The mediating effect of pricing on the link between value-based principles and commercialization success.

A look at Dutch and German SMEs.

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Abstract

Purpose – This paper aims to further explore the relation between value-based principles and commercialization success by looking at the mediating effect of pricing in SMEs. It is proposed that although SMEs understand the added value of value-based principles and pricing, they lack the knowledge or resources to implement a successful value-based pricing strategy.

Design/methodology/approach – The study consists of a mixed method approach, using both a survey and semi-structured interviews with participants from Dutch and German production SMEs.

Findings – The findings of this research are that value-based pricing does lead to increased commercialization success. However, SMEs prefer to use a cost-based pricing strategy rather than a value-based pricing strategy, even when applying value-based principles. This is due to a lack of knowledge and research capabilities in SMEs to fully understand customer value, which is partially compensated for through customer involvement in the commercialization process. There appears to be a mediating effect of value-based pricing observed by the managers, but this is not supported by the quantitative data.

Practical implications – The practical implications are that managers understand the relationship between value-based principles and pricing and their effects on commercialization success but need to invest more resources into learning how to gather information about customer value and how to apply this into a successful value-based pricing strategy.

Originality/value – This study shows that although managers are aware of the benefits of value-based principles and pricing for the company, they lack the knowledge required to implement a value-based pricing strategy. Strong competition can force companies to apply a competition-based pricing strategy, even if the original price was determined using value-based pricing, this is often the case in the later stages of the product life cycle or in markets with perfect competition. Value-based pricing lends itself best for innovative companies and could increase the success rate of their products significantly.

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Introduction

In recent years the concept of customer value has gained increased attention, looking at products for the customer's point of view rather than from the business point of view. Many new concepts like co-creation (Roberts, Hughes and Kertbo, 2014), open innovation (West & Bogers, 2013) and value proposition (Skålén, Gummerus, von Koskull & Magnusson, 2014) have become common practice in many large businesses. This had led to the understanding that using value-based principles is a good way to increase the profits of a company but has the drawback of increasing the fixed costs. (Liozu & Hinterhuber, 2013; Anderson and Narus, 1995) Having increased fixed costs could reduce profitability and having a good pricing strategy could be the key to offset these costs and make a good product profitable.

There is, however, little known about the possible increase commercialization success when incorporating the customer value proposition into the commercialization process. Liozu & Hinterhuber (2013), like many other researchers, noticed that incorporating value-based principles throughout the company is essential to maximize the effect of customer value. There are several ways to incorporate customer value into the organization but information about what the customers values are is required to make an informed decision (Hinterhuber, 2004) Some researchers suggest using focus groups (Anderson and Narus, 1995), co-creation (Roberts, Hughes and Kertbo, 2014) or more modern methods of data collection like the use of the Internet of Things (IoT) and Big Data to learn about customer preferences. Finding customers who are willing to participate in co-creation or focus groups can be difficult, especially for smaller companies since their funds are limited, more so than their large counterparts. Therefor Small and Medium Enterprises (SME's) are more likely to avoid risks that might incur large expenses for an unknown amount or degree of benefits.

There is some confusion about what constitutes value-based principles and value-based pricing. Value-based principles are the ways in which companies assess what customers value in their products and help to create new products that meet the needs and wishes of the customers and does not need to involve the price that the customer pays. Value-based pricing is using the customer value to create a price for the product that matches what the customer is willing to pay with the amount of value they get in return, and is the tradeoff between what the customer gives up and receives.

This paper will look at the effects of integrating value-based principles into the commercialization process in manufacturing SME's and the effect on the commercialization success of products. This is because previous research has shown that new products have a 50-67% chance to fail during the commercialization process (Salman, Hammouda, Monsef and Sadeghi, 2014), which might be improved using value-based principles (Liozu & Hinterhuber, 2013) and value-based pricing (Lapierre, 2000). The link between the concepts seems to be evident for large firms, but much less so for SMEs. There may be constraints for SMEs that prevent them from implementing one or more aspects of a successful value-based pricing strategy (Woodruff, 1997). This leads to the research question:

"Does the pricing strategy for new products have a mediating effect on the link between value-based principles and commercialization success?"

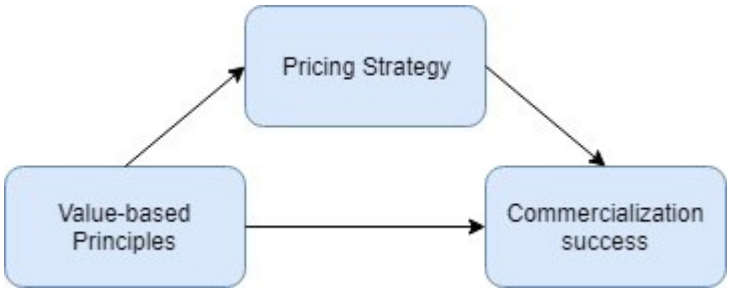

Figure 1 Conceptual model

To study the link between value-based principles and the commercialization success introduced by SME's we will perform mixed method research in several SME's in the Euregio in the Netherlands as well as in Nordrhein-Westfalen in Germany using a mixed method approach involving qualitative open-ended interviews and quantitative surveys. The data gathered will be analyzed based on statistical analysis for direct and mediating effects in the quantitative section and a thematic and network analysis to analyze the links observed by the managers.

The expected contribution of this study is to broaden the understanding of the effects of using customer value-based pricing rather than cost-based or competitor-based pricing on the commercialization success. There has been research in the past that has shown significant benefits for larger firms, but that there might be a barrier to use value-based principles because of knowledge, positioning and monetary requirements (Woodruff, 1997).

This paper will start with a theoretical framework that showcases the relevant scientific publications regarding the subjects of product commercialization and customer value. In the method section the research setting, data collection method, and scale development will be explained further along with the manner of the data analysis. The analysis will first focus on the quantitative data gathered from the surveys followed by additional supporting evidence from the thematic and network analysis of the interviews. From the analysis, the conclusion will be drawn in which the research question is answered. In the discussion, the limitations, implications, and recommendations for future research will be given.

Theoretical framework

The focus of this study lies on the commercialization success of new products, created by SMEs, that incorporate value-based principles. Therefore the layout of the theoretical framework will consist of an explanation of the key concepts with an outline of the existing theory regarding the subject. This will start with an examination of what SMEs consider commercialization success, and explanation of what value-based principles are and the underlying concepts, an investigation into the most commonly used pricing methods and why they are included in this research. This will be combined into an investigation into what the commercialization process looks like in SMEs and finally the hypotheses development.

Commercialization success

Introducing a new product into the marketplace can be a daunting task, even for established businesses. Every company wants their product to succeed in the commercialization process, but what success is, is highly dependent on the project and/or the company that is involved in the product creation (Griffin & Page, 1996). Commercialization success can be measured in many different ways: larger market shares, creating new markets, meeting customer demands and wishes, turnover or profits. Sohn & Moon (2003) for instance, apply customer satisfaction as a predictor of commercialization success, while Link & Scott (2010) use the number of sales as the measure for commercialization success. Griffin & Page (1996) even use 18 different measures of success because they saw that commercialization success is elusive, multifaceted and difficult to measure. This means that it is important for a company to think about the goals that the product should meet during the commercialization process.

Some companies develop products without considering the marketing and commercialization of the product in the early development stages, this could lead to losses instead of market share increase or profits (Salman, Hammouda, Monsef & Sadeghi, 2014) This is a trend that can be seen among multiple sectors. Salman et al. (2014) did a review of studies regarding product development and commercialization processes. They found that many companies struggle with the commercialization process, especially for non-perishable products as the competition could have enough customers and long-running contracts that the new product could sit on the shelves for a long time. This would suggest that commercialization success is also tied in with innovation. Because if the products are innovative, the inventing company needs a very strong marketing position, to make a product successful (Cooper, 1983) This can be limiting to SMEs, as Salman et al. (2014) identified that the two additional environmental influences for new products are capital to produce the new products and customers for the product. SMEs usually do not have the capital or marketing position to adequately promote their product or simply do not have the expertise.

These are not the only obstacles though, even larger companies that do possess the capital, expertise, and position a lot of products fail the product commercialization process. Salman et al. (2014) found that 50-67% of all new products fail the commercialization process, regardless of the commercialization process measure. Griffin & Page (1996) state that customer-focused measures, financial return and technical advantage are all viable options to measure commercialization success. But customer-focused measures are the preferred method for measuring commercialization success (Griffin & Page, 1996), which should mean that further development of value-based principles leads to increased commercialization success.

Value-based principles

Customer-focused measures are the preferred method for measuring commercialization success, therefore taking the customer value into account is important. Value-based principles are the ways in which companies assess what customers value in their products and help to create new products that meet the needs and wishes of the customers. The main topics that will be discussed are understanding customer value, acquiring knowledge about customer value and applying the knowledge to customer value. These are the steps that companies employ to help create new products based on customer value, and are the value-based principles.

Understanding customer value

To understand value-based principles we first need to look at customer value. As early as 1995, Anderson and Narus (1995) identified that understanding customer value and letting customers focus on the total cost of a purchase rather than the initial purchase cost could have a large impact on the profits of a company, without reducing costs or other conventional ways to increase profits. But what is customer value? Sweeney & Soutar (2001) identify four dimensions of customer value: emotional, social, quality/performance and price/value for money. Not all these dimensions are easily quantifiable and there is a certain amount of trade-off for the customer, what they are willing to give up to receive the product. This is the same definition that Woodruff (1997) has, he defines customer value, after reviewing previous definitions, as the perception of the customer of the trade-off what they receive and what they give up to receive the product.

There have been many efforts to make customer value more measurable. Anderson and Narus (1995) suggest that using focus groups might be a good source of information for the customer value. Whereas Sweeney & Soutar (2001) have developed a 19-item scale called PERVAL that companies can use to assess the consumer value of durable goods at the brand level and Lapierrre (2000) identified ten drivers of customer value among three different categories: product, relationship, and service. This means there is no lack of methods to attempt to make customer value more measurable but there is much confusion about what the best methods are, as these are dependent on the industry and the capabilities of the company.

Although there has been much confusion about customer value here three sides to customer value: product, service, and relationship. These seem to be the same across almost all research. For the product side of the value drivers alternative solutions, the quality of the product and the customization of the product are identified (Lapierrre, 2000). The service side of the value drivers consists of responsiveness, flexibility, reliability and technical competence (Lapierrre, 2000). finally, the relationship side of the value drivers consists of the supplier's image, trust and the supplier solidarity with customers (Lapierrre, 2000). This is also what Leroi-Werelds, Streukerns, Brady & Swinnen (2014) saw when looking into the subject. They concluded that customer value is a hard thing to measure (Leroi-Werelds, Streukerns, Brady & Swinnen, 2014) and is always a tradeoff between the benefits and costs for the customer. This is one of the reasons that Anderson and Narus (1995) chose to make comparisons to the competition rather than individual properties of the product. Therefore customer value is defined as the advantages that a product has for the customer. This includes all aspects of price, service relationship, technical capabilities and quality described above. Customer value is very broad and research or customer involvement are necessary to understand what the customer values are in a specific industry or for a specific product.

Acquiring knowledge about customer value

Information about customer value can be acquired in many different ways, however knowing what information is required and obtaining the information itself are two different things. There are two main ways of acquiring this information: by involving the customer to create a new product and through research, both will be examined in this section.

Customer involvement

Customer involvement in the commercialization process can take many forms, from the early stages where through the use of co-creation products are created using input from the customer, using their ideas and incorporating their wishes in the design of the product, all the way till after initial release, where information about customer values can be obtained through satisfaction measurements. Companies can use this information to improves their products and their understanding of customer value, by involving their customers in the commercialization process.

Co-Creation

Co-creation is the creation of new products or services that involve both the company making the product and input by customers or outside inventors. In contradiction to innovation solely by the company, co-creation requires active customer input to function. (Cook, 2008) Not all industries lend themselves well to co-creation, certain industries where a new IP is incredibly important usually opt for value co-creation after production and launch due to the possibility of leaks (Roberts, Hughes and Kertbo, 2014). The industries that do lend themselves well to co-creation could have significantly more insight into the things that their customers value, but when looking at co-creation, one of the most important things to keep in mind is that the firm needs to put in as much effort as the individual (Roberts, Hughes and Kertbo, 2014). So at both the organizational and individual levels a lot of effort is required to use co-creation. The co-creation process doesn't improve innovation or customer value on all aspects, One of the major contributions of Martinez (2013) is that the innovation velocity might not be improved by co-creation, because of the time required to build and nurture relationships. Another misconception is that the customers who are willing to help or work with the company know what the goal is. One of the things that must be made apparent to customers willing to participate in co-creation, or otherwise helping the company develop a better value proposition, is what the supplier wants to focus on and what information the company wants to know. (Anderson & Narus, 1995) Communication, therefore, is very important in co-creation. But because of the resources that companies need to spend on co-creation companies with a smaller R&D budget might not be able to participate in co-creation.

