

Servitization within the construction sector; dependencies and strategic flexibility of SME's

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ABSTRACT,

Adding services to business-to-business corporations for years has been an important addition to the value of companies. Suppliers are increasingly using forms of so called servitization to their business models as an addition to their products. These services range from being product-oriented, towards being customer oriented. For the supplier offering these services often adds to their value, but do business-customers experience this similarly? This study aims to investigate the perceptions of dependencies and strategic flexibility that servitized suppliers bring with them. By examining scientific articles, laying out a survey for SME-Business customers out of the installation and construction industry, and performing an interview with a director, this study aims to offer insight in the understanding of the perception of servitization by business-customers. This research displays possible relationships between dependencies and strategic flexibility, as well as an insight in the way servitization is being experienced. Therefore, this paper is contributing to the servitization literature with a specific focus on dependencies and detrimental strategic flexibility for SME's.

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Keywords

Servitization, Dependency, Lock-ins, Strategic Flexibility, SME, Advanced Services

1. INTRODUCTION

1.1 Background

Corporations are increasingly trying to improve their customer value by adjusting to trends and filling in gaps. To maintain an advantage a large number of suppliers has adjusted towards Servitization. Studied since the 80's, but gained more attention after the change of the millennium (Baines et al., 2017). Adding services to business-to-business corporations for years has been an important addition to their value. The implementation of these services is a trend that has been happening over in almost all industries. Increasing value to corporate offerings through services is mostly referred to as 'Servitization of business'. (Vandermerwe & Rada, 1988) Just as most other sectors, suppliers within the construction sector could not lack behind and are increasingly adapting this shift from having a product towards a service-based approach. Adding to that research has also offered an insight into drivers and benefits of servitisation and approaches and strategies to implement servitisation within companies. Research showed that if performed correctly, it can significantly improve the value for a company (Baines et al. 2009). Servitization has also been implemented at companies to form a way of being more sustainable. Green servitization, a business strategy where corporate goals for sustainability are reached by providing green services, is seen to become a more important aspect than ever. Adopting green service initiatives together with digital service initiatives, in a dual-servitization strategy is proving to be increasing productivity more than companies adopting only one digital service initiative (Opazo-Basález et al., 2018). Switching to a service business model will cost in the short term but it can be an important step while focusing on the long term. Visnjic et al., (2016) consider product innovation and servitization to be 'long-term games'. They state that short-term substitution effects should be balanced against long-term complementarity.

1.2 Research gap

In the literature focussing on servitisation, most research has been conducted following up in the direction from supplier towards customer. Research, on for example the how servitization affects firm performance (Huang et al., 2022). This top down research has mostly been performed, but a gap can be found in the relationship between from the customer side of the spectrum upwards towards the supplier.

Little research however, has been performed on how SME's view upon and respond to the challenges and opportunities servitized suppliers bring with them. Such as situations where we handle lock-ins. They can be described as a way to prevent migration of customers and strategic partners to competitors, by making the switching costs high (Amit & Zott, 2001). Therefore, I will be focussing on the dependencies and lock-ins that are bound towards these servitized suppliers.

1.3 Research objective

This study is therefore set out to examine the strategic considerations in regard to strategic flexibility and increased dependencies of SME business-customers within the construction- and installation sector towards servitized suppliers. The aim of this study is to gather insight in how these business-customers respond and adjust themselves against servitized suppliers. The focus is to find out how these customers adapt to certain problems and positive aspects they face with suppliers that are essential for the functioning of these SME business-customers in the construction- and installation industry. The research will involve the analyzation data gathered by a small scale survey conducted with multiple of these SME business-customers. This will offer insight in how these companies cope with challenges and opportunities of servitized suppliers. Therefore, the research question is:

What are the strategic considerations in regard to strategic flexibility and increased dependencies of SME business-customers in the construction- and installation industry towards servitisation of suppliers?

To narrow down this research questions I will work with theoretical sub-questions. The theoretical sub questions are:

What is the role of servitization of suppliers in enlarging lock-ins/dependencies of their customers and what influence does this have on the strategic flexibility of SME's?

Can we observe a relationship between supplier lock-ins/dependencies AND strategic flexibility of SME's?

The theoretical sub-questions will mostly be discussed within the theoretical framework and aid to create a broader understanding of the current situation regarding the role of servitization on SME business customers.

1.4 Academic and Practical Relevance

This research aims to contribute to the servitization literature, focussing on dependencies that are connected to servitization. The goal of this research is to provide insight in the relationship between servitization and the lock-ins/dependencies SME business customers experience. This could prove useful for further research within the servitization literature.

