What regular activities did buying firms do which improved their standing with suppliers?

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ABSTRACT,
Today, satisfying the supplier is more important than ever. Because of supplier-scarcity there is increased competition among buying firms, to gain the best resources from the best suppliers. This study reviewed literature about three different types of regular activities which positively influence the buyer's standing by the supplier. These activities were grouped as supplier development, supplier awarding and information exchange. As a primary data collection interviews were conducted, where purchasing and sales managers were interviewed. Furthermore, a novel way of analyzing interviews was through the help of the three softwares: Amberscript, IBM Watson and Weka. The findings of the interviews were a set of activities, which were grouped into six categories. The six categories are: personal-, information-sharing-, incentive-, evaluation-, event-, supplier-development-based activities. Regular activities related to these categories were found out to improve the supplier satisfaction.

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Keywords
Supplier satisfaction, Buyer-supplier, Supplier development, Awards, Information sharing

1. INCREASING IMPORTANCE OF BUYER-SUPPLIER RELATIONSHIP FOR COMPETITIVE ADVANTAGE IN B2B MARKET

In the past, suppliers were competing for customers to supply them their products. However, recent research has shown that customers should try to be attractive to their suppliers to be able to get the best supply. This is caused by a reduction of suppliers in many industries. Only a few large manufacturers are dominating one market, because they are able to provide uncommon materials or supply. This supplier-scarcity leads to an increase in importance of developing a good relationship to your supplier as a customer, because only the preferred customer will get preferential resource allocation (Schiele, Calvi & Gibbert, 2012, p.1178). An increase in competition can be seen between customers to gain suppliers. The low number of sources gives the supplier the leverage to decide which customer to serve and to what extent (Schiele, Calvi, Gibbert, 2012, p.1179).

Suppliers only provide their most valuable resources to particular customers. Because of declining numbers of supplier availability, they decide which customer to give the best resources. This emphasizes the importance of satisfying the supplier, since a dissatisfied supplier might not reward the customer with his best resources (Schiele, Ellis, Eßig, Henke & Kull, 2015, p.132). Therefore, a company needs to increase attention on strategic supply management and compete with other firms for the preferred customer status, to get access to important resources (Hüttinger, Schiele & Veldman, 2012, p.1194). "A firm has preferred customer status with a supplier, if the supplier offers the buyer preferential resource allocation" (Steinle & Schiele, 2018, p.11). Furthermore, buying firms are more dependent on their suppliers as a vital source for technology and innovation. Without the necessary commitment to the supplier, which strengthens the relationship, competitive advantage may be lost due to the lack of access to innovative ideas (Roberts, 2001, p.36).

Blenkhorn & Banting (1991) develop the model of reverse marketing. The model explains that there is a shift from traditional marketing, where the supplier needs to take the initiative to persuade the buyer to buy from him, to reverse marketing, where the buyer needs to market himself to the supplier so that he provides adequate resources (Blenkhorn & Banting, 1991, p.187).

After understanding the importance of increasing the supplier satisfaction as a customer, it becomes interesting to find out how that can be achieved, and which specific activities lead to the increase of it. There is a gap in research about how companies can actually achieve a better standing with their suppliers.

The research question of the thesis is: *What regular activities did buying firms do which improved their standing with their supplier?* The research question will focus on specific activities which companies did regular or periodic to increase the satisfaction of their suppliers. This will be done by conducting interviews with buying and supplying companies to find out what they think does improve the relationship between them. As a result, this research adds value by giving buying companies a precise set of activities, which they can adopt to increase their standing with their supplier.

Primary and secondary data collection will be used to collect data about this topic. The literature about regularly performed activities by companies, which have a positive impact on supplier satisfaction will be reviewed. There are some studies about supplier development, giving out awards to suppliers and information sharing to improve the supplier's satisfaction in current literature. These will be reviewed in section two. Primary data will be collected through interviews. In this case there are 41 interviews which were conducted by 7 students. Companies from different industries, different sizes and different countries were interviewed.

After discussing the theory, the methods used in this study will be explained. Not only traditional methods were used, but a novel way of analyzing interviews with the help of IBM Watson and Weka, which is a machine learning software. After that the results of the different analysis methods will be reviewed and a comparison will be made. At the end, the conclusion will include the regular activities buying firms do, but also which data analysis method worked well and if the technological methods should be used in future research.

2. LITERATURE REVIEW

In the following, literature about supplier satisfaction will be reviewed. First, supplier satisfaction in general and its relation to customer attractiveness and preferred status will be explained. After that, current literature about regular activities which were proven to have a positive impact on supplier satisfaction will be collected and analyzed.

2.1 Supplier satisfaction and its relation to customer attractiveness and preferred customer status

Supplier satisfaction is achieved when a buying company satisfies or excels at meeting the expectations of the supplier (Schiele, Calvi & Gibbert, 2012, p.1181). Essig & Amann defined supplier satisfaction as "(…) a supplier's feeling of fairness with regard to buyer's incentives and supplier's contributions within an industrial buyer-seller relationship as relates to the supplier's need fulfilment (…)" (Essig & Amann, 2009, p.104). Satisfying the supplier is important, because a dissatisfied supplier might perform worse, which results in poor quality products of the buyer or less sales volume (Essig & Amann, 2009, p.104).

If a firm wants to operate as good as possible, they need to work together with their suppliers. Achieving supplier satisfaction will improve the end users' customer satisfaction, because the supplying company is more likely to serve with its best resources (Wong, 2000, p.427).

The degree of supplier satisfaction determines whether or not a customer is assigned the preferred customer status (Schiele, Calvi & Gibbert, 2012, p.1181). Furthermore, Pulles et al. (2016) found out that satisfying the supplier and being an attractive customer plays a role in achieving preferred customer status (Pulles, Schiele & Veldman, 2016 p.136). By being the preferred customer, a company gains the advantage of increases in supplier innovativeness and benevolent pricing behavior of the supplier (Schiele, Veldman & Hüttinger, 2011, p.16).

