaviors and we need to be more customer oriented there.”

Perhaps the two heating methods should not be seen as competitors in the future. “There are many interesting solutions of combinations for the future, and not so much research has been made. Big scale and small scale in harmony and not in conflict with each other”, a manager at Company B says.

Manager at Company D explains future predictions: "District heating will always be an existing option. It is about the bigger energy system, and efficiently produce heat at one place. It is also responsibility taken for the society as waste is made to heat, and the circle is completed.” The same manager does not think heat pumps is a good heating solution; "We need electricity for other things, especially when it's cold. To be reliant on electricity for a heat pump when it's the most expensive is not a good solution. Heat should be produced as we do it in district heating.”

The next steps for company D is to reduce energy peaks in the system, and they plan to have a fossil-free heat production by the year 2020, with the exception that there will still be a fraction of fossil in waste. Company A and B have similar goals. A manager at Company B states, “Emissions will be halved by 2020, and by the year of 2030, we will have zero emission impact on the environment.

A manager at Company A points out that political factors play a part; "We are affected by political environmental decisions and it’s somewhat pressuring. We only combust 8% coal, but now it’s decided that in 2022, the combustion of coal is going to cease. At the moment, we use 90% renewable fuels. Plastics in the waste is still a problem.”.
Heat Pumps
Manager at Company E presents upcoming challenges for the heating market; “Newly built houses can be very energy efficient, what heating method should be chosen? Could direct heating by electricity become an option again as a result of improved insulation?”

A goal and a possible future, the manager at Company E says, is: “Make products easier to handle and install. It can be possible to buy the product on the internet and plug it in equally easy as a refrigerator, and eliminate the installation service”.

The company believes that the selling of heat pumps will increase in the future. However, the type of heat pumps customers choose could possibly shift. The technological advancements in air-to-water heat pumps make them more economical and energy efficient. In some parts of Sweden, these have the potential to become a better economical choice than geothermal heat pumps. In fact, the installations of air-to-water heat pumps increase in the same rate as the building rate of new houses.

A manager at district heating Company B believes that in the future, regarding the two factors electricity price and the cost of electric networks, heat pump methods are likely to be more expensive.

The manager for Company E believes that a combined heating method could be a possible future solution; “The combination district heating and heat pumps in the same building is likely to increase, and it requires attention and co-operation from both types of companies”, the manager says.

There is a constant need for improved and cheaper products to be able to withstand competition. “Stricter rules and requirements for energy use of new houses set by the government is a challenge, to produce products that meet the requirements. (...) New ways to use and control the heat pumps and make the products smarter is one way to go”, the manager at Company E says.

4.2 Tenants and Households
As mentioned earlier, the solution to combine district heating and heating pumps is one way of making an individual’s heat consumption more efficient. Manager at company E has utilized this solution in his private home. “My district heating company has accepted this combination. By doing this, I have lowered my energy consumption in the building from 100 000kWh down to 35 000kWh per year. It is a combination that is on the rise”.

One of the people who have a negative perception toward district heating is the chairman of tenant A, in the center of Stockholm. Before switching to geothermal heating, he experienced various aspects of district heating that he did not find comfortable; “If you once choose to go with district heating, you cannot have any other energy source. There is no flexibility. We also felt cheated on the price - they took advantage of their monopoly to push prices to a level where they were almost as high as the oil price.” By switching to geothermal heating, the tenant managed to reduce their energy costs by 80% and thereby saved a lot of money. Also, they have not made any maintenance work since it was installed three years ago.
The chairman of tenant B lives on the same street but in a different building than tenant A. He is, on the contrary, positive to district heating. The main reason for this is due to its simplicity and reliability. Problems have only occurred once; "It is seamlessly, but one time when the company's installer came to replace a vent, he forgot to open it again and the house did not have warm water for a few hours. As an apology, we were given four cinema tickets." Even though he thinks the heating method is practical and easy, he wants a higher degree of simplicity. He says: "I wish the additional service contract was included in the main contract. It should be important for the company to care about that the heat exchanger central is always working, regardless if the customer has signed the additional service contract or not."

The chairman of tenant B does not think the heating bill is unreasonably high, and information about consumption and cost is easy to understand; "Information about the house can be found on the website and it is quite easy to understand the graphs. But only if you have time I think you can fully take advantage of these numbers and adjust accordingly in order to make savings." He shares an idea about price and contracts: "There are about three contracts to choose from, I suppose the option to choose is meant to be good for the customer, but why can't they just automatically give us the best option for our house?"