Moreover, managers from SME business customer companies could use the research to understand their position and stance towards servitization, as well as making managerial decisions based on it. The research could prove to be a valuable insight in the way other companies deal with the challenges and opportunities servitization could impose.

As a final addition to that, policymakers could use this research to gather information on the position of servitized suppliers and the positions of SMEs in a servitized supply chain.

2. THEORETICAL FRAMEWORK

2.1 Servitization; Definition and context

2.1.1 The Definition of Servitization

A plethora of research has been performed with an aim to explain the concept of Servitization. As mentioned before, an early study by Vandermerwe and Rada (1988) refer to 'servitization' as being the addition of services to the corporate offering of organizations to increase their competitiveness, turnover and market power.

Transitioning from product-based companies towards service-based companies faces challenges. Oliva and Kallenberg (2003) state in their research that some of these challenges that organisations face can be tackled by developing relationships with their customers, and actively participate in providing them with tailor made solutions that fit their needs. As an addition to that, the authors suggest that employees of servitized organisations should be trained to provide the best service to customers. Measuring customer satisfaction is key to keep improving the service offerings of organisations.

2.1.2. PSS in Servitization

A key concept used in servitisation literature and research is the so called Product Service Systems (PSS). To explain this concept we first have to distinguish between a product and a service. A product is physical, you can own it, buy it and touch it. A service has been defined as "Any act or performance that one party can offer to another that is essentially intangible and does not result in ownership of anything. Its production may or may not be tied to a physical product." (Kotler, 1988) The definition of PSS is a combination of these two concepts, namely "A marketable set of products and services capable of jointly fulfilling a user's need. The product/service ratio in this set can vary, either in terms of function fulfilment or economic value" (Goedkoop et al., 1999). Although PSS is an important part of research that is performed, the concept itself only had limited success in developing a science field in its own right. (Tukker & Tischner, 2006)

2.1.3. Service Paradox

For many companies the implementation of servitization is not an easy step, and often brings certain problems with it. One of these problems is the 'Service Paradox' as termed by Gebauer et al. (2005). This is a phenomenon in which the increase of service business results in increased service offerings, and higher costs. But not necessarily in correspondingly higher returns. The authors describe this phenomenon as a result of limited managerial motivation to extent the service business, a lack of implementing certain changes in the companies structure, and the struggle with further implementation of other aspects concerning servitisation. Huang et al. (2020) add to this that there are two main connections between servitization and firm performance. They state that a firm cannot gain full financial advantage of servitization, if organisations

fail to understand the value of latent needs identification as well failing to manage the dominant logic conflict.

2.1.4. Advanced Services

In their advanced services model (Fig. 1), Baines and Lightfoot (2013) distinguished advanced services in three categories. The shift is goes from services that are supporting products towards services that support customers.

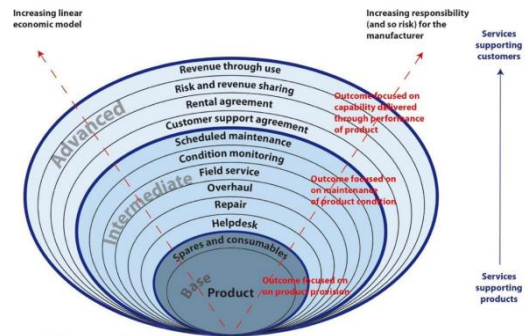


Figure 1. Advanced services (Baines & Lightfoot, 2014)

2.1.5. Industrial Product-Service Business Models

In research from Parida et al. (2015), based on a large-scale survey of Finnish manufacturing companies, showed that adding on simple services to current product offerings turned out to show a negative association towards financial performance. To achieve successful results, big transformations have to be carried out from within entire organisations. By adapting previously carried out research the authors provided a differentiated categorization with four business model categories to implement servitisation. (Fig. 2) On top of that Kindström and Kowalkowski (2014) state, that realignment towards investments should go paired with changes throughout the business model. In that way the process becomes a merged business model innovation process. Meaning that successful change in the one aspects should lead to similar changes in other aspects.