Measuring customer satisfaction

Customer satisfaction is another method to acquire information about customer value and is a very important aspect of value-based principles because the goal is creating a product that offers the best value and satisfaction to the customer. Customer satisfaction has been widely researched and is broadly seen as a useful tool to increase understanding of customer value. However, only a few companies measure customer satisfaction and even fewer act upon the results (Dutka, 1994). The main reason to choose to focus on customer value over customer satisfaction is that, even when consumers are satisfied, they may choose to buy somewhere else (Woodruff, 1997). Whereas if the product has the properties that the customer truly values this may not be the case (Lapierre, 2000). Like customer satisfaction, customer value is personal and changes over time and could change rapidly (Flint, Woodruff and Gradial, 2002). In other words, what satisfies one customer might not satisfy the next customer, even a repeat customer might be

dissatisfied as the properties they value might have changed over time. Martinez (2014) indicated that having the customer in the foreground when innovating is necessary when focusing on customer value and should be reflected in all company activities. Customer satisfaction measurement is just one of the ways in which companies can do this. The largest downside to customer satisfaction measurements is that it requires the customer to have access to the product, therefore it can only be applied in the later stages of commercialization, or when the product is already on the market.

Research

Next to involving customers directly, research can be used to search for information about customer value. Research falls into two main categories: scientific and market research.

Scientific research

Some of the issues faced by companies in acquiring the knowledge about what the customer value is could already have been researched and solutions found. Some of the struggles that companies face in implementing these new technologies and practices might already have solutions that have been found in scientific research. Woodruff (1997) predicted that businesses and research institutions would work more closely together and this would increase the speed at which new research could be distilled and used in organizations. This trend is supported by anecdotal evidence but very little empirical research has been done so far. In the past 20 years, value-based pricing and principles have gained much more attention, because it became more apparent that customer value would be the new source of competitive advantage after concepts like quality management re-engineering, downsizing and restructuring customer value (Woodruff, 1997). Because of the relative youth of value-based principles, Gassmann & Enkel (2004) recognized that using scientific knowledge from external research and development could lead to a significant increase in customer value when applied by companies. Not all companies might have access to scientific research, but market research could prove a valuable resource when it comes to acquiring knowledge about customer value.

Market research

Market research is all the research that a company does to better understand the market and their customers and comes in many forms. Sweeney & Soutar (2001) show that if the sales staff that has direct contact with the customers have in-depth knowledge of customer value they can aggregate value without having to offer discounts. But technological advancement can also be seen in the gathering of data, a great example of this is the rise of mobile devices and the interconnectivity and abilities of these devices. Lee & Lee (2015) show that the Internet of Things (IoT) is one of the fastest growing and possibly one of the most important areas of future technology. Because IoT allows for communication between people and people, people and things and between things the amount of data that could be gathered from customers is greatly increased. Lee & Lee (2015) show clear indications that the data collection is becoming increasingly digital with no signs of stopping. This vast amount of data collected by IoT could also be used to gather information about customer value and preferences, requiring much less active input from the customer (Ramdani, Kawalek & Lorenzo, 2009). Meaning that it can prove valuable to companies, especially those that lack the capabilities for a strong relationship with the customer. This, however, does not mean it can completely replace the relationship aspects.

SMEs use many different forms of digital data collection and management, driven mostly by technological advancement and internal factors (Ramdani, Kawalek & Lorenzo, 2009). Although companies could

gather a vast amount of information this way, this does not mean it is per definition better than the focus groups suggested by Anderson and Narus (1995) or the co-creation that Roberts, Hughes, and Kertbo (2014) support. This is because the data is largely circumstantial and for instance, heavy use of a certain app could be seen as a good value proposition but this is not necessarily the case. The app might be the only one offering the service rather than having taken into account the aspects that provide real value.

Applying customer value

Once the data in gathered on what the customers value, this still needs to be applied to the products. Creating a company or altering a company to focus primarily on customer value is no easy task, but has become increasingly important. One of the major consequences of not taking customer value into account could be that the customers lose confidence in the brand, which could result in a significant loss of sales (Sweeney & Soutar, 2001). But not all aspects of the customer value proposition can be controlled by the company, in fact, far from it, it can be difficult to know what to focus on. Like in other research, Flint, Woodruff, and Gradial (2002) found that environmental conditions have a significant impact on the customer value. In a business-to-business setting, the desires of the customers of your customers are also important as well as the competition of your customers and their macro-environment. In turn, the performance and offerings of the suppliers are also important for the customer value (Flint, Woodruff and Gradial, 2002). This shows that environmental conditions affect customer value mainly in comparison with other offers, whereas the development of the product, service or relation could generate value regardless of other offers.

As stated previously, the customer value is a tradeoff between what the customer gives up and what the customer receives. For customer value the parts that the customer sacrifices are price, conflict and time/effort/energy (Lapierrre, 2000). Because of this tradeoff, increasing the benefits for the customer is important. Creating these advantages should be done in the early stages of the commercialization process, for instance by applying the information from market research or by co-creation. Using an open innovation co-creation process a mutually beneficial innovation agenda could be created, making the benefits known to the customers before commercialization and creating a better value proposition for the customers (Martinez, 2014). Communicating the value for the customer effectively could also be the final step, but it is required. Otherwise, customers might not perceive the added value of the product to them (Nagel & Müller, 2018). Anderson and Narus (1995) focus on making the advantages of buying from the company in question directly apparent and clear for the consumer or customer. This step is often overlooked, but only a fraction of the customers will see the true value of the product for them if they are not actively searching for it or they are made aware of the value (Nagel & Müller, 2018).

Applying the customer value, thereby using all of the steps of value-based principles, is using all the information gathered and the understanding of what customers value in the entire product design process. As shown, this can be done during the development through co-creation efforts or by making adjustments after the product launch with, for instance, customer satisfaction measurements. However, this is only effective if the company knows what to look for and the customer is made aware of the value for them.

Pricing

The third concept in this paper is the concept of pricing. There are many methods that companies may use to determine the optimal selling price for their products. This is a relatively new phenomenon that has not received much attention in the past, Hinterhuber (2004) saw that pricing was receiving little attention from both businesses as well the academic world, even though it was already clear that pricing had a significant impact on the profitability of a company. This is even stranger since it was already clear that having a good pricing strategy could lead to large increases in profit, increasing the price by 5% leads to an average increase of 22% in operating profits (Hinterhuber, 2004).

With regards to the pricing strategies, Liozu, Hinterhuber, Perelli & Boland (2011) found that cost-based pricing and competition-based pricing are still the most commonly used methods even though most scholars agree that value-based pricing offers superior commercialization success. SMEs often used competition-based pricing (Cunningham & Hornby, 1993), simply because they do not have the expertise or influence to adequately use value-based pricing. However, SMEs might have a significant increase in profitability if they use value-based pricing (Liozu & Hinterhuber, 2013). There are other strategies that companies apply, like demand-based pricing, but these three pricing strategies (cost-, competition- and value-based pricing) cover the vast majority of businesses. Because of the frequent use of these pricing strategies will be included in this research.

Value-based pricing

Value-based pricing is using the customer value to create a price for the product that matches what the customer is willing to pay with the amount of value they get in return. It can be tricky to apply value-based principles since like stated previously, customer value has a personal aspect and is dependent on external factors. This is most likely why value-based pricing is often found in markets where customer segmentation is already used because customers with similar wishes can be grouped together (Liozu & Hinterhuber, 2013). There are some contradictions in the literature regarding the use of value-based pricing. It is widely accepted that value-based pricing leads to an increase in firm performance regardless of size, industry or geography (Liozu & Hinterhuber, 2013). But on the other hand, Lapierre (2000) identified the price as one of the least important drivers of customer value. The price is apparently not one of the most important aspects of a new product for the customer, as long as they get what they pay for. This could be the reason why the main benefit from a business perspective of value-based pricing is a possibility of increasing prices without losing sales (Hinterhuber, 2004) because the product's features are much more important than the price (Lapierre, 2000).

There are also some misconceptions about value-based pricing. For instance, that product differentiation is a good way to increase the customer value. Hinterhuber (2004) showed that differentiation does not mean added value, it is only a source of added customer value when the differentiating feature is of real value to the customer. Another misconception is that value-based pricing is hard to apply, being in contact with the customers can be enough to apply some form of value-based pricing. In fact, Rapaccini (2015) found that manufacturing companies with advanced services are increasingly making the shift from a cost- or competition-based strategy to a value-based strategy because it was easier to use. This is due to the complexity of calculations and amount of data required that for instance, cost-based pricing, has when applied to a complex product, making value-based pricing the expected choice.

Value-based pricing increases the firm's performance (Liozu & Hinterhuber, 2013). This is however not without risks, one of the major drawbacks of value-based pricing is the fixed costs of a company will go up and might exceed the increase in revenues, gross margins or both. This would result in less profitability even though the customer value and sales might go up (Liozu & Hinterhuber, 2013). But in practice, this has not been observed so far and value-based pricing is seen by most researchers and businesses as a better alternative than the competition-based pricing or cost-based pricing.

Cost-based Pricing

Cost-based pricing is a pricing strategy that uses the costs to the company as the basis for the retail price so that the company makes a profit or at least covers its costs (Courcoubetis & Weber, 2003). In most cases, this is a fixed margin on top of the manufacturing costs, including overhead, personnel, materials and other costs related to the manufacturing process. Most companies use a Cost-based pricing model, namely cost-plus pricing(Avlonitis & Indounas, 2005). Cost-plus refers to the method of cost-based pricing where a profit margin is added to the average cost of a product (Avlonitis & Indounas, 2005).

Companies apply cost-based pricing because they are familiar with it and because there is an aura of financial prudence behind cost-based pricing (Nagle & Müller, 2018). This is why over 50% of companies apply cost-based pricing (Avlonitis & Indounas, 2005; Liozu et al., 2011). And it can be very effective, Banker & Hansen (2002) found that using a full-cost-based heuristic pricing strategy, in which all variable and fixed costs, as well as a markup, are taken into account that is adjusted to obstacles and issues faced during the production process, offers a near optimal profitability of products. Cost-based pricing can also be very effective in keeping new entrants to the market at bay, due to the (often) lower production costs of established companies newer companies might not be able to turn a profit (Courcoubetis & Weber, 2003).

There are some considerable downsides to cost-based pricing, however. Costs of a product are often not predictable during the development stage of the product and after commercialization, the price may change due to volume scaling or material costs (Nagle & Müller, 2018). The complexity of the product also plays a role, cost-based pricing can still be effective, but only if the products are simple enough to be able to calculate the costs associated with the product. For more complex products, cost-based pricing might only be used as a bottom line for the product profitability (Rapaccini, 2015). These, however, are only minor downsides to cost-based pricing. Much more serious downsides are that cost-based pricing will lead to “overpricing in weak markets and underpricing in strong ones”, this is directly opposite to what a financial sound pricing strategy would be (Nagle & Müller, 2018). It can also be expensive because cost-based pricing requires the company to measure the amount of time spend, the materials used, types of machines used and the labor costs to make an accurate assessment of what the product costs actually are. Even with the expenses, it completely ignores market conditions and might not be the optimal price point for a product (Avlonitis & Indounas, 2005). Beyond that, keeping a price that keeps new entrants away might be favorable to the company but could be in direct conflict with social welfare maximization, meaning that customers might lose out in the long run (Courcoubetis & Weber, 2003).

Cost-based pricing is the most commonly used pricing strategy but it has significant downsides and might not be a favorable pricing strategy, both for the customer and the company. Therefore, it might also not be the best pricing method and is why most scholars see value-based pricing as the superior way to determine price (Liozu, Hinterhuber, Perelli & Boland, 2011).

Competition-based pricing

Competition-based pricing is a pricing method that uses the price point of the competition as the basis for the retail price. This often leads to a situation where companies that can produce similar features for a lower price achieve a higher profit margin or can price their competition out of the market. As stated previously, Avlonitis & Indounas (2005) found that competition-based pricing is one of the traditional and preferred methods of pricing for companies, being the second most used pricing strategy after cost-based pricing. Although cost-based pricing is the most commonly used pricing strategy, Nagel & Müller (2018) found that in most markets, the price is set by the competition rather than by a cost-based or value-based pricing approach. This is because of the market pressure, which can lead companies to apply competition-based pricing rather than cost- or value-based pricing even when it is not the preferred method of pricing (Rapaccini, 2015).