Another private individual, who is the property owner of a one-dwelling house in the outskirts of Stockholm, is content with the geothermal heat pump he installed 15 years ago when he stopped using oil. Economically, the heat pump is starting to pay off just now. He experiences that the pump does not extract as much heat as it did in the beginning. Especially in the winter it lacks the heating potential he and his family require. Service has been performed on a few occasions but no bigger repairs have been needed. In 3-5 years, he plans to replace the pump with a new one and this time he will buy a bigger one that can cover their entire heat demand. The size of the pump, as well as the actual installation, is a decision you will live with for the next 20 years. This is important to have in mind he says. And the pump cannot as quickly heat up your house as district heating can. It has a natural delay.
5 Analysis

It has become evident that there is a gap between customer and district heating companies that has to be narrowed. In addition, there are barriers that need to be overcome in order to create a stronger customer relationship. The lack of knowledge and perception of value regarding district heating among people shows that something needs to be done in the area of communication.

This chapter presents an analysis of the empirical findings and how it relates to the literature review in chapter 3. Moreover, findings regarding customer satisfaction and how it relates to the price of district heating is presented as well as what competitive factors play the biggest roles in the district heating market today.

5.1 Customer Value

It is crucial for energy companies to understand what their customers value when conducting business. In this chapter, an analysis on the differences between energy companies and private households regarding the perception of value is presented.

5.1.1 Corporate Perspective

Since the focus on customer value is a rather new phenomenon in the district heating industry, it is not surprising that there is still room for improvements. Being such a stable and reliable method, the obvious issue with the offering of district heating today is the lack of communication done by heating companies toward their customers. This has resulted in that people stare blindly at the price and thus forget about the real value of the offering. Having a high-quality product is consequently not enough. First, as stated in chapter 3.2.2., delivering high-quality products does not always create a higher value proposition. Customers are generally more interested in the benefits of a product offering rather than its characteristics. Secondly, one also has to know how to communicate its value to the market. But, in contrast to what the attitude was before, district heating companies are today more willing to reach out and get to know their customers as they are starting to see the value in this.

Communicating the value of something that is a matter of course in today's society is a great challenge. District heating companies realize that customer value is complex and that it differs depending on who you ask. But two values seem to be more important than others when asking about the subject; simplicity and reliability. To make the customer feel that their distributor of heat will always deliver and that the pricing is stable and long-term oriented. In addition, heating should be simple to deal with and not demand a lot of time and effort. Some smaller district heating companies have found value in being local. This makes it easier to come closer to the customer and build a relationship.

District heating companies need to realize that simply delivering heat is not enough to make their offering stand out. The Kano Model presented in chapter 3.2.1 justifies this. In today’s competitive climate, something more has to be offered to the customer, some “excitement attributes” as Noriaki Kano calls them. Heat has become a commodity that is taken for granted, at least in the western countries. Some development has been made in the area but there are still much that can be done.
In the endeavor to become more customer-oriented, district heating companies have made efforts in becoming more transparent. They want the customer to know what they are doing to minimize their environmental footprint, what they base their pricing on etc. It creates a feeling of trust. But to be transparent also means to show the degree of competitiveness a company possesses. And the fact that district heating companies have gone from cost-based pricing to customer value-based pricing is a sign that they are willing to show this.

Creating customer value requires an understanding of what the customer wants. We argue that, historically, district heating companies have failed to do this. To refer to the model presented in figure 3 in chapter 3.2, achieving profitability, growth and shareholder value begins with understanding customer needs. Companies in the district heating industry are still, to a large extent, stuck on this first step. Much indicates, however, that this is changing but delivering customer value to customers of district heating is still a challenge that requires a lot of work.

The major issue with district heating from a customer perspective is the sense of lock-in it creates. This has become the biggest argument companies of geothermal heat pumps to use against district heating. They argue that the independence as well as the economic aspects are the biggest reasons people choose geothermal heating over district heating. However, since a heat pump requires electricity to function, the economical profitability is highly dependent on the price on electricity which is always difficult to foresee.

The environmental footprint is also an argument that has been used by advocates for geothermal heat pumps. It is a closed, local system that collects heat straight from the earth which makes it hard to outmatch from an environmental point of view.