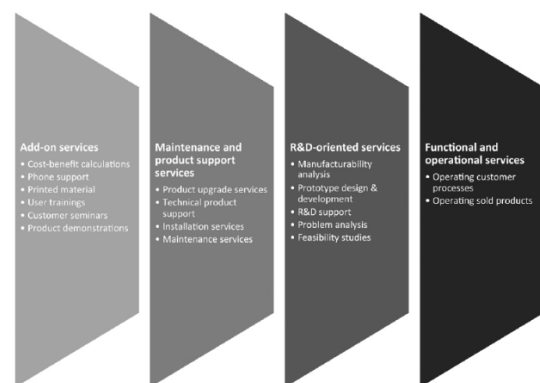


Figure 2. Industrial product-service business models (Parida, 2014)

2.2 Suppliers and Customers

2.2.1 Introduction

The implementation of servitisation within firms in the construction sector can offer companies new opportunities. In research from Brax and Visintin (2017) it is stated that servitisation can drive innovation by creating new opportunities to connect customers and suppliers, as well as making it possible to capture and analyse data.

2.2.2 Lock-ins

A way of companies to ensure customers are motivated to engage in repeated transactions are so called 'Lock-Ins'. As stated in chapter 1, lock-ins can be described as a way to prevent migration of customers and strategic partners to competitors, by making the switching costs high (Amit & Zott, 2001). This can be done for example by using loyalty programs, or by developing a system that's difficult to switch away from. Customers need to make early decisions that result in long term commitments, and therefore need to be cautious in early stages before adapting these sorts of systems. The value of precise information is high in early stages (Farrell & Klemperer, 2006).

In their research, Visnjic et al. (2017) introduced value drivers concerning outcome based models (OBM's). These are forms of servitization where organisations offer outcomes rather than services around product. They suggest the acronym CLEAN (complimentary, lock-in, efficiency, accountability and novelty) as the categories for value drivers within these subject. Based out of this information, we can see that lock-ins can be seen as value drivers within servitization.

2.2.3 Dependencies

Embracing services alongside product portfolio's in order to improve financial performance, is a phenomenon seen in many sectors. Research by Visnjic et al. (2018) has showed that manufacturing firms and software providers can adapt their market strategy, by adding services to their portfolio. This results in more activities, these can be handled internally, or can be outsourced. The new business model creates value, but also increases dependency on suppliers. By increasing services a company accepts greater accountability for customer outcomes and in that way increase customer related uncertainties and risks.

From the customer side, being too reliant on one supplier can cause multiple difficulties. Relational risks and performance risks could form when there is excessive dependency on one supplier. Within this situation a supplier can become opportunistic and exploit this advantage (Narasimhan et al., 2009).

As we have seen before, if implemented correctly, servitization can add customer value to the company that is implementing it (Baines et al. 2009). However we can see that a supplier within the servitization industry can have a certain amount of power. When owning an

immutable resource, there is this position of power for a supplier. Unique resources give upstream companies the possibility to change the competitive area they are engaging in. Firms offering services are improving their bargaining power towards customers by offering these unique resources (Vendrell-Herrero et al., 2017).

2.2.4 Servitization Failure

Servitization can fail in multiple ways. In the eyes of the customer it can happen in at least two ways. First, the offered solution may or may not be something a customer needs, or it fails to create enough value for the customer. And second, the knowledge of the customer can be underappreciated, and the supplier in that way fails to implement the solution or create sufficient value. The opposite can also be the case, where a solution provider relies too heavily on customer knowledge and in that way provide a solution that does not add enough to existing processes (Valtakoski, 2017). Combined with the previously discussed literature about the service paradox (Gebauer et al. (2005), Huang et al. (2020)), a view has been created on the possibilities of servitization failure with respect to the customer. Showing that both Supplier as customer are interdependent on each other.

2.2.5 Strategic Flexibility SME's

Small organisations are vital for the economy. Compared to bigger firms, SMEs have some relative advantages. Strengths of SMEs are flexibility, adaptability and innovation, and weaknesses are mostly in the area of resource constraints (Sullivan-Taylor & Branicki, 2011).

Strategic flexibility is containing the flexible use of resources and reconfiguration of processes, and is considered to be important for the absorptive capacity of a firm (Miroshnychenko et al., 2021).

2.2.6 Elaborating on Lock-ins/dependencies and strategic flexibility of SME's

Arguing based on the previous information it seems to be difficult to achieve strategic flexibility if the flexible use of resources cannot be assured. This is the case when business customers are too reliant on one resource. Since excessive reliance on one supplier could cause the supplier to become opportunistic (Miroshnychenko et al., 2021; Narasimhan et al., 2009). The ability of owning a unique resource, could cause the supplier to have a position of power, posing a risk for an SME business customer (Vendrell-Herrero et al., 2017). Lock-ins are based around a concept of making switching costs high, and in that way also have a power position, bringing risks with it as well (Amit & Zott, 2001).