In a study by Hüttinger et al. (2014) growth opportunity, the buying firm's reliability and its relational behavior have been identified as important drivers of supplier satisfaction. Furthermore, is was found out that the company's operational excellence has an influence on customer attractiveness. (Hüttinger, Schiele & Schröer, 2014, p.712). Customer attractiveness is the necessary precondition for supplier satisfaction. Supplier satisfaction then can lead to the preferred customer status (Schiele, Calvi & Gibbert, 2012, p.1181). In another study by Meena & Sarmah (2012) a supplier satisfaction index model was developed. The model explains that the main dimensions and antecedents that affect supplier satisfaction are purchasing policy, payment/finance policy, coordination policy and the corporate image (Meena & Sarmah, 2012, p.1238). In a

study by Schiele et al. (2012) participants identified three main drivers of Supplier satisfaction, which were a sustainable business approach, the relationship performance of the buyer and a fit between the companies (Schiele, Veldman, Hüttinger & Pulles, 2012, p.144).

A proactive approach to purchasing needs to be adopted in order to satisfy supplier needs (Blenkhorn & Banting, 1991, p.187). Schiele et al. (2012) have identified a relational circle between customer attractiveness, supplier satisfaction and preferred customer status. Customer attractiveness is an antecedent to supplier satisfaction and when the supplier is further satisfied preferred customer status can be achieved (Schiele, Calvi & Gibbert, 2012, p.1181). The circle closes because being a preferred customer influences the customer attractiveness (Schiele, Veldman, Hüttinger & Pulles, 2012, p.141). The relation of customer attractiveness, supplier satisfaction and preferred customer status is illustrated by Figure 1.

The circle of preferred customer status (Schiele, Veldman, Hüttinger & Pulles, 2012, p.142) can be related to social exchange theory. One definition of social exchange theory was formulated by Homans (1958), who explained that "social behavior is an exchange of goods, material goods but also non-material ones (…)" (Homans, 1958, p.606).

Based on the assumptions of social exchange theory, customer attractiveness is based on expectations the supplier has of the relationship to the buyer. After the relationship is initiated the supplier compares the buying company to other alternatives to consider whether to reward him with the preferred customer status or not. Therefore, the three concepts can be related to each other based on social exchange theory (Schiele, Calvi & Gibbert, 2012, p.1180).

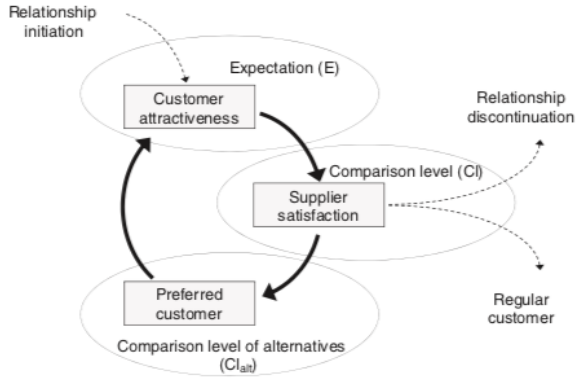

Figure 1: The cycle of preferred customership represents the relation of customer attractiveness, supplier satisfaction and preferred customer status (Schiele, Calvi & Gibbert, 2012, p.1180)

2.2 The effect of supplier development, supplier awarding and information sharing on supplier satisfaction

In the following, literature about activities which have a positive impact on the satisfaction of the supplier will be reviewed. supplier development, supplier awarding, and information exchange are the three main groups discussed. These three groups include different types of regular activities.

2.2.1 Supplier development

Four different types of activities have been stated by Krause (2002) which are used to encourage supplier to improve: competitive pressure, supplier assessment, supplier incentives, and direct involvement investments. The first is using competition to motivate suppliers with a bidding process, where alternative suppliers get involved. In the second category the performance of the supplier is assessed, and feedback is provided. Incentivizing the supplier can be done by giving out awards or certificates to the suppliers. The final category involves activities such as site visits, training of supplier personnel, and direct investment in the supplier's operations (Krause, 2002, p.14). The different categories help to define different regular activities. These four types of activities are used in supplier development, which is believed to have a positive impact on supplier satisfaction. Literature about this hypothesis will be reviewd in the following.

One regular activity buying firms perform, where recent research has shown to have a positive impact on the supplier satisfaction, is supplier development. Supplier development was defined by Krause & Ellram (1997) as "any effort of a buying firm with a supplier to increase its performance and/ or capabilities and meet the buying firm's short and/ or long-term supply needs" (Krause & Ellram, 1997, p.39). A variety of supplier development practices is used by buying firms. These practices range from limited to extensive buying firm efforts (Krause & Ellram, 1997, p.39). Supplier development activities include: supplier assessment, awarding supplier based on improved performance, instigating competition among suppliers and training of supplier's personnel (Krause, Scannell, Calantone 2000, p.34). Prahinski & Benton (2004) found out that supplier development programs, which are based on collaborative communication, are beneficial to the buyer-supplier relationship. (Prahinski & Benton, 2004, p.60)

When a buying firm invests in his supplier it will strengthen the commitment to them. This type of promise then improves the relationship and overall the satisfaction of the supplier (Anderson & Weitz, 1992, p.27). By engaging in capability development initiatives for the supplier the buyer

In another article Ghijsen, Semeijn & Ernstson (2010) research the impact of capital- and human-specific supplier development. Their results were that both supplier development practices had a significant influence on supplier satisfaction but also on commitment to the supplier (Ghijsen, Semeijn & Ernstson, 2010, p.24).

Nollete, Rebolledo & Popel (2012) Found out that making idiosyncratic investment as a buying frim to simplify the supply chain practices is essential to show the supplier what advantage he is gaining through the relationship with the buying firm. Performance and contribution increases will motivate the supplier to also invest in the buying firm. This results in the supplier being depended on the buyer, since the investments are difficult and costly to shift to another buying company (Nollete, Rebolledo & Popel, 2012, p.1190).

2.2.2 Supplier awarding

A study by Benton & Maloni (2005) tested the effect of power sources on supplier satisfaction and supplier performance. The study has shown that a strong relationship between buyer and supplier has a positive impact on supplier satisfaction. Furthermore, the authors found out that coercive-mediated power sources have a negative impact on supplier satisfaction, whereas reward-mediated and non-mediated power sources have a positive effect on supplier satisfaction. (Benton & Maloni, 2005, p.6).