5.1.2 Tenant- and Household Perspective

At the other end of the supply chain there is the customer who receives the heat. The interviews gave us very different views and opinions regarding district heating contra geothermal heating. The most positive attitudes toward to district heating are based on the factors simplicity and reliability. Being the primary unique selling propositions, or USP’s, used by district heating companies today, this is not surprising.

Having district heating means that the customer can pay a minimum amount of attention to it. This is the whole idea behind district heating as heating today is something we more or less take for granted, as discussed earlier. Investing in a geothermal heat pump requires, on the other hand, a higher degree of commitment from the buyer. There are, however, other potential benefits of geothermal heating that people often see as the deal breaker: it is perceived to be cheaper and pay off in the long run. But, if the pump suddenly needs repairing or if the electricity price rises, a geothermal heat pump can quickly turn out to be an expensive investment.
5.2 Marketing

To connect with what has been said in chapter 5.2, communicating the value of district heating is one of the great challenges of today, and a lot more can be done in this aspect. Hence, it is evident that more resources must be dedicated to marketing.

Among the companies that put more focus on marketing, the transition to a more customer-oriented marketing strategy is starting to happen. It has become more common to use relationship marketing rather than traditional marketing as district heating companies feel that they need to come closer to their customers. Traditional marketing is simply not efficient as it puts too much focus on the actual product and the four P’s of the marketing mix. They have come to realize that they need to build a connection with the customer so that they achieve a higher degree of retention. However, the amount resources spent on marketing seems to differ among companies. Company B, for example, has invested heavily in relationship marketing and they make sure that they are exposed at various events and exhibitions. On the other end of the spectrum there is company C who is a much smaller actor on the market. They have a different approach on marketing; not much resources are put on marketing per se. Instead, they try to make use of the benefits of being a local actor. Although, since company C is a much smaller actor, they have naturally less resources to spend which consequently means that they take different strategic decisions. As mentioned in chapter 3.1.3, the type of communication channels a company utilizes depends on their marketing budget.

Through the interviews, it became clear that historically, too much focus has been on the product rather the customer. To refer to figure 2 in chapter 3.1.2, selling has received far more attention than marketing. There is a transition of focus from product to customer that has to happen in order to connect to the customer to a larger extent.

Regarding the actual selling of district heating, the industry has a history of conducting non-personal selling with little or no interaction with the customers. This has started to change as companies are becoming more customer-oriented. They now begin to see the value in interacting with the customers directly.

When it comes to marketing of geothermal heat pumps, they do not seem to do it differently than other companies that sell products. And it was mentioned that companies of geothermal heating are better at marketing their product than companies of district heating. But, there is a difference that needs to be addressed; a geothermal heat pump is a physical product that is placed in your house and by that, has potential to raise the value of the property. In addition, the property owner always has (in principle) the option of choosing geothermal heating as heating method. The availability of district heating is dependent on where the house is placed, and it does not raise the value of the property per se. This creates different conditions for marketing and can therefore not be conducted in the same way.
5.3 Challenges and Future Forecast

As development is a natural ambition, there are several challenges presented by all companies that has been interviewed. One challenge is to decrease the environmental footprint. This is driven by requirements set by the government, the common conception of caring for the environment and profitability by being more efficient in the production and the transferring of heat. Along with other aspects, being environmentally friendly has also become closely related to becoming a more modern company. Embracing digitalization is also something that needs to be done in order to become more modern. It changes customer behavior and district heating companies need to be up-to-date on this.

Along with general production aspirations, goals of being fossil free have been set for district heating companies. Increasing the percentage of recycled energy from customers demand further technical advancements and would be of great benefit. In addition, energy peaks are desired to be fewer and overall lower. More control over the customer’s temperature and to be able to lower it when it is appropriate would save money and is an ambition for the future.

More energy efficient houses can be seen as both an opportunity and a challenge. On one hand, recycled energy would be easier to make use of for these houses if they are connected to a modern heating network, but at the same time, being energy efficient also decreases the demand for heat which ultimately leads to less profit for heating companies.

A combined solution for heating between district heating and heat pumps is something that some district heating companies are against but it is still a possible future solution. Heat pump producers want to make pumps easy to install, as all types of heat pumps today need professional installers.