Liozu & Hinterhuber (2013) saw that focusing on the competition rather than the customer could decrease the customer value of a product and draw attention to the features of competitor products. This is the same observation that Hinterhuber (2004) made almost a decade earlier. However, focusing on the competition is often easier than setting a price. But, one of the downsides of using competition-based pricing is that, by definition, there has to be competition in the market. In highly innovative or new markets there is no competition in the early stages, making competition-based pricing only viable in established markets and the later stages of product life. Avlonitis and Indounas (2005) implied that competition-based pricing has the exact opposite problem of cost-based pricing, focusing too heavily on the market and not enough on the individual properties of the product.

The applicability of competition-based pricing is also subject to the nature of the market where the company operates (Courcoubetis & Weber, 2003). In a perfect competition setting, companies might not be able to use anything else but competition-based pricing or a combination of competition-based pricing and another pricing method, whereas in an oligopoly companies might be able to partially ignore their competition (Courcoubetis & Weber, 2003).

Commercialization process in SMEs

Like stated above, large companies are already using value-based pricing to great effect. However, much less is known about how SMEs apply value-based pricing strategies. SMEs are everywhere, they account for 99% of all European businesses (European Commission, n.d.). One of the things SMEs are good at is flexibility and innovativeness, Chesbrough (2006) provided indications that SMEs generate more new technology and knowledge compared to large enterprises. This is probably why "SMEs are the backbone of the economy" as stated on the official website of the European Commission (European Commission, n.d.). SMEs are the everything from self-employed people to businesses with up to 250 employees, less than 50 million turnover or less than 43 million balance sheet total (European Commission, n.d.) This is also how SMEs are defined for this research.

Because of the innovativeness of SMEs, they release many new products. These new products and features need to be introduced into the market and to do that the products need to have a price. Three of the most commonly used practices are value-based, cost-based and competition-based pricing. SMEs often used competition-based pricing (Cunningham & Hornby, 1993) simply because they do not have the expertise or influence to adequately use value-based pricing. However, SMEs might have a significant increase in profitability if they use value-based pricing (Liozu & Hinterhuber, 2013). Because of the lack of research

on value-based pricing in SMEs and the importance of SMEs, this research will focus on the relations that have been found in large companies and examine whether SMEs exhibit the same relationships.

Hypotheses

From the review of previous research, it became clear that in larger firms, the use of value-based principles should have a positive effect on the commercialization success of products. This is because the companies can take the customer preferences into account when creating the products. This effect is also expected to occur in SMEs, therefore the first hypothesis is:

H1: Value-based principles have a direct positive effect on commercialization success.

The use of value-based principles should have a positive effect on the commercialization success. Liozu & Hinterhuber (2013) saw that value-based pricing is a good way to increase the profitability of products, rather than for instance competition-based pricing. From the theory, value-based pricing should be the most profitable pricing strategy and should be based on value-based principles, this is because the core of value-based pricing is creating a price based on what the customer values. Value-based principles assess what the customer values, the relationship between value-based principles and pricing is therefore expected to be positive.

H2: Increased use of value-based principles leads to an increased use of value-based pricing.

As stated above, value-based pricing should also increase the commercialization success (Hinterhuber, 2004). However, most of the studies were conducted in larger companies and SMEs might not have the resources or knowledge to apply value-based pricing. The SMEs that do apply value-based pricing are expected to have a greater commercialization success than the competing companies that apply either cost-based or competition-based pricing.

H3: Value-based pricing has a direct positive effect on commercialization success.

Using these three hypotheses the entire model as displayed in Figure 1 can be tested and the research question: "*Does the pricing strategy for new products have a mediating effect on the link between value-based principles and commercialization success?*" can be answered. In the method section, the research setting and data collection methods will be explained.

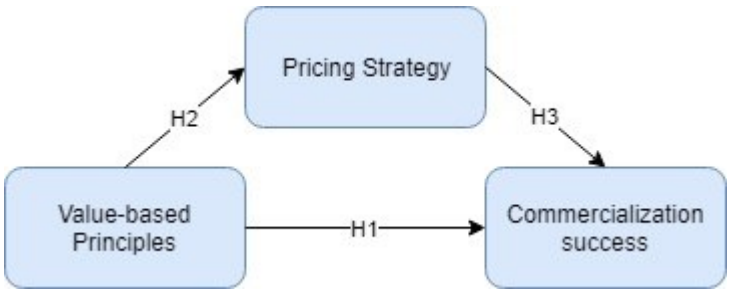

Figure 2 Conceptual model with hypotheses

Method

The method of this research will consist of conducting interviews and surveys in Dutch and German SMEs. In this section, the research setting and data collection methods will be explained along with the scale development of the survey. In order to gather the required data to answer the research question, both survey and an interview data will be gathered from the participating companies. This will be used to answer the research question and the hypotheses using linear regression and mediation testing using the survey data, followed by the coding, thematic analysis and network analysis of the interview data to support the findings of the quantitative analysis.

Research setting

The interviews will be conducted in the Netherlands in the Euregio region, close to the German border and in the neighboring region Nordrhein-Westfalen in Germany. All the companies must be SME's with between 20-200 employees and have a turnover of 10-100 million Euro. This excludes some of the smallest companies who would have many overlapping responsibilities. The reason for using the SME's is the lack of research on value-based pricing and principles in SMEs, as outlined in the literature review. The purpose of interviewing multiple people in the same companies is to gain a broader perspective in the company about the use of value-based principles that having a single person with multiple responsibilities might not have. This is used to increase the understanding of the possible mediating effect of value-based pricing on the link between value-based principles and commercialization success. By having multiple perspectives in multiple SMEs the perceived links, as well as the actual effect size, can be analyzed. The sample selection criteria will be outlined in the following section. The timeline of the data collection is three months to find companies and set-up interviews with key personnel, followed by three months of conducting the interviews and analyzing them.

Sample selection criteria

For the survey, several variables will be included to show hetero- or homogeneity of the sample as well as external and internal influences on the relationship between pricing and product success.

Table 1 Sample Selection Criteria

Sample Selection Criteria	Description	Operationalized item
Location of the company	In which region the company is located.	- The Netherlands - Germany - International
Industry	For which industry the company produces goods.	- Consumer goods - Industrial - Combination of both
Location of customers	In what parts of the world the company does business	- Only in own country - In Europe - International
Size of the company	How many employees the company employs.	- Less than 20 - Between 20 and 50 - Between 50 and 100 - Over 100
Innovativeness (Chesbrough, 2006)	How frequent the company creates new products	- Almost never - Sometimes - Moderate - Frequent - Focused almost exclusively on innovation

These sample selection criteria (see table 1) are based on the internal discussions with both internal and external supervisors of possible influences on the relationships.

Data collection

To test the hypotheses a series of interviews with 30 different companies. The data collection will be carried out over a period of three months. In each of the companies, interviews will be conducted with one to two personnel members directly involved in the creation and pricing of new products and the commercialization process. The interviews will be semi-structured and conducted sequentially. Before the interview, a small survey will be given to the participating personnel to gather information that is more objective and that would be time-consuming to answer in an interview. If participants have not answered the survey before the interview, the interviewer will make time at the end of the interview to ensure that both data collection methods are used with every participating company. All the collected data from the interviews will be transcribed and the entire dataset or relevant answers collected will be used for the analysis.

Data sampling

The participants of this study will be contacted through contact information gathered from the Chamber of Commerce as well as local SME associations. Every company that matches the criteria, as laid out in the research setting, will be contacted using emails and phone calls. Using this method the vast majority of production SMEs in the region can be contacted to get a representative sample. A large number of companies will be contacted due to the time required for participation, so the expected participation rate is low.

Scale development of the Survey

To look at the links hypothesized, a questionnaire will be devised to determine the extent to which certain pricing methods are used by a company, the commercialization success, and the value-based principles.

Value-based principles

Knowing what a customer values when creating a new product is of value for all businesses. But for companies who plan to use a pricing strategy based on value-based pricing, this should essential. For this research, the focus will lie on the gathering of the data of what customers truly value, either by co-operating on the development of new products or through other information gathering activities. Because previous research is largely focused on how to assess customer value rather than gaining an understanding of how the companies collect information on customer value, the following items have been created to test the latter. This way there will be a more complete understanding of how much and which data companies collect. This construct and its items have to be validated and tested for consistency in the analysis.

Table 2 Value-Based Principles Survey Items

Construct	Source	Item	Operationalized item
Value-based principles	Woodruff (1999)	Macro-environmental data	We take technical advancements into account when creating a new product
	Woodruff (1999)	Customer complaints data	We use customer complaints to help create a better product
	Woodruff (1999)	Competitors offer data	We use information about competing products to help create a better product
	Woodruff (1999)	Salesperson call reports data	We use feedback from our salespeople to better understand customer value
	Woodruff (1999)	Customer targeting data	We use data to know what customers to focus our new products on.
	Woodruff (1999)	Customer value determination research data	We use scientific literature to determine what our customers value.
	New item based on Roberts, Hughes, and Kertbo (2014)	Co-creation activities	We work together with our customers to create new products

The item "co-creation activities" was added, because the theory showed that that co-creation has become an important part of value-based principles.

Pricing

The hypotheses look at value-based pricing as the pricing strategy, in order to compare differences in the effectiveness of pricing strategy and all three pricing strategies mentioned in the theory: cost-based, competition based and value-based pricing will be included in the survey. The items for cost-based and value-based pricing are adopted from the widely used paper by Ingenbleek, Debruyne, Frambach & Verhallen (2003) accompanied by the additions that were made by Liozu & Hinterhuber (2013) on competition-based pricing. These items will be operationalized to more accurately fit the research. The survey items can be found in Appendix A. The pricing will be split into three sections to reflect the most commonly used pricing strategies: Value-based, Cost-based and Competition-based pricing.

Table 3 Value-Based Pricing Survey Items

Construct	Source	Item	Operationalized item
Value-based pricing	Ingenbleek et al. (2003)	The advantages of the product compared to competitors' products	Our new products have better/more advantages than the products of the competition
	Ingenbleek et al. (2003)	The customer's perceived value of the product	Customers see our products as good value
	Ingenbleek et al. (2003)	The advantages the new product offers to the customer	Our products offer advantages to the customer
	Ingenbleek et al. (2003)	The balance between advantages of the product and price	The price and the advantages of the product are balanced
	Ingenbleek et al. (2003)	The advantages of the product compared to substitutes	Our new products have better/more advantages than other products that fulfill a similar need

The items for the value-based pricing construct are mainly focused on the advantages that the product has, either solely based on the merits of the product or in comparison with other substitute products. It is based on the widely used scales from the Ingenbleek et al. (2003) survey.

Table 4 Cost-Based pricing Survey Items

Construct	Source	Item	Operationalized item
Cost-based Pricing	Liozu & Hinterhuber (2013)	Variable costs of products/services	We have a good understanding of the variable costs of a new product
	Liozu & Hinterhuber (2013)	Price necessary to break-even	A good price point is necessary to break-even
	Liozu & Hinterhuber (2013)	Investments in products/services	We have a good overview of investments in the new product
	Liozu & Hinterhuber (2013)	Target margin guidelines	Before the launch of a new product, we set clear target margin guidelines
	Liozu & Hinterhuber (2013)	Target return on sales levels	Before the launch of a new product, we set clear return on sales guidelines
	Liozu & Hinterhuber (2013)	Variable costs of products/services	We have a good understanding of the variable costs of a new product
	Liozu & Hinterhuber (2013)	Investments in products/services	We have a good overview of investments in the new product
	Liozu & Hinterhuber (2013)	Target margin guidelines	Before the launch of a new product, we set clear target margin guidelines
	Liozu & Hinterhuber (2013)	Target return on sales levels	Before the launch of a new product, we set clear return on sales guidelines

The items from the construct cost-based pricing are focused on the use of cost calculation, targets and the necessity of a break-even point. Although the last point might seem obvious for any pricing strategy there are many objectives that a product can be focused on that supersede break-even or profit. For instance, a product can be focused on market share, advantages for the customer or having a complete offering.

Table 5 Competition-based Pricing Survey Items

Construct	Source	Item	Operationalized item
Competition-based pricing	Ingenbleek et al. (2003)	The price of competitors' products	We have a good understanding of the competitor's pricing strategy
	Ingenbleek et al. (2003)	The competitor's current price strategy	We know the price of the competitor's price
	Ingenbleek et al. (2003)	The estimation of a competitor's strength to react	We are likely to alter the price of our product based on the strength of the competition
	Ingenbleek et al. (2003)	The market structure (number and strength of competitors)	We that the number and strength of the competition in the market into account when setting a price point
	Ingenbleek et al. (2003)	The degree of competition in the market	We consider the degree of competition in the market to set a price point
	Ingenbleek et al. (2003)	The competitive advantages of competitors on the market	We take the competitive advantage of our competitors into account when launching a new product
	Ingenbleek et al. (2003)	The price of competitors' products	We have a good understanding of the competitor's pricing strategy
	Ingenbleek et al. (2003)	The competitor's current price strategy	We know the price of the competitor's price
	Ingenbleek et al. (2003)	The estimation of a competitor's strength to react	We are likely to alter the price of our product based on the strength of the competition
	Ingenbleek et al. (2003)	The market structure (number and strength of competitors)	We that the number and strength of the competition in the market into account when setting a price point
	Ingenbleek et al. (2003)	The degree of competition in the market	We consider the degree of competition in the market to set a price point
	Ingenbleek et al. (2003)	The competitive advantages of competitors on the market	We take the competitive advantage of our competitors into account when launching a new product

The items for the competition-based pricing construct focus on market structure, the pricing strategy of the competition, relative capabilities and the degree of competition. These are important factors to determine if a company uses competition-based pricing and if so, to what extent.