Moreover, Supplier certification has a positive impact on the buyer-supplier relationship (Larson & Kulchitsky, 1998, p.80).

In spite of some literature about the positive effect of supplier satisfaction on awarding the buyer, as in the article of Vos et al. (2016): "the tendency to award the buyer preferential customer status" (Vos, Schiele & Hüttinger, 2016, p.9), there is not much research on how awarding the supplier has an effect on the satisfaction with the buyer.

2.2.3 Information exchange

Exchanging information between buyer and supplier has multiple advantages. The first is that it has a negative impact on the supplier's perception on buying firms unethical behavior. Following, it has a positive impact on the perceived buying firm commitment by the supplier. This is an important factor because when the buying company shows to have a big interest in the continuation of the relationship to the supplier and that has a positive impact on the supplier satisfaction. Finally, information exchange as well as the perceived commitment has a positive impact on supplier satisfaction (Eckerd & Hill, 2012, p.241).

Information sharing has a positive influence on supplier satisfaction according to Nyaga et al. (2010). The author explained that information sharing is critical to develop trust and commitment. These two factors are both influencing supplier satisfaction, but also the satisfaction with the results and the performance (Nyaga, Whipple, Lynch, 2010, p.110).

In a study Ellis, Henke & Kull (2012) found out that, supplier involvement has a positive influence on becoming the preferred customer. Supplier involvement in this case is the extent to which a buying company involves his supplier in the development process of a new product. By increasing the involvement for improving the product and gaining performance gains, the buyer demonstrates their interest in the relationship. (Ellis, Henke & Kull, 2012, p.1265). This can be seen as a form of information or innovation exchange with the supplier.

Ghosh, Joseph & Gardner (1997) further implicate that sharing expectation about price and nonprice benefits, is positively associated with a good relationship between buyer and supplier (Ghosh, Joseph & Gardner, 1997, p.64).

The importance of information and knowledge sharing is important since it is a well-established way to show the supplier that the buying company is committed to do business with them. This eventually builds up the relationship and is an effective way of increasing supplier satisfaction (Vanpoucke, Vereecke & Boyer, 2014, p.27)

3. METHODS

Through this research, activities will be identified, which purchasers can perform to improve their relationship to their supplier and optimally gain the preferred customer status. The methodology approach is a qualitative approach. Interviews combined with different technologies, to help analyze the outcomes of the interviews will be used to investigate the research question. In the following section this process will be elaborated.

For this study 41 interviews were conducted. The data was gathered by seven students. The interview consisted of seven different questions, where every student analyzed one of the interview questions. Furthermore, the interviewed companies filled out a survey to determine how they perceive their suppliers to be satisfied with them.

3.1 Interviews as the qualitative data collection method

A qualitative data collection method was chosen because activities, which are not yet known to have a positive impact on the buyer-supplier relationship, could be identified. Whereas quantitative data collection only would ask for existing activities.

Results of the interviews were manually coded. This was done by looking at each interview and defining the activities or topics the participants were talking about. This includes dividing the interview answers into different sections and assign every section to a factor or activity. Furthermore, it was looked at the frequencies of these activities.

The interview was conducted with purchasing managers and sales managers. Due to confidentiality the interview transcripts are not included in the appendix.

By using this method, different types of activities, which improve the relationship between buyer and supplier in a positive way, will be identified. With the insights obtained from that, the research question: "what regular activities buying firms do to increase their standing with their supplier", can be answered.

The question asked in the interview was generally asked and followed up with examples in current literature. After the participant had spoken openly it was asked whether they were engaged in supplier development, awarding, certification or information sharing.

3.2 Quantitative data in form of surveys to support interviews

A five score scale was used in the survey, which ranged from "do not agree at all" = 1 to "very much agree" = 5. The survey included questions to determine the supplier satisfaction, if they have the preferred customer status, whether they have a high status in the view of their suppliers and whether they think their supplier management is successful. For every of these four categories, four sub questions were included. The average of these sub questions was taken to determine the overall score of the category.

As an example, to find out what the supplier satisfaction score of the companies were, these four question were asked: most of our supplier… (1) …are very satisfied with the overall relationship with us, (2) …are very pleased to have us as their business partners, (3) …if they had to do it all over again, would still choose to serve us as customer, (4) …do not regret the decision to do business with us. The average of supplier satisfaction score of all companies in this study is 4.08 and the median is 4. The remaining survey questions can be found in the appendix, however the answers to the survey were left out due to confidentiality.

Furthermore, participants needed to fill out the number of employees, their annual revenue, their position and in which industry the company is operating. The sample consists of companies from different industries and different sizes. The interviews were also conduct with companies from different countries, mainly Germany and the Netherlands. Through the use of the survey the interview participants can be divided by in groups by their size, industry or supplier satisfaction.

3.3 The help of technology for the analysis of qualitative data

This section is about the support of technologies to make the analysis of data easier. The artificial intelligence softwares used in this study were: Amberscript, IBM Watson and Weka. Moreover, how these softwares were used will be explained in the following.

3.3.1 Amberscript – transcription tool

Transcribing and coding interviews often takes a long time. This is also a limit to many studies, since a large number of interviews means long hours of transcribing and coding. That is why in this study different technologies were used to try to make the process faster and easier.

A software called Amberscript was used to transcribe the interviews. For that the interviews were recorded and after that the audio files were uploaded to Amberscript, where the records needed 10 – 20 minutes to be transcribed into text files. The software was really reliable and understood a lot of words. After the transcription only a few mistakes needed to be corrected.

3.3.2 IBM Watson – natural language classifier

After the interviews were transcribed two different softwares were used to analyze the data. The first was IBM Watson and the second Weka. The function "natural language classifier" from IBM Watson was used to analyze the interview data. To use this analysis method, the interview answers needed to be compiled in one text file. After that artificial intelligence software Watson did go through the text to identify key words. At the end it gives an output where they keywords are shown, where the frequency of the words can be seen as well as a relevance score assigned by Watson. The relevance score is determined by the importance of the word in the text context and the frequency.