3. METHODOLOGY

The aim of the present research is to examine the position of SME business customers within the construction industry, regarding their servitized suppliers. And the relationships, dependencies and lock-ins between these servitized suppliers and SME business customers. With as goal to offer detailed information on the current attitudes and behaviours towards these servitized suppliers.

3.1 Research Strategy

The theory from the previous chapter will be used to collect data from selected SME's. Data collection will be carried out by conducting a small scale online survey where I will focus on dependencies and changes in strategic flexibility that SME's in the construction and installation sector experience, as well as an interview to gather a more practical insight of a director that has experiences with servitization.

This part of my research will be focused on gathering data on the behaviours of SME business-customers in the construction industry towards servitisation of their suppliers. The online survey will aim to gather data about perceived increases in dependencies and perceived decreases in strategic flexibility of these SME business-customers in regard to servitized suppliers, to find out if there is a relationship between the two variables. The survey will be focused on creating quantitative data by offering four scenarios to the participants with each three closed end questions. The scenarios are based on the previously mentioned industrial product-service business models identified by Parida et al. (2015). The three questions are uniform for each scenario, with the aim of gathering data that is easily comparable to each other. The questions about the scenarios will be closed end and ordinal. On top of that, there will be four questions to introduce control variables, these questions are partially closed end.

The first scenario will focus on the industrial product-service business model of having add-on services, the second scenario will focus on maintenance and product support services, the third scenario on R&D oriented services, and the last scenario will focus on Functional and operational services. The aim while making these scenarios is to keep them as similar as possible in explaining every scenario, and emphasise on the importance of the second part of the scenario where the scenarios will distinguish themselves from each other. In this way I have tried to ensure that the data that is gathered from the corresponding questions is as unbiased as possible.

The three uniform questions for every scenario, will be laid out based on the research question: "What are the strategic considerations in regard to strategic flexibility and increased dependencies of SME business-customers in the construction industry towards servitisation of suppliers?". The questions will be focused on the willingness to engage in a contract, the perceived increase in dependencies and the perceived decrease in

strategic flexibility by these SME business-customers. From which the main focus is on seeing if there is a relationship between the independent variable 'Dependency' and the dependent variable 'Strategic flexibility'. This I do by creating answers to statements based on the Likert scale. An open end question in which participants can post remarks, could give me some qualitative data about the experiences with the survey.

On top of the data that is gathered by conducting the survey, a qualitative semi-structured interview will be conducted with a representative of one of these SME businesses in the installation sector. This interview has as aim to clarify some of the participant's experiences with servitization of suppliers.

The qualitative research, will be focused on the gathering information about a phenomenon, namely on describing lived experiences of servitization. For this reason I am planning to use a phenomenological research strategy for this interview, described as one of the five qualitative approaches to inquiry (Creswell et al., 2016).

The information that is gathered through these primary and secondary sources of data will be used to identify the most important results.

3.2 Data Collection

For gathering the primary data there are multiple approaches. For this research it is important to have both a fixed and flexible approach towards gathering data. The main data will be gathered via a fixed approach; the survey. And some additional data can be gathered by conducting an interview with one of these SME Business customers.

The survey will be set out as followed. The survey starts with the necessary approval of the participant, and then some control questions about the sector and size of the company, as well as the position and experience of the participant. Followed up with the previously named scenario's and the three corresponding questions. The Survey finishes with a feedback question as well as the possibility to acquire the final report of the thesis after the research as a way to offer a reward to the participant.

The survey will be performed with the help of the Qualtrics survey platform. And gives the possibility to create surveys as well as directly analyse them. The pool of respondents was expected to be small, since the survey is aimed at a very specific group of the population. This survey will merely give us an indication on what to expect from the population, but cannot provide us with a definitive conclusion. The survey has been executed in Dutch, since this increased the chance of having more respondents. The final number of respondents turned out to be 10.

As mentioned before, another aim is to have a form of qualitative data to provide further insight into the Lock-ins/dependencies SME's in the construction/installation sector face with regard to servitization of their suppliers. For this, I plan on gathering this information by conducting a semi-structured interview, in this way I

have a certain frame to stick to, as well as being flexible in specific situations. I am planning to structure the interviews by dividing the interview in multiple parts.

Before starting the interview the representative will be provided a short introduction of the research, and offer explanations of key concepts of servitization. This will help smooth out the interview in the start of the research, and will already filter out data that is not necessary for my research.