Commercialization success

In order to determine the commercialization success, the work of Ingenbleek et al. (2003) is used to ensure the largest consistency between the survey constructs. The survey items themselves will be supplemented with a "Commercialization success" item which measures the approximate success rate of new product in the eyes of the company. This is done to ensure that even when companies apply other measures of success than listed by Ingenbleek et al. (2003) the commercialization success of a company could be measured.

Table 6 New product Commercialization Success Survey Items

Construct	Source	Item	Operationalized item
Commercialization success	Ingenbleek et al. (2003)	Turnover objectives since its launch	New products reach their turnover objectives on time after launch
	Ingenbleek et al. (2003)	Profit objectives since its launch	New products reach their profit objectives on time after launch
	Ingenbleek et al. (2003)	Market share objectives since its launch	New products reach their market share objectives on time after launch
	Ingenbleek et al. (2003)	Competitive advantage objectives since its launch	New products reach their competitive advantage objectives after launch
	New item based on Salman et al. (2014)	Commercialization success	Our new products are successful

Interview Questions

The interview questions were developed on the bases of the literature used to create the survey questions for the correspondent construct. The entire list of interview questions can be found in Appendix B. Since the questions were created as part of a larger research the source of the other questions could not be given.

Table 7 Interview question development

Construct	Source	Item	Operationalized item
Pricing	Ingenbleek et al. (2003) & Liozu & Hinterhuber (2013)	Pricing strategy	What pricing strategy is used for new products?
New Product Success	Ingenbleek et al. (2003)	Measure of success	What is the most important measure of success for new products?
Value-based principles	Woodruff (1999)	Customer value	How do you assess what customers value in your products?

Method of Analysis

The analysis will be carried out in two steps: the quantitative and the qualitative. The quantitative analysis will be carried out first. Before this analysis, the data will be checked for missing data, entry errors and normality. During the analysis, the constructs will be created based on the constructs stated in the scale development, namely: value-based principles, value-based pricing, cost-based pricing, competition-based pricing, and commercialization success. These are the operationalized constructs from the research model (see Figure 1) and will be based on the items used in the survey (see Appendix B). The internal constancy will be checked using Cronbach's Alpha to ensure that the items are measuring the same construct.

These constructs will be used in the quantitative analysis, that is based on multiple linear regression to test the hypotheses and a Sobel test to test the mediation. The effects on cost-based pricing and competition-based pricing will also be examined next to the value-based pricing as a comparison.

The quantitative analysis is followed by a qualitative thematic analysis that will start with establishing a coding scheme using deductive and inductive approaches. The deductive approach will use the codes that are established beforehand using the theory whereas the inductive approach uses the interviews themselves to find additional codes until saturation has been achieved. If variations within the codes appear, they are also added to the coding scheme. Finally, these codes will be evaluated and together form the coding scheme. The second round of coding will be conducted, following the same pattern of deductive (retrieved from the coding scheme), inductive, variation and evaluation. Any new codes found during the second round will be added to the coding scheme until saturation has been achieved again, and then applied to the other interviews. Interviews that had already been coded will be re-examined and the additional codes will be applied. After two rounds of coding, a revision of the entire coding scheme will be done, to remove unused codes and check if all the relevant data from the interviews has been coded. If this is not the case, round two will be conducted again until no new codes appear.

These codes will be used to conduct an explorative thematic analysis to find the core themes in the data as well as the underlying themes. These themes will be based on the coding scheme and represent the most important subjects as they relate to the research question. Common themes will include pricing methods, value-based principles, and commercialization success. By analyzing the data using the themes, the attitudes of the managerial staff towards value-based principles and pricing as well as commercialization success can be framed and used to support the findings of the qualitative analysis. The thematic analysis will provide insight into why managers have a certain attitude toward certain pricing strategies.

The network analysis will study the links that are pertinent to the research question and will look into the perceived effects that value-based pricing and principles have on commercialization success. The links analyzed will be:

- The link between value-based principles and commercialization success
- The link between value-based principles and value-based pricing
- The link between value-based pricing and commercialization success

The links will be examined in the context of the sentence (co-occurrence) and in context of the entire interview using pattern analysis of the total mentions in each interview. The variations of the codes will play a key role in this to determine not only if there is a perceived link between the themes but whether or not the link is perceived to be positive or negative. The purpose of the qualitative analysis is to check and support the findings of the quantitative analysis and bring new insights into the perceptions of the managers regarding the links studied.

The use of both quantitative and qualitative methods will show a clear picture of not only the perceived methods applied but also the degree to which the pricing strategies and value-based principles are used within the companies. This coupled with the interview and survey questions regarding how companies perceive commercialization success and if they find their products to be successful will give an overview of the same links that are found in large companies hold true for SMEs and whether or not those links are perceived as such by the managers. The sample selection criteria will be included in the analysis to find

whether the effects of value-based pricing are the same for all SMEs in manufacturing or that there are distinct differences based on the experience of the managers, industry, education, size of the company or geographical location.

Analysis

As stated above, a mixed method approach is also applied to the analysis. The first step in the mixed method approach for this research is statistical analysis using SPSS. This means that the constructs will be created based on the survey data and tested for consistency and normality. These constructs will be used to measure the direct and mediation effects of the model, thereby answering the hypotheses. Due to the fact that not all the data was able to be collected by the researchers the multiple linear regression cannot be carried out because the minimum of 30 participants has not been met, therefore single linear regression will be used to test the direct effects of the model. This also pertains to the reliability and validity of the quantitative analysis and therefore makes the qualitative analysis more prudent to make informed conclusions about the research question.

The thematic and network analysis will be used to support and further investigate the findings of the quantitative analysis, as they relate to the research question. The thematic analysis looks into the attitude of managers towards different pricing strategies, value-based principles, and commercialization success. The network analysis looks for patterns in the coded interview data to check if the links that are found by the quantitative analysis are also perceived by the managers or that the managers have a different perception of these links. The links that will be analyzed are:

- The link between value-based principles and commercialization success
- The link between value-based principles and value-based pricing
- The link between value-based pricing and commercialization success

The combination of the thematic analysis and network analysis will provide insight into the perceived links and the ideas on the core concepts.

During the interviews and transcription there was additional information that was applicable to the research question, therefore of the all the questions directly regarding pricing or value-based principles have also been coded and taken into account. The interview was conducted with 17 companies who were asked 29 questions in a semi-structured interview. Of those 29 questions 16 interview questions have been coded, the 13 other interview questions pertained to general information about the participant, the marketing orientation, and obstacles. The general questions have been condensed in table 6 and the questions regarding marketing orientation and obstacles have been omitted because they fell outside the scope of this research.

Participants

The participants were one or two employees of each SME, all the participants of the study were all middle to upper management employees. Most participants (12) had an HBO (Higher vocational) education, four had a university education and three had an MBO (intermediate vocational) education. An overview of the participants can be found below. This data was gathered from the general information part of the interviews, as can be found in Appendix A.

Table 8 Participants of the study

Company	Function	Education	Years of experience	Sector
Agri 1	Manager of plus department	University	5 years	Agricultural machines
Agri 2 (1)	General manager	University	30 years	Agricultural machines
Agri 2 (2)	Business process investigator	HBO	4.5 years	Agricultural machines
Sport 1 (1)	General manager	University	13 years	Sports equipment
Sport 1 (2)	Head of Sales	MBO	23 years	Sports equipment
Semicon 1	Head of Sales	HBO	25 years	Electronic industrial products
Semicon 2	Sales Manager/Head of sales	HBO	22 years	Semiconductor and general
Steel 1	Co-owner/general manager	MBO	20 years	Construction, Agricultural machines, and machine building
Steel 2	Director	HBO	17 years	Machine building and water management
Iron 1	Sales Manager	HBO	40 years	Building, Automotive, and heating
Mechanical Engineering 1	Head of marketing and sales	HBO	6 years	Mechanical engineering and recycling
Textiles 1	Managing Director/Owner	University	20+ years	Textiles, Fashion, Automotive and medical
Plastic 1	Head of Purchasing/ Commercial manager	HBO	21 years	Plastic, cooling and agricultural
Plastic 2	Director/Owner	HBO	10 years	Plastic, Horticulture, Household
Plastic 3	Sales Manager	MBO	6 years	Plastic processing
Printing 1	Sales Manager	HBO	10 years	Paper Printing
Thermoplastic 1 (1)	Director	HBO	20 years	Medical, Automotive, Machine building and specials
Thermoplastic 1 (2)	Technical sales manager	HBO	12 years	Medical, Automotive, Machine building and specials
Aerotec 1	Sales director	HBO	30 years	Semiconductor and aerospace

Of the 17 companies that participated in the study, five were German and 12 were Dutch, all the companies are within the production industry. And all data was collected over a 45 day period. A total of over 700 companies were approached via email and telephone. This means a response rate of 2% rounded down. On average, setting up an interview required two emails and one telephone call to set up. Common reasons for not participating were the lack of time, vacations of staff members and company policy. Common reasons for participating were gaining more insight, having a soundboard and the personalized report the companies were given for participation.

Companies

When looking at the sample selection criteria there were no large differences between companies based on the experience of the participant, location of the company or the location of the customer. With the exception of Iron 1 and Steel 1, larger SMEs were more likely to be more innovative. This can be seen by the fact that most companies that have between 20 and 50 employees answered “sometimes” or “almost never” when asked how often they innovate while companies between 50 and 100 employees answered “moderate” or “frequent” and companies with over 100 employees answered “frequent” or “sole focus”.

Table 9 Company general information

Company	Location of company	Location of customers	Size of company	Innovativeness
Agri 1	The Netherlands	International	Over 100	Sole focus
Agri 2	The Netherlands	International	Between 20 and 50	Sometimes
Sport 1	The Netherlands	International	Between 50 and 100	Frequent
Semicon 1	The Netherlands	Europe	Between 20 and 50	Almost never
Semicon 2	The Netherlands	International	Over 100	Frequent
General 1	The Netherlands	Europe	Between 20 and 50	Sometimes
Steel 1	The Netherlands	The Netherlands	Between 20 and 50	Sole focus
Steel 2	The Netherlands	Europe	Between 20 and 50	Sometimes
Iron 1	The Netherlands	Europe	Over 100	Almost never
Mechanical Engineering 1	Germany	unknown	unknown	unknown
Textiles 1	The Netherlands	International	Over 100	Frequent
Plastic 1	Germany	International	Between 50 and 100	Frequent
Plastic 2	International	Europe	Less than 20	Moderate
Plastic 3	Germany	International	Between 50 and 100	Sole focus
Printing 1	Germany	Europe	Between 20 and 50	Sometimes
Thermoplastic 1	The Netherlands	International	Between 50 and 100	Moderate
Aerotec 1	The Netherlands	unknown	unknown	unknown

One of the things that stood out is that only one of the companies operates within the confines of their home country but most operate within Europe or internationally.

Statistical analysis

From each of the companies that participated in the study, survey data was collected. The statistical analysis is done using the methods described in Field (2009) and Huizingh (2012). The first step in analyzing the data was an overview was made of the descriptive statistics to identify missing data, skewness, kurtosis and in turn abnormalities in the data. One wrong entry was found for the third question of competition-based pricing and was corrected using the original survey that the participant filled out. There was some missing data in the success of new products section, this was due to the fact that not every company measured the success of their products or did not put a timeline on the success of the products, this reasoning was gathered from the interviews with the participants. No other abnormalities were found and the normality of the items was assumed. In case of survey research it is customary to perform a factor analysis, Comrey & Lee (2013) state that if the sample size is below 50 the results will be very poor because the sample size is 17 no accurate factor analysis could be performed and has therefore been omitted. Because of the sample size, any conclusions drawn from the quantitative data might not hold true for the entire population.

Internal consistency

In order to determine if the items that make up the construct as proposed in the Method section measure the same construct. To be thorough, an analysis of the internal constancy was made even though the survey was previously validated since there were several new items added to the existing surveys. Because of the low sample size, Cronbach's Alpha was used to assess the internal consistency of the constructs at a 0.6 level.