5.4 Price and Customer Satisfaction

To get a picture of customers’ view on district heating, data from Svenskt Kvalitetsindex (SKI) and Nils Holgersson Gruppen has been collected to see which companies have the most satisfied customers. When comparing this to what price each company charge for their district heating, it appears that price is not directly correlated with customer satisfaction. The comparison is presented in figure 8.
Figure 8. Customer satisfaction. Based on Qvarnström (2016) and Nils Holgersson Gruppen (2016). Prices are average prices for locations in which the companies operate.
5.5 Four Factors of Competitiveness

During the empirical study it became apparent that a few factors are more important than others when it comes to being competitive. Figure 9 shows the main competitive factors in the Swedish energy sector today. The four factors environment, customer service, digitalization and local presence, are the ones energy companies should consider dedicating resources to in order to remain competitive. Local presence does not implicitly mean geographic presence, it can also reflect an emotional presence where the customer feel that they are close to the company in such matter.

The colored lines in the graph represents how well different energy companies perform within each category. Note that the results presented in the graph are just examples of how they could look like.

Some companies perform better in certain categories than others, and a low result in one category can be outweighed by a strong result in another. In other words, a company cannot excel in everything. The challenge is to identify the factors where there is potential to be successful and thereby show competitiveness.

Figure 9. Four factors of competitiveness
6 Discussion
This chapter discusses findings within three topics; heat as a product, price and how it relates to customer satisfaction and lastly, future research.

6.1 Heat as a Product
Heat is not a product in the typical sense. Marketing of heat must therefore be conducted differently. The concept of the four P’s presented in chapter 3.1.1, is not applicable on the heating market. This is partly because it does not focus on delivering superior value, and partly because heat is not something that is possible to try out in a store or differs depending on which brand you choose or is. It is also not something you buy more of once you have a stable distribution. In addition, heating does not possess any exhibitionistic values in the way clothes, electronics or cars do – it is not visible in the same way and it is not a symbol of status per se. The only "P" that can be relevant in the heating market is perhaps price. But, as shown in chapter 5.4, price seems to be an inferior factor to other values. Heating is an entirely different market which is important to have in mind when discussing customer value in this industry.

When a household decides to install district heating, the heat pipes has in most cases already been built. If a house is built in a region without a district heating system, the option of installing district heating is consequently not available. The ability of choice is in other words highly restricted and dependent on factors that is often beyond the customer's reach. This is often likely to create a feeling of constraint which has, as mentioned earlier in the report, been a big problem for district heating companies to deal with.

6.2 Price and Customer Satisfaction
In figure 8, staple charts comparing price and customer satisfaction are presented. The first thing to note in these charts is that smaller, local firms such as Luleå Energi, Skellefteå Energi and Varberg Energi score high in customer satisfaction, while E.ON., Vattenfall and Fortum who are the biggest actors within district heating in Sweden, score considerably worse. One may think that a big, stable business instill reliability and is able offer a competitive product offering. While this might be true for other branches, different rules apply in the heating industry. Of course, reliability is still a very important factor, but why do the smaller firms score higher in customer satisfaction, despite having average prices? (The reason why Luleå Energi has a much lower price than the rest is because they have a partnership with SSAB who provides them with energy which ultimately enables them to charge less). We argue that this is because they are local actors that thrive on the feeling of solidarity which seem to be superior to the price factor. These companies are so strongly associated with their geographical area of business so that the inhabitants in these areas become more emotionally connected to them. As mentioned in the previous chapter, they have found value in being local. This is very difficult for bigger companies to achieve. In addition, one of the advantages of being a smaller firm is that it is usually more accessible for customers. It is often easier to get in touch with managers as the organization is smaller and not as complex as larger firms. Because of this, customer service tends to be better.
As briefly mentioned in the beginning of this chapter, price and customer satisfaction does not seem to be correlated. Price, which generally plays a big role in how we perceive value, does not have the same prominent role when recognizing value in the heating industry. There are other values that customers value more, such as simplicity and being a local actor. Therefore, the value-price model depicted in chapter 3.2 is not as applicable in this case as it is in other markets. The reason why it is presented in this report is because we think that it is important to address this. District heating with a certain price is not perceived to be of higher value than district heating with a lower price, for example. It is not the same as buying a new computer where a higher price generally comes with better technical specifications than a computer with a lower price.