IBM Watson was chosen as an analysis method because its cognitive computation solutions has the ability to understand, evaluate and learn from data. This gives the opportunity for a faster research process, but also to novel insights. The cognitive computation process may also improve coding process in qualitative data analysis (Chen, Argentinis & Weber, 2016, p.699). That is why in this study the computation ability of Watson is tested on the 41 conducted interviews. Furthermore, 41 interviews are much for a qualitative study. An article from Francis et al. (2010) explore the principle of data saturation. This means that most important results will come out the first 10 to 15 interviews. Therefore, analyzing further interviews will not make a significant change to the outcome. An example in the article stated that 97% of the codes where found in the first 12 interviews of a 60 interview sample. This implies that a sample size of 10 to 15 interviews, depending on what is investigated, is sufficient (Francis, Johnston, Robertson, Glidewell, Entwistle, Eccles & Grimshaw, 2010, p.1241). However, with the ability of Watson the artificial intelligence should be able to analyze all 41 interviews and gather information which would be more generalizable than just conducting 10 interviews. Since, coding interviews takes a lot of time in research, this would simplify the data analysis drastically, no matter how big the sample size is.

3.3.3 Weka – supervised machine learning

The process of Weka which was used is called "supervised machine learning". To properly use Weka, the interviews had to be divided in small sections. Every section was assigned a letter, were a letter is a code or activity. A excel sheet needed to be created for that. The first 20 interviews were coded manually to train the system. After the system had been trained, the remaining interviews could be uploaded. Weka then uses the pattern which were recognized in the training set to assign a category which fits the requirements to the remaining interviews.

4. ANALYSIS

In this section, the results of three different analysis methods will be discussed and evaluated. The analysis methods include the traditional manual coding, IBM Watson's natural language classifier and Weka's supervised machine learning procedure. At the end of this section all three methods will be compared.

4.1 Regular activities used by buying firms found out by manual coding

In the following, findings of the manual coding will be discussed. The results of the 41 interviews are activities which buyers use to improve their standing by their suppliers. The interviews are divided by company size and the buyer's perceived satisfaction of the supplier. For this study a small company has between 1 – 50 employees, a medium sized company between 51 – 250 employees and a large company has over 250 employees. Perceived satisfaction of the supplier by the buyer has been measured in a survey which can be found in the appendix. The findings of the manual coding are summarized in table 1. Overall 11 small sized companies, 7 medium sized companies and 23 large sized companies were interviews in the study. Since, the manual coding was based on analyzing the frequency of activities occurring the frequency how often a purchaser mentioned a specific activity is shown in the table behind the activities.

The classification used in the table are useful to see what larger companies do other than small ones and which activities are undertaken by purchasers which perceive their suppliers to be satisfied with them.

Company visits and meetings have been mentioned across all categories. In the interviews, it became clear that these things are the first necessary thing to do when a purchaser wants to build up a relationship with his supplier. These go hand in hand with the buyer sharing expectations with the supplier. Supplier appreciate when companies are able to explain their intentions to them.

One activity where especially large firms and firm who have satisfied suppliers seem to engage in is information sharing. This ranges from sharing information about markets or forecasted demands to sharing innovations. When buyers share information with their supplier, suppliers see that the buying companies commits to the supplier since, exclusive information is not granted to everybody. Forecasting demands shows that the buyer will in the future keep business with the supplier. This is in principle the same as offering opportunities to the supplier. As an example, if the buying firm tells their manufacturers that they have a new product, where production will soon start and they need parts or materials from that supplier, the supplier will be more satisfied with the buyer for offering him this opportunity for future business.

Supplier development is mostly done by large companies, since they have the capabilities for that, but also medium sized companies have mentioned such actions in the study. This again is a tool to increase the commitment to the supplier which results in an increased standing with that supplier. This is the case, since supplier development most of the time includes an idiosyncratic investment in the supplier, which in return increases the tendency of the supplier to invest in the buying firm according to Nollete et al. (Nollete, Rebolledo & Popel, 2012, p.1190). Investing in each other increases trust and commitment which overall increases the suppliers satisfaction.

Giving out feedback and receiving feedback improves the relationship between buyer and supplier. That can be done through many different activities like quarterly business reviews, performance reviews, supplier evaluation or sending out surveys to the supplier to receive feedback. This will show the supplier if his performance decrease and that the buying company still wants to do business and help to improve the areas which are not so good. This goes in the same direction and is part of supplier development.

Furthermore, events like supplier days, exhibitions, fairs, seminars, etc. are frequently used to increase satisfaction with the supplier. Here the buying company is marketing themselves to suppliers. Often during these events, new innovations, products or developments will be presented. The supplier will see the opportunity for future business and improve the standing of the buyer because of that.

Another activity type which only large companies are engaged in are giving their supplier awards or certificates. This gives the supplier some kind of prestige. Getting an award for his performance, gives him a good feeling and overall improves his satisfaction with the buyer.

Some interview participants mentioned unusual activities, which they are regular doing to improve their standing with their supplier. One purchaser said they were organizing parties, where they also giving out awards to some suppliers. This kind of event will foster personal interaction between purchasing managers and sales managers. Knowing the person who you are talking to

in during phone calls will have a positive impact on the relationship. Another interview participant explained that his company is enabling their supplier to advertise with their products. The example mentioned in the interview was about a manufacturer who gets a picture of the finished product, which he can use to market itself. This gives the manufacturer a kind of prove where he can show other possible buyers what his materials were used to. If the end product is developed good the customers of the manufactures will assume that the materials will also be good for their product. This is an example of how enabling the supplier to advertise improves the standing to that supplier. These examples are interesting cases, however these are difficult to generalize to every company, since only a few participants mentioned these. Continuingly the results will focus on findings, which were mentioned more often and seem to be generally applicable.