Value-based principles

The value-based principles have a total Cronbach's Alpha of .581 for the entire dataset, this can be improved to .672 by removing the first two questions. Due to the limited data set and the fact that the items were previously validated the choice was made to continue with the complete seven questions. The final item, Co-creation activities, was found to have an excellent internal consistency with the other items while not being part of the original survey.

Value-based pricing

Value-Based Pricing had a Cronbach's Alpha of 0.759, that could only be slightly improved to 0.771 when removing question four. Due to the small increase, being above the 0.6 level and the fact that this was also previously validated the choice was made to continue with the complete dataset.

Cost-based pricing

Cost-based pricing had a Cronbach's Alpha of 0.719 that could only slightly be improved by removing question 3 to 0.762. Because this was also previously validated and the internal consistency of the construct is well above the 0.6 boundary, all questions were used for the construct.

Competition-based pricing

Likewise, Competition-based pricing showed Cronbach's Alpha of 0.741 that could be improved to 0.781 with the removal of question 3.

Commercialization success

The Commercialization success had a Cronbach's Alpha of 0.634 and could be improved to 0.934 with the removal of 3 questions. This would remove a significant amount of data and because the Cronbach's Alpha is above the 0.6 threshold all the questions were included. The new item "Commercialization success" has an excellent internal consistency and was the only item under commercialization success that was filled out by every participant.

Table 10 Internal consistency of constructs

Construct	Cronbach's Alpha
Value-Based Principles	0.581
Value-Based Pricing	0.759
Cost-based Pricing	0.719
Competition-Based Pricing	0.741
Commercialization success	0.634

To compensate for the missing data in some of the sections of the commercialization success, the choice was made to use the average value of the items that are part of the construct as the value for the construct. This choice was made to preserve the most data that companies provided.

Uniformity of the data

After the creation of the constructs, a new overview of the descriptive statistics was made, as can be seen in table 9. All the constructs have both skewness and kurtosis between -2 and 2, therefore normality is assumed. Commercialization success had a lower N due to the fact that one company did not measure success in any form.

Table 11 Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Dev	Skewness	Kurtosis
Value-based principles	15	3.20	5.00	4.0000	0.52915	0.668	-0.024
Value-Based Pricing	15	2.57	4.14	3.4571	0.49839	-0.612	-1.011
Cost-based pricing	15	2.20	4.60	3.4400	0.68951	-0.509	-0.190
Competition-based pricing	15	2.50	4.67	3.4111	0.68968	.167	-1.257
Commercialization success	14	2.80	5.00	3.5143	0.58026	1.293	1.918

Correlation

To check if any of the constructs have a significant correlation the correlation table was created (see table 9), there was only one significant correlation at the 0.05 level between value-based pricing and cost-based pricing. Because of the significant unexpected correlation, the Variance Inflation Factor was calculated for the two constructs to check for collinearity, but no collinearity was found (VIF=1.000, p=0.846).

Table 12 Correlation Table

	Value-based principles	Value-Based Pricing	Cost-based pricing	Competition-based pricing	Commercialization success
Value-based principles		0.286	-0.055	0.418	0.482
Value-Based Pricing	0.286		0.519*	0.424	0.081
Cost-based pricing	-0.055	0.519*		0.429	-0.199
Competition-based pricing	0.418	0.424	0.429		0.148
Commercialization success	0.482	0.081	-0.199	0.148	

* *The correlation is significant at the 0.05 level (2-tailed)*

Testing for Direct effects

Testing the direct effects is done using a linear regression, because of the number of respondents (17) it was not possible to perform a multiple linear regression, there for all the direct effects are tested using single linear regression for a significance at the 0.10 level due to the small data set. Three hypotheses were tested.

H1: Value-based principles have a direct positive effect on commercialization success.

Independent Variable	Dependent variable	R^2	B	T	F	Significance
Value-based principles	Commercialization success	0.081	3.176	3.650	0.080	0.783

In order to test the first hypothesis, a linear regression between value-based principles and commercialization success was tested. There is no significant relationship between value-based principles used in the company and the success of the products therefor H1 is rejected.

H2: Increased use of value-based principles leads to an increased use of value-based pricing.

In order to test the second hypothesis the effect of the value-based principles on the value-based pricing construct is tested using single linear regression. The effects of value-based principles on competition-based pricing and cost-based pricing are also tested to check if the relationship exists for all, some or none of the pricing strategies.

Independent Variable	Dependent variable	R^2	B	T	F	Significance
Value-based principles	Value-based pricing	0.286	0.304	1.077	1.161	0.301
Value-based principles	Cost-based pricing	0.519	0.718	2.189	4.794	0.047
Value-based principles	Competition-based pricing	0.424	0.586	1.686	2.841	0.116

There is no significant relationship between value-based principles and value-based pricing. (F=1.161, P=0.301, R^2=0.286), the same hold true for Competition-based pricing (F=1,686, P=0.116, R^2=0.424). Cost-based pricing does have a significant direct effect from the use of value-based principles, even at the 0.05 significance level (F=4.794, P=0.047, R^2=0.519). Because of the insignificant effect of value-based principles of value-based pricing H2 is rejected.

H3: Value-based pricing has a direct positive effect on commercialization success.

Independent Variable	Dependent variable	R^2	B	T	F	Significance
Value-based pricing	Commercialization Success	0.482	0.521	1.908	3.641	0.081
Cost-based pricing	Commercialization Success	0.199	-0.163	-0.703	0.495	0.495
Competition-based pricing	Commercialization Success	0.148	0.123	0.518	0.268	0.614

The is a significant effect on the success of new products that can be explained by value-based pricing (F=3.641, P=0.081, R^2=0.482) at the 0.10 significance level, this relation also does not exist for competition-based (F=0.268, P=0.614, R^2=0.148) and cost-based pricing (F=0.495, P=0.495, R^2=0.199). Therefore H3 is accepted.

Table 13 Hypotheses testing

Hypotheses	Accepted/Rejected
H1: Value-based principles have a direct positive effect on commercialization success.	Rejected
H2: Increased use of value-based principles leads to an increased use of value-based pricing.	Rejected
H3: Value-based pricing has a direct positive effect on commercialization success.	Accepted

Testing for mediation

To test the mediation effect suggested in the model, the Sobel test was used, which tests if the reduction in variable Y (Commercialization success) by variable X (value-based principles) was because of an indirect effect by mediator M (pricing strategy).

Table 14 Mediation anaiysis

Path	Path	R^2	B	T	F	Significance
Direct	Value-based principles -> Commercialization success	0.1404	0.3441	1.3998	1.959	0.1869
Indirect	Value-based pricing -> Commercialization success	0.2443	0.5682	1.8601	1.778	0.0898
	Value-based principles-> value-based pricing	0.2443	-0.1363	-0.4097	1.778	0.6899

Like the previous tests, it showed no significant relationship between value-based principles and value-based pricing or value-based principles and the success of the product, the mediation effect was also insignificant (Z=-0.4002, p=0.6891).

Description of the Coding process

To get viable data for the qualitative analysis, the data first had to be coded. The coding was done on the interviews as described in the method section. The coding was done in three rounds: establishing the coding scheme, applying the coding scheme and a revision. The first two rounds first round were deductive, inductive, applying the variation of the code and evaluation. In the first round, the deductive step was based on previous research, as outlined in the theory section. In the second round, the deductive step was based on the coding scheme, established in the first round of coding. The rounds of coding were combined in this analysis to increase the clarity of the coding process for the reader.

Deductive Coding

The deductive coding process started with the overview of the relevant literature presented in chapter two, on this basis the first codes were created. These were then applied to the 17 collected interviews, an overview of the number of times the code was found can be found in Appendix D. The codes for the deductive process were can be found in table 15.

Table 15 deductive coding table

Code	Based on
Value-based Pricing	Ingenbleek et al. (2003)
Cost-based pricing	Liozu & Hinterhuber (2013)
Competition-based pricing	Ingenbleek et al. (2003)
Value-based principles	Woodruff (1999)
Scientific research	Lee & Lee (2015)
Market research	Lee & Lee (2015)
Innovation	West & Bogers (2013)
Co-creation	Roberts, Hughes, and Kertbo (2014)
Commercialization success	Salman et al. (2014), Ingenbleek et al. (2003)

These codes are based on the core concepts of the relevant literature that pertain to the research question. This means that the three pricing strategies described are taken into account, the concepts of value-based pricing and the commercialization success. Innovation was taken into account because previous research showed that SMEs are often innovative and this relates to the survey item “innovativeness”.

Inductive Coding

After the deductive coding, the inductive process began. Although many new codes were found concepts like ERP, alterations, brand name and focus groups were too uncommon to use in the model. The new concepts that arose can be found in table 16.

Table 16 Inductive coding table

Code	Reason
Customer involvement	Although it is part of the value-based principles the concept of customer involvement was present so many times that a sub-group was created for this concept, co-creation was re-coded into this code
Employee expertise	Commonly, companies that applied value-based pricing applied this on the basis of the expertise of the employees.
Pricing Other (round 2)	Not all of the pricing strategies that were applied fell within the three categories established through the literature.

During the second round of coding, the "Pricing other" code was found in the Agri 2 interview. This code was added to the coding scheme and applied to the other interviews.

Variations

All the codes were given three variations: positive, negative and struggle. A positive code (+) for pricing, for example, would be "you only look at the value-based model", a negative code (-) would be "No, we don't do that" and a struggle (+/-) would be "I find it difficult to explain how you then do the pricing differently" when applied for the value-based pricing codes. Not all codes had all three variations present in the transcripts, as was found in the revision, those that were not present have been omitted from the table in Appendix C.

Table 17 Code Examples

Code	Example
Competition Based Pricing +	Because some prices, you can look to the competitors.
Competition-based Pricing -	I think it is the last thing we do, look at the competition.
Competition-based Pricing +/-	We don't always know for certain what our competition offers
Cost-based Pricing +	Yes we do, normally it should always cover the cost-price
Cost-based Pricing -	The cost price component was too high and that's why he asked us to reduce the price.
Cost-based Pricing +/-	Every product is unique. So every time we have to make a new calculation. Every time it is something different
Value-based Pricing +	But I think 90% of the options are value-based pricing.
Value-based Pricing -	There is nothing what you could call a value-based pricing strategy.
Value-based Pricing +/-	It is hard to put it into numbers what the real value for the customer and then translate that to a certain price
Customer Involvement +	Because they give us feedback, what could have been done better, what is redundant or what could be improved on the power packs, and then it can happen that such a new unit is developed in cooperation with customers.
Customer Involvement -	If there is no reply, it is probably fine.
Customer Involvement +/-	But this also works in both directions, for example, if we get a request from a customer where we just see he requested, e.g. with complete paint, we look at this and ask us, why does he need that, then we ask the customer and he often does not know that very well.
Expertise Employees	yes, the knowledge in the heads of the employees, and not in the system, or the company itself. The employees are the knowledge of the company.
Innovation +	We want to be the first on technology, and the most advanced.
Innovation -	We do not have any new products.
Market Research +	We only do it on our own research. And by research, it is not scientific research, but market research, our own ideas.
Market Research -	Is there research, data research? No.
Market Research +/-	From that end, it is very difficult to get hard data.
Pricing Other	Then we can give some discounts depending on properties for our customers.
Scientific Research +	We have already done so, yes. But we also work together with different universities, with the Münster University of Applied Sciences, and with Cologne, we work together, so together with them, we develop new products, but then also together with customers.
Scientific Research -	it is not based on data.
Commercialization success +	How I measure it? If I get a satisfied customer and the invoice gets handled on time then we are also satisfied and see it as a success
Commercialization success -	We don't really measure the success, we make it and it is done

Code	Example
Commercialization success +/-	Some customers can get it, then they say good on the market. I do not go much money for this plant so I only take the cheap foil pot. Other customers then say, well I take your pots because they are more stable and can withstand a bit, for example in automation, with the technology and the machines, there is such a stable pot much, much better.
Value-based Principles +	So we are looking at the value for the customer.
Value-based Principles -	Customers don't always have the same know-how about the added value that we have. In the end, the customer wants a product that lasts 20-25 years and doesn't consider how we do it.
Value-based Principles +/-	This is very important for the machine. But the customer does not see that

Qualitative Data Analysis

Before a network analysis can be made the data has to be described, this is done by explorative thematic analysis. An explorative analysis of the themes is used to get a better overview of the data and to be able to make a network analysis. The thematic analysis will show the ideas that managers have about the core concepts and the attitude that they have towards them. The themes will be based on the coding scheme as established in the coding section. On the basis of the thematic analysis, the connections between the themes are analyzed in relation to the direct links represented in the research question, this being:

- The link between value-based principles and commercialization success
- The link between value-based principles and value-based pricing
- The link between value-based pricing and commercialization success

During the quantitative analysis, one additional link between value-based principles and cost-based pricing was found, which will also be taken into account in the network analysis.