When analyzing the staple charts, one can see that some companies are at the top in one category and in the same time at the bottom in the other. SEOM is one example. They have very satisfied customers in the household segment but scores low among corporate customers. One explanation is that some areas are simply denser in industries than others and some are more populated by households, and the local district heating company is customized for that specific type of market. Mölndal, for example, is an industrial city which could explain the fact that Mölndal Energi scores high among corporate customers. SEOM, on the other hand, is located in Sollentuna which is a municipality in Stockholm County. It consists almost exclusively of households. Furthermore, in the interviews it has come to our attention that bigger customers, or corporate customers, are paid more attention to than smaller customers, households. It is more efficient to support and aid fewer important customers as less resources can be spent for more gain and customer contact.

An apparent value for the customer lies in the heating company being local. Bigger district heating companies, sometimes of national size, must find other ways to compensate for this in order to create customer value. The next chapter is going to discuss this further.

6.3 Future Research
As briefly discussed in chapter 5.4; one challenge for district heating companies and for most the heating industry, is the emergence of highly energy efficient buildings, so called passive houses. As these buildings require less heating and therefore lower the demand for purchased and produced heat, other heating methods might become more viable in the future. One possible future scenario is that electric heating, which is less complex but today quite expensive as a heating method, will gain market share. This is because less energy will likely be needed and fluctuations of the electricity price will not affect much due to the low demand – the heating bill will still remain relatively cheap despite high electricity price. This is an issue that affects the whole energy sector, and district heating companies will have to understand its future development and acknowledge this as an important subject for further investigation and research.
As mentioned in chapter 1.4, this report has paid a minimum amount of attention to rules and regulations set by the Swedish government. If someone is to further investigate the solutions proposed in chapter 7, possible modifications may need to be applied to these to fully align with the demands. In addition, it has come to our attention through the interviews that the government tends to focus and favor short-term economic goals at the expense of long-term environmental gain. Hence, informing and having a dialogue with politicians and decision makers regarding future solutions for district heating will be necessary.

Since this thesis has only focused on the Swedish heating market, further research regarding the heating market in other parts of the world is left for investigation, markets that might differ a lot from the Swedish. District heating is still to a large extent a Nordic phenomenon. In other parts of Europe, the situation is different. In Brussels, for example, most houses have their own boiler that runs on oil. This results in large amounts of emissions of environmental pollutants. With the endeavor to achieve both national and international environmental goals, a change to cleaner heating methods in areas like this is more or less required.

As mentioned earlier, the report has been written with a qualitative approach. Qualitative research is less sensitive to few interview subjects. However, this study would have benefitted from more interviews with households. If more qualitative interviews had been performed and then followed up with an accurate quantitative survey with a large sample size, it is reasonable to presume that a more accurate and true representation of customer value would be found. This in turn could reveal additional points on which research focus should have been put on.
7 Proposals for Further Investigation

This chapter presents three proposals that could potentially help district heating companies to create a stronger relationship with their customers by adding something more to their product offering. The proposals have been developed from studying the empirical data as well as looking at practices from other industries. Note that these proposals are merely suggestions that are subject for further research and development. They are not based on scientific research.

Depending on the size of the organization, the strategy to build a stronger relationship with customer differs, but the general idea is the same; being informative, transparent and engaging. District heating companies have already come a long way in this endeavor, but more can be done. In addition, the industry’s monopolistic nature tends to arouse skepticism towards district heating. To remedy this situation, companies must find new ways of bringing the customer closer. This section discusses three possible solutions to this problem. These propositions are all commercially innovative ideas rather than technically innovative. This is because we argue that it is primarily on a commercial level changes have to be made in order to achieve higher customer satisfaction. It should be noted however, that the propositions are not fully developed. If a company desires to take these fully into practice, the proposals must be further developed. Besides extending the proposals, legal issues may occur as laws and jurisdiction have not been taking into account in the report.

7.1 District Heating Shares

Owners of commercial buildings are offered the opportunity to buy shares in their district heating company. This way, the district heating company receives financial resources in an early stage which can be used for investments. The shares will be tied to the property through corporatization which will result in an increased property value of the same amount as the investment. The investment guarantees that a dividend from the district heating company’s profit is paid to the customer in form of a reduction of the heating bill. An increased property value and lower heating costs are some of the factors that make people invest in heat pumps. Now, customers of district heating get them as well. But, in contrast to a heat pump, district heating also retains simplicity as district heating requires less maintenance.