Table 1 Regular activities

	Company size		
Perceived Supplier Satisfaction Score from Survey	Small 1 – 50	Medium 51 – 250	Large > 250
2 – 3	Phone calls Performance review		Company visits x 2 Innovation sharing
3 – 4	Company visits Meetings Sharing expectations	Sharing expectations Supplier development Enabling advertisement	Meetings x 5 Phone calls x 2 Sharing expectations Innovation sharing Information sharing Offer opportunities x 3 Supplier development x2 Innovation events Awards x 4 Quarterly business review x 5 Supplier evaluation x 3 Receive feedback
4 – 5	Company visits x 2 Meetings Information sharing Fair Jubilee Open day Exhibitions Performance review x 2	Company visits Meetings Sharing expectations Innovation sharing Information sharing Supplier days Awards x 2 Seminars Parties Quarterly business review Supplier evaluation	Company visits Meetings Phone calls Sharing Expectations Innovation sharing x 3 Information sharing x 4 Offer opportunities x 3 Supplier development Supplier days x 7 Innovation events Exhibitions x 2 Awards x 3 Quarterly business review x 2 Performance review Supplier evaluation x 2 Receiving feedback

Notes: Perceived supplier satisfaction by buyer was measured in a survey which can be found in the appendix.

The scores are the average of the questions about how satisfied the supplier is according to the buyer (1=worst, 5=best). The numbers behind the activities explain how often they were mentioned.

Concludingly, many different activities have been identified during the interviews. To give a better structure the activities can be grouped into categories. The first category includes personal-based activities which include phone calls, meetings, company visits and parties. The next is information-sharing-based activities where every kind of activity is included where information or knowledge to the supplier is shared. The third includes incentive-based activities, mainly awarding the supplier. The fourth category is evaluation-based, here all activities which evaluate the supplier or review the business are included. The next is event-based activities. These include all types of events like supplier days, innovation events, fairs, exhibitions etc. The final category is supplier development based. In this category all activities which support the supplier through direct or indirect investment are included. These six categories summarize the outcome of this research in a simpler way than a big list of all the different activities.

When comparing the literature with the findings some intersections can be noticed. The findings show that information exchange to information sharing are vital activities when aiming to satisfy the supplier. This result is also supported by the article of Eckerd & Hill (Eckerd & Hill, 2012, p.241). Developing suppliers, with the activities: supplier evaluation, offering opportunities and general capability improvement of the supplier is also supported by the literature to have a positive impact with supplier satisfaction (Ghijsen, Semeijn & Ernstson, 2010, p.24; Prahinski & Benton, 2004, p.60). Furthermore, there is no prove of the effect of exhibitions, supplier days, innovation events, seminars and fairs on supplier satisfaction in the literature. However, the research results of this study show that these activities have an influence on the standing of the buyer. There was also no literature on how quarterly business reviews, performance reviews and receiving feedback from the supplier effect the relationship. General literature about information exchange is out there (Nyaga, Whipple, Lynch, 2010, p.110), but many purchasers in this study have explained that quarterly business review and receiving feedback are important activities when building a good relationship with their supplier. Organizing parties and enabling the supplier to advertise with the products of the buying company are exceptional results only mentioned each by one purchaser. However, these could be activities not widely known yet to improve the supplier satisfaction. The significance of the effect of these activities on supplier satisfaction is not high and reliable, but this can be a topic of further research.

Coding interviews manually is time costly and subjective. However, the advantage is that a human can see relations in a sentence. Therefore, it is easier to group e.g. synonyms to the same category, since different words can have the same meaning. Furthermore, the whole process of coding is very easy and does not need any intensive training.

4.2 Comparison of companies with high supplier satisfaction vs low supplier satisfaction

As in the previous section touched upon, companies which scored high on the survey, about supplier satisfaction, can be compared to companies which score low. Companies who score four or higher were classified as high achieving companies. All other companies below four were classified as low achieving companies. The scores were determined by the survey which the participants filled out, where the score is the average of all four questions regarding supplier satisfaction. Companies above a score of four are high achievers because the median of all companies is four. Therefore, companies above four are better than the average.

Low achieving companies nearly only rely on meetings, company visits and phone calls to build up a good relationship to their supplier. Whereas high achieving companies take a stronger initiative and use more opportunities to satisfy their suppliers. They use different forms of information sharing more often than low achieving companies. Activities like innovation sharing, information sharing and sharing expectations are used by buyers who have satisfied suppliers.

Furthermore, high achieving buyers communicate with their suppliers and try to help them improve their firm. They do this by reviewing their business and their performance, but also through direct investment in the supplying firm inform of supplier development initiatives.

Finally, purchasers who have satisfied suppliers organize more events, where they present their business to the suppliers. However, this seems to be mainly adopted by firms who are large and have the capabilities to organize events like supplier days, innovation events and open days. The findings are represented in table 1. Interview participants from large companies with satisfied suppliers mentioned supplier days more frequently than small firms with unsatisfied suppliers.

4.3 Analysis results of IBM Watson's natural language classifier function

The output of the IBM Watson analysis was not as good as thought of in the beginning. The artificial intelligence program gave many keywords, their frequency and assigned a relevance score to them.

The results of the Watson analysis show that regular calls, important events, open day, standard visit, innovation awards, regular meetings and quarterly business review are mentioned as periodic activities in the interviews. Many further keywords have been suggested from the program however the rest is not very useful for this study. The complete output of Watson can be found in the appendix. The program has not been trained to search especially for activities neither has it been trained to understand what an activity is or what the words, we are searching for means. This can be the cause, which resulted in the many unimportant keywords.

The first problem with the frequency analysis is that the keyword with the highest frequency is "supplier" with a frequency of 55. This result does not really give us something to analyze of, since the study is about supplier satisfaction and "supplier" is obviously a word, which is often mentioned.

The relevance score is not very useful to assess the keywords. The highest score is 0.7620 and the lowest 0.5149. Considering that most keywords show a frequency of 1 and only a few more than that, it is difficult to understand how this relevance score is actually calculated of. Even though "supplier" has the highest frequency it does not have the highest relevance score. The program does not give any further explanation on how it has defined important relations in sentences.

4.4 Analysis results of Weka's supervised machine learning function

The output of the program Weka showed an unsuccessful result. All the interview answers were divided in a total of 99 sections and every section got assigned a letter. Each letter had activities assigned to it. Table 2 shows the shortcuts and which activities were distributed to which shortcut. The activities were assigned letters so that the program has less classes it can assign sections to, since more classifications with less sections makes the outcome more unreliable. From that sample, 49 sections were used to train the program so that it will be able to identify the letter of the following 50 sections.