General impressions

The general impressions of the companies interviewed were that there was a clear willingness to apply value-based pricing but often lacking in the knowledge or expertise to do so. What also stood out was that almost all the companies used cost-based pricing to determine a bottom line for the product. The companies that lacked the knowledge to apply value-based pricing also used the cost-based pricing with an added margin to determine the price. There was a reluctance to apply competition-based pricing among the innovative companies with many custom products.

Some of the participants were stressed because of time limitations or missing staff due to summer vacations, resulting in shorter answers for some of the interviews.

Explorative thematic analysis

By examining the themes directly representative of the core constructs a better overview of what the views of the managers are on the commercialization success, pricing, and value-based principles. This explorative will show their idea of the core concepts (themes) and their attitude towards them (variations).

Commercialization success

From the thematic analysis of the data, it became clear that most companies view most of their products as successful. Some of the companies, Like Steel 1 and Electra 1, indicated that they do not directly measure the success of the product itself because they only produce goods as a contractor for other companies. These companies measure the success either by the success reported by the purchaser (Electra 1) or not at

all (Steel 1). The general manager of Steel 1 indicated: "We don't really measure success, we make it and it is done. The result we don't really look at" The companies that measured commercialization success fell into two distinct categories: custom product focus and standardized product focus. The companies that focused on custom products, like Agri 2, showed that the measures for success were mainly focused on customer happiness and the quality of the work. Companies that produced mainly standardized products, like Sport 1 and Agri 1, showed that they were more focused on the advantages of the product and increased market share.

Getting a good return on the products was of much less importance to the companies in both categories, this is characterized by "So it has to be profitable, but other than that….." uttered by the Manager of the plus department of Agri 1. This was a common sentiment among most of the companies, the Head of Sales of Electra 1 also mentioned: "we have a bottom line that we have to meet". This further emphasizes the observation that the products need to meet a minimum price set beforehand but are not the measure of success that SMEs apply for their products.

Value-based principles

Value-based principles were used in many different ways by the participating companies. Some of the most common themes used were the know-how of acquiring information about customer value, flexibility in manufacturing, advantages for the customers and services. What stood out was that there was very little research being done, either market or scientific, much of the data that was gathered was either from an automated system or personal inquiry with the customers. One of the struggles that Sport 1 encountered was that they "have a very small customer group, so it is difficult to find data". This was a common problem among many of the SMEs, but this could be partially compensated by working together with the customers and keeping personal contacts within the customer companies. Like many of the interviewed companies, Semicon 1 gathered their data almost exclusively "by keeping in constant contact with our customers". Receiving feedback was a very important part of this contact, most companies actively sought out feedback from customers, both positive and negative feedback. Steel 1 stood out from the rest because it did not employ any value-based principles other than the bare-minimum contact required to establish customer wishes, "When it is done, it is done.".

Overall, companies found cost-effective ways to assess customer value by using existing data and the expertise of existing employees. Their data collection methods were more qualitative than quantitative. Of the companies that lacked the expertise to gather this data, there was an expressed desire to train their employees further or to hire employees that were already skilled in assessing customer value. This expertise was also seen as an added value to the customer itself, because "the purchaser does not have the knowledge to describe exactly what they want." More experienced and skilled employees find more value for the customer, even things they might not have thought about, for a price that both parties are willing to accept.

Pricing

From the data three main subjects regarding price came to light: most SMEs apply cost-based pricing to determine a bottom line for the product price, producers of custom products do not look at the competition and value-based pricing is applied to products if the knowledge is there.

Value-based pricing

Value-based pricing was the most common subject in the interviews, a total of 220 times over the length of the interviews. The overall tone was positive with 69% of the responses being positive, 9% negative and 22% showing struggles with value-based pricing (see Appendix C). One of the main issues raised by companies was: “Well it’s like this, we do not use the value as a pricing strategy, but our products have a good value, otherwise our customers would not order from us.” This example came from Plastic 2 and shows that the reason that people buy products must mean that there is some value for them in the customer, but this is not necessarily translated into the price of the product. The main reason Plastic 2 gave for this behavior is the complexity of the product: “I think by these advantages, we can definitely achieve an extra price but of course this has its limits, it's just all still a bucket.” This combined with the philosophy: “one does not have to become rich all at once, with us the focus is definitely on the continuance of the company. “ showed a necessity to use cost-based and competition-based methods, but issues with value-based pricing due to the established market.

What became abundantly clear in almost every company that applied value-based pricing is that the expertise and experience of the employees is a more important factor in determining a value-based price than any quantitative based data gathering method. Perhaps this is expressed best by the General manager of Sport 1: “Well, there is no data-driven system behind that, so it is "Fingerspitzengefühl". But many more examples can be given, the business process investigator of Agri 2 explained: “Yes, the knowledge is in the heads of the employees, and not in the system, or the company itself. The employees are the knowledge of the company.” Having a good relationship with the customer, involving the customer in the process and knowing what they want, in other words, the value-based principles seem to be important in establishing the value-based price. This was also backed up by the co-occurrence of customer involvement and value-based principles with value-based pricing, which was to a greater extent than all other pricing methods combined (see appendix D). This adds support for the Hypotheses.

Cost-based pricing

Cost-based pricing was the second most mentioned after value-based pricing. The tone was positive, of the responses 62% were positive, 20% negative and 18% struggled. Like we touched on briefly in the analysis of the success of new products, the cost price of is seen as a bottom line, that is only rarely crossed. Like with Sports 1, that sold some products under the cost price for a long time because they did not have a clear picture of what the cost price of the product was. When they discovered that one of their products made a loss they still decided to continue selling the product because it complemented their offer and they wanted to have a full range of products to offer customers. This is the exception to the rule most companies expressed, like Agri 2: “When the cost price is lower than the value-based price, then we don’t do it.” Or like Steel 1: “if it is below the cost price, then we don’t do it.”. Cost-based pricing is seen as the most reliable and objective measure to help determine the price when data is available. Agri 2, like Sports 1 was in the process of acquiring more data to make the necessary calculations and only knew this for several products. The for other products the cost-price was estimated like with Agri 2: “We have a lot of machines and as you can see the price of a 6 meter is a little less than the price of a four-meter divided by 4 and multiplied by 6”.

There was a large co-occurrence with value-based pricing, in both directions (see appendix D). Some companies applied the cost price as a bottom line and supplemented this with value-based pricing.

Competition-based pricing

Competition-based pricing was the least mentioned subject in the interview in regards to pricing. The overall tone was positive with 60% being positive, 24% negative and 16% struggle (see Appendix C). The thing that really stood out for the use of competition-based pricing is that producers of custom products rarely look at the competition when it comes to price. The comparison that the companies make is more on the bases of lead time and advantages of the product. Not only did the custom products have this trend but also innovative companies as suggested by Agri 1: "We are kind of an innovative company, not really looking at the competition but really thinking ourselves.". The reasons given for this behavior is that being the first with an advancement in technology you have little to no competition and not wanting to be a follower. Companies that fell into the category for standardized products mentioned in the success of the product analysis above, were much more likely to apply competition-based pricing.

Taxonomy

During the coding process, a hierarchical pattern was found. It gives a clear picture of the structure of the codes and can be used as a basis for the network analysis.

Table 18 Taxonomy table

Core themes	Themes	Variations
Value-based principles	Customer involvement	Customer involvement +
		Customer involvement -
		Customer involvement +/-
	Employee expertise	
Pricing	Value-based pricing	Value-based pricing +
		Value-based pricing -
		Value-based pricing +/-
	Cost-based pricing	Cost-based pricing+
		Cost-based pricing -
		Cost-based pricing +/-
	Competition-based pricing	Competition-based pricing +
		Competition-based pricing -
		Competition-based pricing +/-
	Pricing other	
Developmental strategies	Research	Scientific research +
		Scientific research -
		Market research +
		Market research -
		Market research +/-
	Innovation	Innovation +
		Innovation -
Commercialization Success		Commercialization Success +
		Commercialization Success -
		Commercialization Success +/-

A graphical overview of the data from table 16 can also be seen in figure 3.

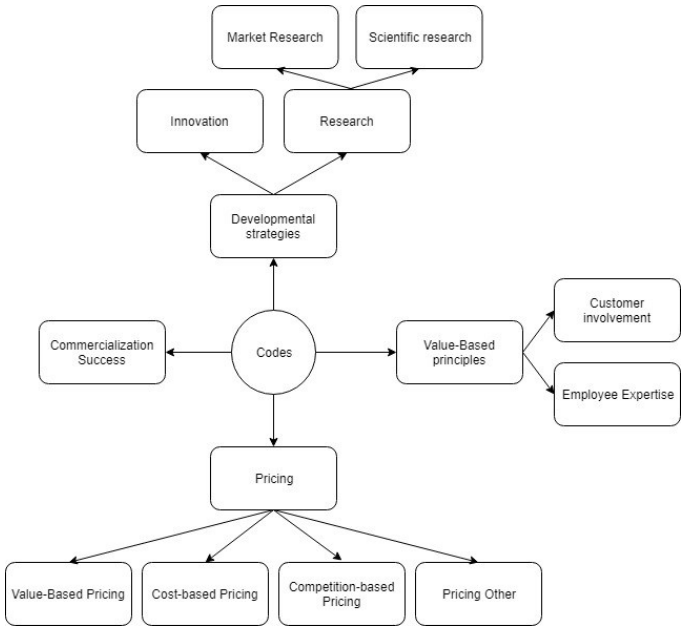

Figure 3 Overview of code hierarchy

Network analysis

Following the explorative and hierarchical analyses, a network analysis was conducted to verify and support the findings of the statistical analysis. The three connections that were part the of the original hypotheses are the effect of value-based principles on the commercialization success, the effect of the value-based principles on value-based pricing and the effect of value-based pricing on the commercialization success. In the statistical analysis a fourth connection was discovered: the effect of the use of value-based principles on cost-based pricing. These four connections will be discussed in this chapter along with noteworthy discoveries during the network analysis.

Deductive

In order to examine the relations that were found in previous research and found in the statistical analysis, a deductive network analysis was used. For each of the links the co-occurrence was examined first, followed by a pattern analysis of the total mentions of the themes, An overview of the co-existence of the themes can be found in Appendix D. The pattern analysis checks if themes coincide frequently with other themes, whether or not these are both positive, one positive and one negative or any other combination of the three variations of the themes (see Appendix C).

Value-based principles linked with Commercialization success

In the interviews, none of the participants made the link between applying value-based principles and commercialization success (See Appendix D). This was also supported by the quotation data, there was no clear pattern that would suggest a link between the two themes (see Appendix C).

Value-based principles linked with value-based pricing

In the interviews there were seven instances were value-based pricing and value-based principles were both mentioned positively, one where they were both mentioned negatively and two were they were both

mentioned as a struggle. There was also one instance where the participant struggled with the principles but was positive towards value-based pricing and two instances where participants had a positive attitude towards value-based principles but a negative towards value-based pricing (See Appendix D). With the exception of Plastics 3 and Iron 1, the attitude towards value-based principles seems directly proportional to the attitude towards value-based pricing (See Appendix C).

Value-based pricing linked with commercialization success

In the interviews, there were four instances were both value-based pricing and commercialization success were mentioned positively and one instance where they were both mentioned negatively. Next to these, there were two instances where the commercialization process was mentioned positively but value-based principles negatively (See Appendix D). There is no clear pattern in the quotation data that would suggest a perceived link between value-based pricing and commercialization success (See Appendix C).

Value-based principles linked with Cost-based pricing

in the interviews, there was only one instance of a negative attitude towards cost-based pricing and value-based principles combined, one instance of struggling with both and one positive value-based principles and negative cost-based pricing (See Appendix D). There is a pattern in the quotation data were a positive attitude towards cost-based pricing in the interviews coincides with a positive attitude towards value-based principles (see Appendix C).

Inductive

When performing an inductive approach to the coded data some interesting insights came to light. Positive Customer involvement had 18 co-occurrences with positive value-based principles and positive innovation. These were separate instances as positive innovation and positive value-based principles had only four co-occurrences. Positive value-based pricing had 15 co-occurrences with both positive and negative cost-based pricing.

Conclusion

The purpose of this study was to answer the question: *"Does the pricing strategy for new products have a mediating effect on the link between value-based principles and commercialization success?"* The statistical analysis did not show a significant mediating effect but did show value-based pricing does lead to an increase in commercialization success. This is also observed in the qualitative analysis, but there seems to be a mediating effect present in the network analysis. The connection between value-based principles and commercialization success seems to be non-existent but value-based principles to value-based pricing and the link between value-based pricing and commercialization success are clear from the perspective of the managers.