The district heating company will retain more customers as the customers will feel more emotionally invested in the company. We argue that this will increase the customer value and thereby prevent customers from leaving district heating for other heating methods. It improves “local presence” in the graph presented in figure 9.

The concept of buying shares has been utilized before in the Swedish wind power industry. However, given the unpredictable nature of wind, it was difficult to achieve profitability. We argue that the district heating industry is better suited for this concept because of its relatively stable market.
7.2 Automatic Price Model

District heating companies' price policies take into account what can be seen as value for their customers and how the market situation is. The price must be competitive to other heating alternatives and consider values such as simplicity, reliability and sustainability. Price changes must be reported in advance and no big variations should occur, the price should in other words be stable. Customers in different heating situations are to be treated equally. However, there can be different pricing models for industry customers and household customers.

Fortum, one of the biggest energy companies in Sweden, offer their customers four pricing alternatives for district heating: Trygg (reliable), Aktiv (active), Flexibel (flexible) and Invest (Fortum Värme, 2016). Since customers' interests and consumptions are different, Fortum believes that it is beneficial as customers are free to choose the alternative that fits them the best. However, we argue that the different alternatives can be deceiving for both parties. As tenant B said in the interview; “it is hard to know which alternative that is the best and results in the lowest price”. It is necessary for the customer to do a thorough examination and make a prediction of what the consumption and consumption rate are going to be in order to choose the best fitting option. This requires knowledge and might still not result in the customer choosing the cheapest alternative. We argue that the company should keep the price models. However, the customer should not have to choose one or the other.

Instead, in the end of the year, the customer’s consumption is matched to the price models and the best option is automatically applied, so that the customer always pays the lowest price. The customer can still pay the monthly bill but the excessive amount paid is paid back at the end of the year. As the price for the heat is always optimized for the customers and they never pay "too much", the district heating company might receive slightly less profit. However, the benefits for both parties are far greater. The proposal adds to the value of simplicity for district heating as the customer does not need to be educated or spend significant amounts of time and effort to find what alternative would fit them best. The customer also experiences that the heating company cares about their interests which leads to increased customer satisfaction and trust toward the company, with the effect that the customer is more likely to stay faithful to the company, strengthening the customer relationship. However, worth noting is that as an implementation of a retirement fund might result in less profit, less resources can consequently be spent on maintenance, improvements and developments of the district heating system which, by extension, might affect the customer in the long run.

Lastly, despite being argued earlier in this paper, it is safe to say that a lower price is appreciated by the customer. To refer to figure 9, this solution enhances “customer service”, as well as "local presence".

7.3 Retirement Fund

Related to the concept of district heating shares, the customer is provided with the option to invest capital in a fund created by the district heating company. Given the relatively stable nature of the business, this is a low-risk investment that gives the customer a greater sense of “connection” to their district heating company. We argue that this will raise more
interest and engagement among customers regarding district heating.
The reason why people would invest in a district heating fund instead of any other fund is first and foremost; they invest in something they are familiar with and already have a certain degree of connection to.

Secondly, as was mentioned above, the heating industry is a stable market and there will always be a demand for heat, in one way or another. Especially in densely populated areas, district heating will most definitely always have an edge against other currently existing heating methods. Thirdly, heating and pension are usually two things people do not want to dedicate much time to. Therefore, making sure that both can be taken care of by their heating distributor is something that we think would be appreciated.

Worth noting is that 2.5% of an individual’s income is decided by Swedish law to go to pension savings in funds (Pensionsmyndigheten).

Like the district heating shares, the implementation of a retirement fund falls under the category “local presence” in figure 9.
9 Conclusion

The purpose of this research was to examine how district heating companies can be competitive on the Swedish heating market. The objective was to identify customer value both from a corporate perspective as well as from a customer perspective and from that propose measures to enhance customer value. These would consequently help district heating companies to achieve better competitiveness against other heating methods, especially against geothermal heating which is its biggest competitor.

Two research questions were formulated in the beginning of the report;

RQ1: How can a district heating company more accurately meet customer value in order to become more competitive on the heating market?

In general, district heating companies need to find ways to meet customer value in order to remain competitive on the heating market. Despite the fact that companies have become more customer-oriented over the years, there is still a lot more that can be done in this matter. Companies of district heating must realize that simply delivering heat is not enough anymore, something more needs to be offered in order to create more customer value and by that also becoming more competitive. In other words, they need to utilize the message of the Kano model that tells us that delivering only threshold attributes is not sufficient if a higher customer satisfaction is sought-after.