Since all sections were also manually coded the output of Weka can be compared to it and checked whether the program assigned the right letters to the sections.

Table 2 Shortcuts for activities

Shortcut for Weka	Activities			
A	Meeting	Phone call	Company Visit	
B	Fair	Jubilee	Open day	Party
C	Quarterly business review	Performance review	Supplier evaluation	Receive feedback
D	Information sharing	Innovation sharing	Sharing expectations	
E	Innovation event	Supplier day	Exhibition	
F	Awards	Certificates		
G	Supplier development	Offer opportunities	Enable advertising	

Unfortunately, only 16 out of 50 sections were identified correctly. This can be because 49 sections with 7 categories is too small of a sample to train the program. As an example, category B only had 3 sections. Therefore, the program does not have enough examples to learn which category belongs to which sentences. Surprisingly 7 out of 9 sections were correctly classified as C. This again can be because the initial training set of 49 sections had more C categorized sections than other letters. The program also assigned the letter C 11 times wrongly to a section, which had another letter. Therefore, it is difficult to say if Weka had developed an understanding of the C category and therefore assigned it correctly or if it just was random guessing.

The biggest disadvantage to use Weka for qualitative data analysis is that a really big sample size is needed with a lot of examples for all the classifications. The program will work better then only searching for two different classes, e.g. A and B. Therefore, it is difficult to search for codes with Weka, since an interview most of the time has more than two codes. Furthermore, there is no option to identify new codes with this program because all classes need to be identified to teach the program what it needs to search for. This is also a disadvantage, since some new codes can arise in the last interviews.

4.5 Comparison of manual coding, Watson and Weka

In the next section, a comparison will be made between the manual coding process, the natural language classifier application and the supervised machine learning process. All methods have advantages and disadvantages, however the manual coding process was in this case the best one. The disadvantage of coding manually, is that there is a subjective manner to it. When interviews are coded by humans, there is always a subjective opinion behind the process of developing codes and assigning interview sections to these codes. This is an advantage of Watson and Weka, since the subjectivity can be limited, and qualitative data could be analyzed in a more quantitative way.

Coding manually gets time costlier the more interviews one has. When using the help of technology, further interviews could be added to the program even after the study has finished, to make the outcome more precise from time to time. This would take some initial time in the beginning to train the software, however after it have been trained the process is easy and gives very fast outputs. The problem with a large sample size for qualitative research is, that due to data saturation (Francis & Johnston, 2010, p.1241) most studies only have about 10 interviews. This is too small to teach Watson and Weka the meanings of the codes. During this research it has been identified that even a sample of 41 is too small for Weka to work properly. However, even then making a large study with e.g. 500 interviews, it is difficult to say if Weka could add any benefit to the results, since data saturation says that about 97% of the results can be found in the 11 first interviews (Francis & Johnston, 2010, p.1241).

Furthermore, the interviews need to be divided into sections, since Weka is only able to understand small strings of words, and 30 – 50 percent of the sections need to be coded manually. Considering these factors for setting up and training the program, it eventually takes more time than just coding all the interviews manually. Because of the disadvantage mentioned, the use of Weka for analyzing qualitative data is not supported by this study.

The biggest advantage of Watson in comparison to Weka is that the natural language classifier is able to find new codes, which were not know prior to the analysis. Whereas, when using Weka all the codes need to be formulated prior to the analysis to train the program. Therefore, Watson can come up with new codes.

The artificial intelligence only gives keywords as an output. The keywords then need to be analyzed again to see if some could be used as codes. This is a disadvantage, since this can also take some time into account, because not all the keywords identified are relevant.

Watson's usability was also limited. Since, the outcome of an interview is not always clear and structured, the artificial intelligence had difficulties identifying the relevant keywords. When coding manually it is easier to assign different words with the same meaning to the same category. Watson only looked at the words and therefore some unimportant words which were mentioned often were classified as important to Watson. However, some of the outputs show relevant finding. When structuring the interview questions exactly so that Watson will be able to understand them while also having a large sample size, the program can be used as a backup to see if it will find some of the same codes or even some which were missed in the manual coding process.

Finally, it can be said when comparing these three methods, the manual coding took the least time and effort to use. Even though there are some subjective attributes when manually coding, these definitely outweigh the cost of time intensive training of software.

5. CONCLUSION

Finally, a summarized conclusion of this thesis will be given. This conclusion is divided in the content related conclusion and the methods related conclusion. Furthermore, the set of activities which improve supplier satisfaction found out in this study will be mentioned. After that, it will be summarized why manual coding is currently the best analysis method for interviews.

Table 3 Main findings divided in six categories

Regular activity categories					
Personal	Information sharing	Incentive	Evaluation	Event	Supplier development
Phone calls	Information sharing	Supplier awarding	Supplier evaluation	Supplier days	Supplier development
Meetings	Innovation sharing	Supplier certification	Performance review	Innovation events	Offering opportunities
Company visits	Expectation sharing		Quarterly business review	Fair	Enabling advertisement
Parties			Receiving feedback	Open day	
				Jubilee	
				Exhibition	
				Seminar	

5.1 Personal-, information-sharing-, incentive-, evaluation-, event- and supplier-development-based activities identified which improve the supplier satisfaction

The aim of this paper was to answer the research question: *What regular activities did buying firms do which improved their standing with their supplier*, by giving a precise set of activities which improve the supplier satisfaction. The set of activities can be divided into six classes. The first is personal-based activities, which include phone calls, meetings, company visits and parties. The second is information-sharing-based activities, which include innovation sharing, expectation sharing and any type of valuable information sharing. The third is incentive-based activities and include awarding the supplier or giving certificates. The fourth is evaluation-based, here activities like general supplier evaluation, performance review, business review, receiving feedback and in general any type of supplier evaluation are included. After that, the fifth category is event-based activities, where the organization of events like supplier days, innovation events, fairs, open days, jubilees, exhibitions or seminars are included. The final classification is supplier development, which includes offering opportunities, enabling the supplier to advertise with the products of the buying firm and any type of direct or indirect investment in the supplying firm. An intensive set of activities was able to be established during this study. The summary of the main findings is represented in table 3. This was done by collecting data through interviews with purchasing and sales managers, which talked about their experience on how to improve supplier satisfaction.