Increasing the use of value-based principles does not necessarily mean that a company is more likely to use value-based pricing, as was shown in the contradicting results of the statistical and network analyses. In fact, a company that focusses on value-based principles is more likely to compete on price (cost-based pricing) according to the statistical analysis. From the thematic analysis, it became clear that there are several possible explanations for this phenomena. The first reason is that most SMEs are more comfortable with cost-based pricing, as is much more tangible for users, more easily verifiable and explainable to board members. The second reason is that there is a general lack of knowledge in SMEs on how to put value-based principles into value-based pricing. The network analysis shows that the managerial staff

believes that the relation between value-based principles and pricing is positive. This means that although there is an intention of the managers to use value-based pricing as they use value-based principles, this is not what happens in practice.

Applying value-based principles in the company does not have a direct effect on the commercialization success as shown by both the statistical and network analyses. There appears to be no link present like in the work of Lapierre (2000). Using value-based pricing does have a positive effect on the commercialization success. But the unexpected finding in the statistical analysis, that an increased use value-based principles leads to an increased use of cost-based pricing is very interesting when considering the previous point that managers believe that the use of value-based principles has a positive effect on the use of value-based pricing. This pattern is also seen in the network analysis but to a much smaller extent. Managers do seem aware that both cost-based pricing and value-based principles are very important but do not directly link them together. This difference between the quantitative and qualitative data shows that there is a difference between what the companies actually do and what they think they do.

This all results in a situation where the companies that know how to use value-based pricing, have products that come out ahead in the market, but most companies that do still use a cost-based approach in conjunction. The inductive network analysis showed a large co-occurrence between cost-based and value-based pricing strategies. This is similar to Rapaccini (2015), who found that although many studies use a clearly defined separation between pricing strategies, many companies use a combination of pricing strategies that might better suit their needs. But this is seen either as a positive relation, being supplemental to the value-based pricing strategy, or negative relation, being competing methods that can both be costly to implement.

One of the major findings that already because apparent during the interviews and coding process, was that there is a general lack of research that is applied by SMEs, either market or scientific research. Almost no company applied scientific research and market research was very limited. The thematic analysis revealed that the cost of research was too great for the SME to get any value out of. Because of this, the value-based pricing and principles were mostly based on customer involvement and the expertise of the employees. The more innovative the company was, the higher the likelihood of involving the customer in the product creation process. However, this relation may not be so clear, as these companies focused on custom goods, which requires much more customer input than standardized products by their very nature and more research is required to make claims about the nature of the relationship.

In the end, SMEs are trying to use value-based pricing and principles and see the benefits of using a value-based strategy but often lack the systems or expertise to acquire and apply these successfully. The most important ways in which production SMEs assess customer value is through customer involvement and employee expertise because these are seen as cost-effective ways of attaining this information. Even when applying value-based pricing on this basis, cost-based pricing is often used as a back-up pricing model to ensure profitability. Value-based pricing strategies are effective in increasing the commercialization success of SMEs but most stick to a cost-based pricing model.

Practical implications

The implications for managers are that there that value-based pricing leads to more successful products and that in order to implement this you have to have employees that have the knowledge and experience

to implement value-based pricing. Managers already see the benefits of using value-based principles and pricing, but both the interviews and surveys showed that companies have trouble implementing value-based pricing, even when they already made use of value-based principles to develop new products. Companies will stick to what they know because it worked in the past. But could have a large benefit to shift their pricing to value-based pricing, to reduce the risk of implementing a new pricing strategy most companies keep a cost-based model alongside to make sure that the new product is profitable to produce at the value-based price. Only later in the products life cycle, when other competitors have also established substitute products or earlier in an established market with much competition should competition-based pricing be considered.

One of the potential issues that were identified during the theory was the financial capabilities of SMEs to use value-based principles within the company. During the interviews, it became clear that SMEs can cost-effectively assess what the customers value by using the expertise of the employees and maintaining a high level of contact with the customers. Having a small budget does not need to be a hindrance when applying value-based principles as long as the employees know what to look for and the communication with the customer and between apartments is good.

Theoretical implications

The expected contribution of this study was to broaden the understanding of the effects of using customer value-based pricing rather than cost-based or competitor-based pricing on the commercial success of new products. The theories postulated by Woodruff (1997) hold true for SMEs as well, value-based pricing has a significant positive effect on the success of the new products. The predictions made by Woodruff (1997) in regards to the barriers for SMEs were also largely correct: SMEs often lack to knowledge to move from value-based principles to value-based pricing, the position in the market is also very important because of the threat of substitutes. Monetary requirements were less present because the lack of marketing research due to the monetary requirements could be mitigated with experienced employees and a larger customer involvement according to the participants.

The direct positive effect of applying value-based principles on commercialization success like in the work of Lappiere (2000) could not be found. When examined closer, this appears to stem from the fact that their research is done among customers and this research is done among suppliers. This points towards that the emotional component of customer value is hard for companies to consider when applying value-based principles.

Limitations

Due to the nature of the research, there are several factors that have to be taken into account in this research. There are cultural limitations that might not make this study applicable to other countries, both the countries in this study are western European countries. Germany and the Netherlands have similar customs and business practices, although the German companies tend to have a more hierarchical structure and whereas the Dutch companies tend to favor a flatter company structure.

A second limitation of the study is the language if the interviews, the Dutch interviews were not conducted in the native language of the participants and the choice of words might have been influenced by this. If there were issues with the comprehension of certain words the researchers took the time to explain these topics, either in English or the native language, to ensure that the participants knew what the question was

about. The German interviews were all conducted in German and the translation of the interview questions and transcripts was done by native German speakers.

Because of a different school system in the non-university educations, an approximation had to be made of the education level of the German participants. This is done with the help of a native German who studied in the Netherlands to ensure maximum accuracy.

The number of participants was lower than the initial estimate and this affected the accuracy of the statistical analysis. The items are all based on previously validated surveys to make sure that the items had a good internal constancy and measure the correct subject. Nonetheless, the number of participants was not enough to make hard claims about the nature of the relationship between the constructs that are applicable to the entire population.

Future research

In future research, the focus could lie on the reasons why companies continue with cost-based pricing when they have the capability to implement value-based pricing, other than comfort with the cost-based model. Because there was a clear difference in pricing strategies between innovative and non-innovative production companies this might also be a topic for further investigation. This could be due to the difference between the custom and standardized products but requires further investigation. Because of market circumstances, companies might also employ competition-based pricing in conjunction with value-based pricing. This raises the question whether the company power in the market further influences the pricing strategy.

Discussion

From the initial impressions of the interviews, it soon became clear that most of the companies applied a combination of cost-based and value-based pricing, with some also applying competition-based pricing. The competition-based pricing was mostly out of necessity due to heavy competition in the market. This same effect was seen in the statistical analysis, where an increase of value-based principles led to the increased use of cost-based pricing and an increase of value-based principles led to a more successful product.

One of the things that really stood out was that there were very few instances of research, either market or scientific research, with scientific research being almost non-existent. Even with the use of modern methods, like Roberts, Hughes, and Kertbo (2014) suggested, companies had a lot of trouble collecting data. Only Plastic 1 had scientific research done in cooperation with a university. Some of the other companies, like Steel 1, mentioned that they incorporated a small amount of scientific research, but this was mostly based on industry magazines and might not be scientifically sound. Market research was much more prevalent but for many of the interviewed companies it was too expensive to do, this was especially true for companies that focused on small batch production. This is an area were companies need additional expertise, either through training of current employees or hiring new employees who are experts in the field.

As stated in the statistical analysis, there was not enough data to make hard claims about the nature of the relationships between the construct. The thematic analysis did show support for a large number of firms using value-based principles but a struggle with how to translate that into value-based pricing. In some

cases with a strong competition in the market value-based pricing was only viable when offering features or products that the competition could not offer, otherwise, companies would be bound to a competition-based pricing model. In practice, this means that most companies apply a combination of pricing strategies to get the best price for their product. Having an understanding of what the cost-price is and what the competition is doing are great tools for helping to establish the price. However, looking too much at these pricing methods could lead to copying your competitors or cutting features that would be of great benefit to the customers. In conclusion, value-based pricing is the best pricing model to create a successful new product and companies should learn on how to apply that in more of their products, while not ignoring other resources available to them.

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Appendix A: Item Scale Survey

Pricing Survey

Hello, thank you for participating in our research. This survey will consist of 65 questions that can be answered on a five-point scale. At the start of each section, a short description of the terms used in the questions will be given. If there are any questions they can be asked via email …….. or before the interview. All information will be gathered anonymously and will be handled with the utmost care.

Introduction

We are doing research on how small-medium sized manufacturing companies handle customer value in relation to new products and pricing for a master thesis project. This survey is aligned with our research on the pricing strategies applied to new products. While theory suggests that value-based principles are ideal, it might not be the ideal in practice. In this case, value-based pricing is an approach which uses the perceptions of benefits from a product or service, translates those benefits into value and sets a price relative to that value. Consequently, the ideal pricing strategy might not be applied when a firm is faced with obstacles. The completion of this survey strengthens the research and allows us to compare how companies perform in contrary to the market. Additionally, it gives a perception of what the most common pricing approaches are in the Netherlands and the reasons behind them. In return, for the completion of this survey and interview, we will share the results with you so that you can see how your company compares to other companies in the market.

Informed consent form (Universiteit Twente, 2018)
Title research:
Responsible researcher:

To be completed by the participant I declare in a manner obvious to me, to be informed about the nature, method, target and [if present] the risks and load of the investigation.

I know that the data and results of the study will only be published anonymously and confidentially to third parties. My questions have been answered satisfactorily.

[If applicable] I understand that film, photo, and video content or operation thereof will be used only for analysis and / or scientific presentations. I voluntarily agree to take part in this study. While I reserve the right to terminate my participation in this study without giving a reason at any time.

Name participant:
…...……

Date: ……..…… Signature participant:...……

To be completed by the executive researcher

I have given a verbal and written explanation of the study. I will answer remaining questions about the investigation into power. The participant will not suffer any adverse consequences in case of any early termination of participation in this study.

Name researcher:
……..……..

Date: ……..…… Signature researcher: ……....……

General questions

Where is the company located?	☐ The Netherlands ☐ Germany ☐ International
Where are your customers located?	☐ Only in our own country ☐ Europe ☐ International
How many employees does the company have?	☐ Less than 20 ☐ Between 20 and 50 ☐ Between 50 and 100 ☐ Over 100
How frequent does the company invent new products?	☐ Almost never ☐ Sometimes ☐ Moderate ☐ frequent ☐ Sole focus

Value-based principles are the ways in which a company assesses what customers value about their products.

Value-based principles	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
We take technical advancements into account when creating a new product	☐	☐	☐	☐	☐
We use customer complaints to help create a better product	☐	☐	☐	☐	☐
We use information about competing products to help create a better product	☐	☐	☐	☐	☐
We use feedback from our salespeople to better understand customer value	☐	☐	☐	☐	☐
We use data to know what customers to focus our new products on.	☐	☐	☐	☐	☐
We use scientific literature to determine what our customers value.	☐	☐	☐	☐	☐
We work together with our customers to create new products	☐	☐	☐	☐	☐

Value-based pricing as an approach which uses the perceptions of benefits from a product or service translates those benefits into value and setting a price relative to that value.

Value-based Pricing	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
Our new products have better/more advantages than the products of the competition	☐	☐	☐	☐	☐
Customers see our products as a good value	☐	☐	☐	☐	☐
Our products offer advantages to the customer	☐	☐	☐	☐	☐
The price and the advantages of the product are balanced	☐	☐	☐	☐	☐
Our new products have better/more advantages than other products that fulfill a similar need	☐	☐	☐	☐	☐

Cost-based pricing is an approach of pricing that uses the cost of manufacturing and/or a profit margin as the base for the price of a product.

Cost-based Pricing	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
We have a good understanding of the variable costs of a new product	☐	☐	☐	☐	☐
A good price point is necessary to break-even	☐	☐	☐	☐	☐
We have a good overview of investments in the new product	☐	☐	☐	☐	☐
Before the launch of a new product, we set clear target margin guidelines	☐	☐	☐	☐	☐

Before the launch of a new product, we set clear return on sales guidelines	☐	☐	☐	☐	☐

Competition-based pricing is an approach of pricing that uses the price of the competition as the base for the price of a new product.

Competition-based pricing	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
We have a good understanding of the competitor's pricing strategy	☐	☐	☐	☐	☐
We know the price of the competitor's price	☐	☐	☐	☐	☐
We are likely to alter the price of our product based on the strength of the competition	☐	☐	☐	☐	☐
We take the number and strength of the competition in the market into account when setting a price point	☐	☐	☐	☐	☐
We consider the degree of competition in the market to set a price point	☐	☐	☐	☐	☐
We take the competitive advantage of our competitors into account when launching a new product	☐	☐	☐	☐	☐

The success of new products is measured differently by different companies, this section looks at the what ways companies use to see what products are successful.