We believe that if the relationship between the district heating company and its customers can be strengthened, less customers will look for other heating alternatives as it appears to be a connection between customer relationship and customer satisfaction. Therefore, this report has suggested three proposals that we believe can achieve this. Our three suggestions are focused around one of the core values that characterizes district heating: simplicity - customers choose district heating because it does not require much commitment. Our recommendation is that bigger district heating companies should continue to make district heating even simpler and offer the customer a complete solution that facilitates the customer’s future choices. This way, district heating can effectively meet the competition from heat pumps or other heating methods.

RQ2: What are the barriers regarding customer relationship in the district heating industry?

In order to more accurately deliver customer value, it is of high importance to address what factors that hinder further improvements of the relationship between customer and company. First of all, it has become evident that district heating and its advantages are still relatively unknown to the average citizen. We argue that it is the result of inadequate marketing and information. In addition, having access to heat is something that has become a matter of course – people just want it to work. This creates a challenge for companies of district heating when it comes to marketing and trying to build a relationship with the customer. Due to the fact that district heating consists of a large, established system that puts the customer in a rather restrictive situation, it is a big challenge to create a solid customer relationship.
The creation of local presence is another barrier for most district heating companies, especially the larger ones. There is a clear correlation between being small and local and having satisfied customers. Smaller companies have an edge against larger companies when it comes to creating a local sense of pride and connection. Today, larger companies cannot compete against the smaller companies partly because of this reason.

Another challenge is the feeling of restraint district heating entails. This is one of the reasons why people leave district heating for other heating methods such as geothermal heating. Companies must find other ways of dealing with this issue, since being tied to one district heating provider is how the district heating system works, at least for the perceivable future.

The customer must also feel that they are given value for their money. This is something that has been problem, and still is. They are only seeing a heating bill every month and that is it. They forget that they receive a reliable, high quality product from a stable and environmentally friendly energy source. Again, it is the communication that is the barrier; people do not know what they are getting or where it comes from. This also goes hand-in-hand with being transparent and letting the customer know why prices are in a certain way or what they are doing to decrease their environmental footprint. Much has been done in this area, but there is still room for improvements.
References


Merriam, S. B. (1998). Qualitative Research and Case Study Applications in Education. Revised and Expanded from "Case Study Research in Education."


Appendix I

Interview objects

<table>
<thead>
<tr>
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<th>Method</th>
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<td>Face-to-face</td>
</tr>
<tr>
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<td>26/4</td>
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Appendix II

Examples of the questions asked in the semi-structured interviews are listed below.

**District heating company interviews:**

- Why would a customer want district heating?
- How are you marketing district heating? Who are your typical customer?
- Content customers is important. How do you maximize customer value? What is customer value? How do you create trust?
- What is your prognosis for district heating in the future?
- Is your offer of district heating different from that of other district heating companies?
- One reason why customers are abandoning district heating is because they feel that they get too tied up to one distributor. What are your thoughts about this? Is it possible to create more freedom for the customer? Or would it be viable to initiate some sort of a co-operation with the customer?
- Are you transparent enough toward the customers? Is transparency needed?
- What would you do if heat pumps became even more efficient and price competitive and therefore threaten to conquer a large part of your market?
- What challenges lie ahead for your company and district heating in general?

**Heat pump company interviews:**

- Why would I as a customer choose a geothermal heat pump over district heating?
- How are you marketing your products? Who are your typical customer?
- Content customers is important. How do you maximize customer value? What is customer value? How do you create trust?
- What is your prognosis for heat pumps in the future?
- Some arguments against geothermal heat pumps is the increased electricity prices, levels of interest and service and repairs. How do you face those arguments?
- What challenges lie ahead for your company and your products?
Private individual/chairman interviews:

- What is your perception and experience of the district heating/geothermal heating in your house?
- Are there any downsides with your heating system? Have repairs been needed?
- What is the general attitude by the people in the house toward your district heating company? (Only asked to current or former district heating customers)
- Is information about consumption and cost received from the company clear and understandable?
- Have you been in touch with the company? In that case, how was your experience?
- Is the amount you pay for the heat fair?
- Are there any services you are missing?
- Have you or anyone else in the house discussed other heating options?