These are the key findings answering the above mentioned research question. Purchasing managers who are aware of the importance of reaching preferred customer status, should adopt some of these activities to show commitment and trust to their supplier. Furthermore, a combination of categories is advisable to gain the most value out of these practices, since e.g. a company who has a lot of personal-based activities to improve the supplier satisfaction can benefit from implementing some event-based activities. This will eventually make the supplier more satisfied with the buyer and increase the likelihood of getting preferential treatment.

Becoming the preferred customer is important. However, there is a research gap where there is little literature about how to become the preferred customer. This paper closes the research gap and creates value by identifying the most important activities. However, it is important to say that not all activities may be useful to every company. Some may yield less satisfaction from the supplier others might more. To answer that question further research needs to be undertaken. However, this paper gives a general indication of what seem to be important activities when striving for a better relationship with a supplier.

5.2 Recommendations for firms which want to improve standing with their suppliers

The research results are useful for managers who would like to improve the satisfaction of their suppliers. They can use the list of activities to see which activities they are already using, and which can be implemented in the future to improve supplier satisfaction further.

The personal-based activities should be implemented first since they do not need a lot of cost and effort. Sharing information with the supplier should be used where it is possible. One interview participant said that they had information which they did not want to share with their supplier, but at the end they shared it and that impacted the performance and relationship in a positive way. Furthermore, purchasers should regularly evaluate the suppliers, since that shows them that they have an interest in improving the supplying firm. This should also be implemented in the organizational culture, so that it becomes the norm.

Companies which are large should use incentives like awards and certificates to give the supplier some kind of prestige. Even small to medium firms can use some kind of award for good performance to give the supplier a feeling of achievement. This form of gratitude will positively influence the satisfaction of the supplier.

It is recommended for buying companies to also invest in the supplier. This is easier for large companies which have the capabilities to invest, however even smaller companies get an advantage when investing in the supplier. The advantage for smaller companies might even be higher since that will differentiate them from other small sized firms.

Finally, it is recommended to use all kind of events to present the buying firm to the supplier. Things like supplier days can yield a lot of benefits. New suppliers can be found, but the relationship to already existing suppliers will also be improved through communication between buyer and seller during these events.

5.3 Traditional analysis method and the usability of artificial intelligence supported technology in qualitative research

After the results of all three analysis methods have been looked at and a comparison is made, a conclusion needs to be made about the usefulness of each in qualitative research.

In this case, the manual coding was definitely the best and easiest. However, it is difficult to say if it is for all cases. Watson and Weka both can have reasons to be used to analyze qualitative data. The advantages of fast analysis of a large sample size of qualitative data is not to be forgotten. The use of technology will hopefully see further research in the future. The scope of this research did not enable to test out a lot of things with the programs. One or two strategies were developed and then implemented. There was not enough time to really evaluated and reorganize again and again to come to an optimal solution. The sample size of this study was also too small for best use of Watson or Weka. However, when making a big study with a lot of qualitative data, the use of these softwares may become helpful. By using artificial intelligence, the results of the research may also become more generalizable to the population, it has a large sample size and was analyzed using systematic patterns and not subjective opinion.

The most time consuming part of traditional coding is the transcribing part. The transcribing software, Amberscript, did a really good job in this study. In spite of some small mistakes which needed to be corrected, it is able to transform audio files very quickly into text files. This makes the transcribing and coding process easier than ever before.

This study was a pioneer in using technology to help analyze data. Even though the output was not very useful it gave a good direction for future research. IBM Watson's natural language classifier can be well used as a second opinion when developing codes of interviews. Weka's supervised machine learning process will be helpful in studies where there is a large sample size and a few codes to be identified. Overall, it can be said that artificial intelligence will become more useful for analyzing data in the future. Until then manual coding seems to be a reliable option, even though it is time consuming.

6. LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The purpose of the study was to identify a list of activities which buying firms use to improve supplier satisfaction, however there are some limitations which can be addressed through future research.

Even though the study has a quite high sample size with 41 total interviews, the results are still difficult to generalize to the whole population, because qualitative data is always based on subjective opinions. Furthermore, the sample consisted of companies from different industries, different countries and with different sizes. Therefore, it is difficult to say which activities are useful for which type of company.

The study only identified different activities which, according to buying firms, have a positive impact on the satisfaction of the supplier. However, it has not been identified to which extent which activities have a positive impact. Since, some may be more effective than others.

Furthermore, future research should look at both purchasing managers and sales managers. Even though this study had some interviews from sales managers, the most interview participants were purchasers and the activities they do to increase supplier satisfaction may not even increase the satisfaction of the supplier. Therefore, a both sided study would be useful to make the results more generally applicable.

The survey used in this study was conducted to identify the satisfaction of the suppliers with the buying company. This outcome may be biased, since the purchasers can have a different perception of how satisfied their supplier is with them. Therefore, the purchaser may think that the supplier is satisfied with him, but actually the supplier may not be as satisfied as the purchaser thinks.

7. ACKNOWLEDGMENTS

First of all, I would like to thank my supervisor, Prof. Dr. Schiele, for making this whole journey such a pleasure. His experience & enthusiasm in purchasing inspired and motivated me during this process. I learned a lot from him during the development of my thesis.

I would also like to thank the six other students from my bachelor circle with which I have worked together to get all the technical processes running. I was able to analyze a big sample of interviews, because the interviews conducted were shared among the bachelor circle. This gave me interesting insights, which I would not otherwise have gained.

Following, I would like to thank all participants for our research which helped me answer my research question through their knowledge of the purchasing function.

Finally, I am grateful for all the support my friends gave me throughout the whole process while I was writing my thesis.

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9. APPENDIX A – SURVEY

In the following, the survey used in this study is presented.