The success of new products	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
New products reach their turnover objectives on time after launch	☐	☐	☐	☐	☐
New products reach their profit objectives on time after launch	☐	☐	☐	☐	☐
New products reach their market share objectives on time after launch	☐	☐	☐	☐	☐
New products reach their competitive advantage objectives after launch	☐	☐	☐	☐	☐
New products are successful	☐	☐	☐	☐	☐

Velocity refers to how fast the market changes in the direction, which can lead to a competitive advantage or disadvantage if a company can't keep up with the pace.

Velocity

	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
We perceive stable directional changes in our market	☐	☐	☐	☐	☐
The directional changes in our environments are predictable	☐	☐	☐	☐	☐
We have sufficient technological resources to keep up with our market	☐	☐	☐	☐	☐
We perceive a lot of intensity of directional change in our market	☐	☐	☐	☐	☐
The directional changes in our environments are rapid	☐	☐	☐	☐	☐
In high-velocity environments, we are more inclined to use a value-based pricing approach	☐	☐	☐	☐	☐
In high-velocity environments, we are more inclined to use a cost-based pricing approach	☐	☐	☐	☐	☐
In high-velocity environments, we are more inclined to use a competitive-based pricing approach	☐	☐	☐	☐	☐

Turbulence can be defined as the amount of uncertainty in the market change concerning anticipated directions. This can be influenced by unexpected competitors and the development of trends, especially when accompanied by new digital electronics and internet. In this case, high turbulence is characterized with a lot of uncertainty, while low turbulence is characterized with low uncertainty in the market.

Turbulence

	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
We are able to confront with unexpected competitors	☐	☒	☐	☐	☐
We confront with many unexpected competitors	☐	☐	☐	☐	☐
Our pricing strategy remains stable against unexpected competitors	☐	☐	☐	☐	☐
We frequently perceive a lot of developments in our market	☐	☐	☐	☐	☐
The changes in our market (turbulence) have taken us by surprise	☐	☐	☐	☐	☐
The unexpected competitors in the market have had an impact on our pricing strategy	☐	☐	☐	☐	☐
In highly turbulent environments we are likely to use a value-based pricing approach	☐	☐	☐	☐	☐
In highly turbulent environments we are likely to use a cost-based pricing approach	☐	☐	☐	☐	☐
In highly turbulent environments we are likely to use a competitive-based pricing approach	☐	☐	☐	☐	☐

Growth is identified as the shape of the market that can influence the necessity of resources. A company, in this case, can be in a dilemma between insufficient capabilities or capabilities that are ahead of the market needs. An example would be, the amount of telecom infrastructure that is necessary to assist a service or product.

High-growth markets are characterized by continually expanding opportunities, which can make current operational systems insufficient and can call for bulky but risky investments.

Low-growth markets are the opposite, with not much expanding opportunities and with almost no need for investments to meet the needs of the market.

Growth

	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
We are able to overcome an unexpected growth of the market	☐	☐	☐	☐	☐
We frequently perceive an unexpected resizing of the market	☐	☐	☐	☐	☐
Our pricing strategy remains stable when facing a resized market	☐	☐	☐	☐	☐
We often have sufficient resources to meet the needs of the market size	☐	☐	☐	☐	☐
We see more opportunities than threats in a growing market	☐	☐	☐	☐	☐
The unexpected resize of the market affects our pricing strategy	☐	☐	☐	☐	☐
In high-growth environments, we are likely to use a cost-based pricing approach	☐	☐	☐	☐	☐
In high-growth environments, we are likely to use a competitive-based pricing approach	☐	☐	☐	☐	☐
In high-growth environments, we are likely to use a value-based pricing approach	☐	☐	☐	☐	☐

Instability is perceived as the amount of competitive moves by other competitors. Instability can, for example, exist by competitors entering with cheap or substitute products.

Instability

	1: Strongly disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly agree
Competitors with similarly cheaper products do not affect our pricing strategy	☐	☐	☐	☐	☐
We hardly ever receive competitive moves from our competitors	☐	☐	☐	☐	☐
We rarely engage in promotional wars with our competitors	☐	☐	☐	☐	☐
We seldom face with product imitations	☐	☐	☐	☐	☐
We reassess our pricing strategy when faced with competitive moves	☐	☐	☐	☐	☐
We are likely to follow a value-based pricing approach when faced with competitive moves from our competitors	☐	☐	☐	☐	☐
We are likely to follow a cost-based pricing approach when faced with competitive moves from our competitors	☐	☐	☐	☐	☐
We are likely to follow a competitive-based pricing approach when faced with competitive moves from our competitors	☐	☐	☐	☐	☐

Appendix B: Interview Questions

General questions:

1. *What is your function within the company?*
2. *What education did you have?*
3. *How many years have you been working in this area?*
4. *Which sectors does the organization operate in?*
5. *What do you consider to be value?"*
6. *How do you measure the success of new products?*
7. *What pricing strategy is used for new products?*
8. *Do you combine different pricing strategies? (If they do not know which pricing strategies, name cost-based pricing and competitive-based pricing)*
9. *For how many of your new products do you apply value-based pricing?*

Value-based pricing questions:

10. *How do you assess what customers value in your products?*
11. *Do you translate any of that value into the pricing of the products?*
    "If so how?
12. *For how long have you been translating value into the pricing strategy?*
13. *If you don't consider value within the pricing strategy, why not?*
14. *Do you consider the advantages of a product compared to competitor's product in the price?*
    If so how?
15. *Do you consider the perceived value of the customer in the product's price?*
    If so how?
16. *Do you consider the advantages of the new product offers to the customer in the price?*
    If so how?
17. *Do you consider the balance of the advantages of the product and price?*
    . *If so how?*
18. *Do you consider the advantages of the product compared to substitutes in the price?*
    . *If so how?*
19. *Have you ever involved customers in the product development process? How?*
20. *Are you planning to change your pricing strategy (in the near future)?*

Market/marketing orientation questions:

21. *What does the term „market/marketing orientation" mean to you? What kind of things does a market/marketing-oriented company do?*
22. *What organizational factors foster or discourage this orientation?*
23. *What are the positive consequences of this orientation? What are the negative consequences?*
24. *Can you think of business situations in which this orientation may not be very important?*

Obstacle questions:

25. *How are you dealing with challenges in regards to implementing value-based pricing?*
26. *What kind of obstacles did your company face when implementing the pricing strategy? (Emphasis on the company). In what way did you overcome them? Did you face personal challenges?*
27. *How would you describe the alignment between upper management and staff regarding your pricing strategy?*
28. *What external obstacles have you faced that had an impact on the pricing strategy?*
29. *What is your personal opinion about the way you currently determine prices?*

Appendix C: Quotation table

Number of quotations	Competition Based Pricing	Competion Based Pricing +	Competition Based Pricing -	Competition Based Pricing +/-	Cost Based Pricing	Cost Based Pricing +	Cost Based Pricing -	Cost Based Pricing +/-	Value Based Pricing	Value Based Pricing +	Value Based Pricing -	Value Based Pricing +/-	Pricing Other	Customer Involvement	Customer Involvement +	Customer Involvement -	Customer Involvement +/-	Expertise Employees	Innovativeness	Innovation +	Innovation -	Research	Market Research +	Market Research -	Market Research +/-	Scientific Research +	Scientific Research -	Product Success	Succes of Products +	Succes of Products -	Succes of Products +/-	Value Based Principles	Value Based Principles +	Value Based Principles -	Value Based Principles +/-	Totals
Agri 1	22	7	14	1	16	6	7	3	28	20	3	5	0	5	2	1	2	0	8	6	2	2	0	0	0	1	0	1	0	0	16	9	3	4	98
Agri 2	18	9	6	3	26	11	5	10	11	6	1	4	8	6	3	2	1	1	6	5	1	0	0	1	0	2	1	1	1	0	15	7	2	5	94
General 1	3	1	1	1	9	5	1	3	14	8	0	6	2	9	5	3	1	4	0	0	0	0	0	0	0	2	1	1	0	0	26	14	5	4	66
Semicon 1	7	5	2	0	10	8	2	0	18	16	0	2	0	8	8	0	0	0	1	1	0	0	0	0	0	0	0	3	1	1	14	13	1	0	61
Sport 1	14	13	0	1	11	5	3	3	19	12	3	5	3	6	6	0	0	1	8	8	0	5	0	1	4	0	1	3	3	0	23	17	2	3	93
Steel 1	4	3	1	0	6	5	0	1	8	2	1	5	0	8	1	4	3	2	0	0	0	1	0	1	0	0	0	3	1	2	0	5	2	1	35
Medical Engineering 1	8	6	1	1	3	2	0	1	4	1	1	2	1	5	5	0	0	0	0	0	0	2	0	0	2	0	0	2	2	0	3	3	0	0	28
Textiles 1	7	5	1	1	6	6	0	0	13	13	0	0	4	4	4	0	0	1	2	2	0	1	0	0	1	0	1	1	0	0	12	11	0	0	50
Iron 1	3	3	0	0	10	10	0	0	4	2	2	0	4	5	5	0	0	0	3	3	0	1	1	0	0	0	0	2	2	0	9	9	0	0	41
Semicon 2	9	5	1	3	9	4	2	3	17	14	1	2	4	11	7	1	3	1	10	10	0	5	5	0	0	0	0	2	2	0	13	11	0	1	80
Plastic 1	7	4	3	0	6	1	5	0	10	10	0	0	0	3	3	0	0	0	3	3	0	1	0	0	1	0	0	3	1	1	8	7	0	1	41
Plastic 2	3	1	1	1	14	6	5	3	15	5	3	7	3	7	7	0	0	0	8	7	1	2	0	1	1	0	1	1	0	0	10	10	0	0	64
Thermoplastic 1	9	3	0	6	6	4	1	1	11	8	0	3	6	12	11	0	1	2	3	3	0	4	4	0	0	0	0	1	1	0	10	5	1	2	62
Plastic 3	6	2	2	2	11	11	0	1	9	0	5	4	1	5	5	0	0	0	4	4	0	1	1	0	0	0	0	3	3	0	2	2	0	0	43
Steel 2	13	10	0	3	6	6	0	0	14	13	0	1	0	5	4	0	1	1	3	3	0	0	0	0	0	0	0	2	2	0	14	13	0	0	57
Print 1	6	4	2	0	4	3	0	1	8	5	2	1	1	11	9	0	2	0	3	2	1	1	1	0	0	0	0	2	2	0	13	9	2	2	49
Aerotec 1	7	6	0	1	8	7	1	0	17	16	0	1	0	6	6	0	0	0	1	1	0	4	4	0	0	0	0	2	2	0	10	8	0	2	55
Totals	146	87	35	24	162	100	32	30	220	151	21	48	37	116	91	11	14	13	63	58	5	32	18	3	5	5	4	34	25	6	203	150	17	24	1017

Appendix D: Co-existence tables

Co-occurrence of Codes	Competion Based Pricing +	Competition Based Pricing -	Competition Based Pricing +/-	Cost Based Pricing +	Cost Based Pricing -	Cost Based Pricing +/-	Value Based Pricing +	Value Based Pricing -	Value Based Pricing +/-	Pricing Other	Customer Involvement +	Customer Involvement -	Customer Involvement +/-	Expertise Employees	Innovation +	Innovation -	Market Research +	Market Research -	Market Research +/-	Pricing Other	Scientific Research +	Scientific Research -	Success of Products +	Success of Products -	Succes of Products +/-	Value Based Principles +	Value Based Principles -	Value Based Principles +/-
Competion Based Pricing +				8	2	1	7			1					2	1							3					
Competition Based Pricing -				1	1		2	2			1	1											1					
Competition Based Pricing +/-						2			3				1										1					
Cost Based Pricing +						2	15	3	4	1	1			2														
Cost Based Pricing -							15		1						2	1						1	1	1				
Cost Based Pricing +/-							3		7								1								1			
Value Based Pricing +										2	1				1	2							7		1			
Value Based Pricing -																							2	1				
Value Based Pricing +/-											1				2	1	1								2			
Customer Involvement +															1	1	18		6				18					
Customer Involvement -																								1				
Customer Involvement +/-															2										1			
Expertise Employees																							1					
Innovation +																	2						4					
Innovation -																												
Market Research +																	1	1					2					
Market Research -																	2											
Market Research +/-																												
Pricing Other																												
Scientific Research +																							2					
Scientific Research -																												
Success of Products +																							4	2				
Success of Products -																								1				
Succes of Products +/-																												
Value Based Principles +																												
Value Based Principles -																												
Value Based Principles +/-																												

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