Supplier Satisfaction						
Most of our suppliers...	1	2	3	4	5 (very much agree)	
...are very satisfied with the overall relationship to us						
...are very pleased to have us as their business partner						
...if they had to do it all over again, would still choose to serve us as customer						
...do not regret the decision to do business with us						

Preferred Customer Status						
Compared to other customers in our suppliers's customer base, on average...	1	2	3	4	5 (very much agree)	
... we are their preferred customer						
... they care more for us						
... we receive preferential treatment						
... our suppliers go out on a limb for us						
... our suppliers' employees prefer collaborating with us to collaborating with other customers						

Status						
In the view of our suppliers, our firm...	1	2	3	4	5 (very much agree)	
...has a high status						
...is admired by others						
...has a high prestige						
...is highly regarded by others						

Success of supplier management						
	1	2	3	4	5 (very much agree)	
Our supplier management is better than that of our competitors.						
Overall, we are satisfied with our supplier management						
In recent years, we were able to minimize supplier dissatisfaction						
In recent years, we improved our supplier management more than our competitors did						

General information
Annual Turnover (in €). (When you belong to a firm-group, please provide the details of your firm branch!)
Number of employees
Ownership (private, public)
What is your position in the company?
Since how many years you are in purchasing with your company?

Please chose your firm's ecl@ss classification from the following list:

(For more information to determine your ecl@ss please visit http://www.eclasscontent.com)

13 Development (Service)	
14 Logistics (Service)	
15 Maintenance (Service)	
16 Food, beverage, tobacco	
17 Machine. device (for special application)	
18 Equipment f.mining, metallurgical plant, rolling mill a.foundry	
19 Information, communication and media technology	
20 Packing material	
21 Manufacturing facility, workshop equipment,	
22 Construction technology	
23 Machine element, fixing mounting	
24 Office product, facility and technic, papeterie	
25 General Service	
26 Energy, extraction product, secondary raw material and residue	
27 Electric engineering, automation, process control engineering	
28 Automotive technology	
29 Home economics, Home technology	

30 Auxiliary supply, additive, cleaning agent	
31 Polymer	
32 Laboratory material, Laboratory technology	
33 Installation (complete)	
34 Medical Device	
35 Semifinished product, material	
36 Machine, apparatus	
37 Industrial piping	
38 Inorganic Chemical	
39 Organic Chemical	
40 Occupational safety, accident prevention	
41 Marketing	
42 In-vitro diagnostic	
43 Optics	
44 Motorvehlice	
45 Human and veterinary drug, pesticide as well as active ingredient	
46 Clothing and textile	
47 Body care and personal hygiene	
48 Sport, playing, leisure	
49 Public safety and military technology	
90 Interim class (mix)	

10. APPENDIX B – WEKA OUTPUT

The output of Watson is shown below. 50 sections of interviews are shown. They are numbered in the first column. In the third column the category predicted by Weka can be seen. The category are the letters: A, B, C, D, E, F and G.

=== Predictions on user test set ===

0	inst#	actual	predicted	error	prediction
	1	1:?	3:C		0.998
	2	1:?	1:A		0.977
	3	1:?	1:A		1
	4	1:?	3:C		1
	5	1:?	1:A		0.543
	6	1:?	1:A		1
	7	1:?	5:E		1
	8	1:?	1:A		1
	9	1:?	1:A		0.806
	10	1:?	1:A		0.995
	11	1:?	5:E		0.863
	12	1:?	1:A		0.514
	13	1:?	3:C		0.997
	14	1:?	3:C		0.993
	15	1:?	4:D		0.925
	16	1:?	3:C		1
	17	1:?	1:A		0.975
	18	1:?	1:A		1
	19	1:?	5:E		0.641
	20	1:?	4:D		1
	21	1:?	3:C		1
	22	1:?	3:C		1
	23	1:?	4:D		0.995
	24	1:?	3:C		0.96
	25	1:?	3:C		1
	26	1:?	5:E		0.998
	27	1:?	3:C		1
	28	1:?	3:C		0.996
	29	1:?	1:A		0.746
	30	1:?	4:D		1
	31	1:?	3:C		0.736
	32	1:?	3:C		0.979
	33	1:?	1:A		1
	34	1:?	7:G		0.63
	35	1:?	3:C		1
	36	1:?	3:C		1
	37	1:?	1:A		0.996
	38	1:?	3:C		1
	39	1:?	3:C		0.937
	40	1:?	1:A		0.992
	41	1:?	3:C		0.96
	42	1:?	4:D		1
	43	1:?	3:C		1
	44	1:?	3:C		0.77
	45	1:?	4:D		0.985
	46	1:?	1:A		0.962
	47	1:?	4:D		0.425
	48	1:?	1:A		1
	49	1:?	1:A		0.675
	50	1:?	3:C		.964

11. APPENDIX B – IBM WATSON OUTPUT

In the following, the Watson output is shown. Here the keywords are represented, the assigned relevance and the frequency.

```
Keywords
text    relevance       count
supplier relationship meetings
        0.7620  1
center s cause 0.5941  1
local suppliers         0.5901  1
years time      0.5781  1
company s developments          0.5536
        1
regular call    0.5502  1
much distributors       0.5465  1
good relationship       0.5451  2
important events        0.5443  1
important items         0.5400  1
particular year         0.5392  1
specific business       0.5372  1
only thing      0.5302  2
s point 0.5294  1
suppliers       0.5290  55
open day        0.5290  1
standard visit 0.5285  1
specific work   0.5282  1
production facility     0.5265  4
main categories         0.5236  1
big banners     0.5231  1
ridiculous example      0.5230  1
new warehouse   0.5230  1
people s education      0.5224  1
monthly basis   0.5217  3
next year       0.5207  2
much competition        0.5205  1
innovation awards       0.5204  1
regular meetings        0.5203  1
local supply market     0.5201  1
side  suppliers         0.5199  1
seriousness of the relationship
        0.5198  1
quality of the people 0.5190  1
kind of discussions     0.5188  1
preferred customer      0.5188  2
plaque talks    0.5183  1
first time      0.5181  1
project area    0.5179  1
like yesterday 0.5178  1
different office        0.5176  1
internal Yokogawa events        0.5172
        1
day basis       0.5169  1
focus point     0.5167  1
concrete example        0.5162  1
big share       0.5162  1
end of the year         0.5159  1
machine doesn t work    0.5157  1
quarterly business reviews      0.5154
        2
regular activities      0.5150  2
half hour       0.5149  1
```