Starting off, the aim is on identifying key servitized suppliers of the SME, and the business they are situated in. Following up the goal is to find out the level and form of servitization the supplier is offering. This will be identified on the hand of the advanced services and the industrial product service business models (Baines & Lightfoot, 2014; Parida et al., 2015) that have been discussed in the theoretical framework. Once these forms of servitization have been identified, the step to the second part of the interview can be made. Here the attempt will be to identify the possible dependencies and lock-ins the SME is experiencing regarding the servitized supplier. Focus will be on identifying the level of dependency on the supplier, to find out the supplier is crucial for the way the SME is conducting their business. The third part of the interview will be focused on how SMEs view the challenges and opportunities the identified key servitized suppliers bring with them. The level of satisfaction with the status quo is an important part of this part of the interview. The fourth part of the interview is focussed on how the company responds to the challenges and opportunities that servitized supplier bring with them. Focus here is to so the level of adaption towards these servitized suppliers.

I plan to conduct this interview face to face and I plan to take taking notes. I am aware that these data collections need to be aligned with data and privacy regulations. For this I have gotten approval from the ethics department at the University of Twente.

3.3 Data Analyses

This primary data will help me identify the forms of servitization of suppliers that SMEs face, the lock-ins/dependencies they experience, and how they cope with them. For the last point the interview will be used. My goal for the interview is to organize it in a way that it gives clarified practical experiences to the survey. For this, interview data needs to be combined with the previously gathered survey data to draw conclusions.

4. RESULTS

4.1 Small Scale Survey

4.1.1 Introduction

As mentioned before in this research there has been used to gather key data from SME's in the construction and installations sectors. An online call-up led to multiple candidates that were willing to participate in this survey.

Since the response level was low as expected, the choice has been made to let every respondent be part of the sample for gathering the necessary data. The results of this survey will be explained per industrial product-service business model as described by Parida et al. (2015). The results of the interview will be discussed separately and later on connected to the results of the survey.

4.1.2 Add-on Services

The first scenario that has been shown to the participants has been focused on the add-on customer services. Which emphasises that the supplier that makes use of this form of servitization is offering services that are related to the explanation of the product itself. Parida et al. (2015). This is a mild form of servitization that is very much product related, and can be seen as a base/intermediate form of service provision (Baines & Lightfoot, 2014).

In Appendix 1, we can see the responses to the question: "For what period of time would you engage in a contract with this supplier?". From this table we can see that introduction of this service does for none of the respondents result in the rejection of a contract. Most of the respondents choose to have a contract of one year to see if the provision of these services will turn out to be a good decision. This introductory question gives us already an insight in what way the respondents look upon these services.

In Appendix 2 we can see the results of the view of the respondents on the statement: "The addition of this service increases your company's dependence toward the supplier.". Here we see a varying range of answers of the respondents ranging from mostly disagreeing towards agreeing. This indicates that the perception of dependency varies between the participants.

In Appendix 3 we can see the answers to the statement: "The addition of this service reduces your company's strategic flexibility.". This statement has a response that varies between agreeing, being neutral and disagreeing with the statement. The perception of reduced strategic flexibility varies for the participants.

In Appendix 4 we see the results of the correlation test between the results on the two statements. We see that the P-value is low, but not significant. Which means that we do not find a statistically significant correlation between the two variables.

By performing a regression test we see a moderate effect of independent variable 'perceived increase in dependency' on independent variable 'perceived decrease in strategic flexibility' (fig. 3). This means that the independent variable moderately explains the dependent variable.

Sample Size	McFadden's R-squared	Model Fit (AICc)
10	41,3%	17,53337072

Figure 3. Logistic regression scenario 1.

4.1.3 Maintenance and product support services

The second scenario that has been shown to the participants has been aimed at certain perceptions around services that consist of maintenance, technical help and installation of the product. Which emphasises that the supplier is offering services as installing, maintaining and replacing the product. Parida et al. (2015). This is a form of servitization that is a mix of being product and service related. This is an intermediate form of service provision (Baines & Lightfoot, 2014).

For this form of service provision we see a somewhat similar response towards the willingness to engage in a contract Appendix 5. This again shows us that the respondents are not hesitant to have a contract with a supplier that is servitized till this extent, with only one exception. Again the majority of the respondents are willing to engage in a one year contract, to see if the service works for them.

The responses to the statement about the dependency is again distributed broadly from strongly disagreeing towards agreeing Appendix 6. Again meaning that the perception of dependency varies strongly between the participants. The difference in the responses on the statement: “The addition of this service reduces your company's strategic flexibility.” are less widely distributed and more skewed towards disagreeing with this statement (Appendix 7).

The correlation test (Appendix 8) shows us that there is no significant correlation between the responses of the statements about perceived increase dependency and perceived decrease in strategic flexibility.

In figure 4 we can see the regression test of the effect of the responses on statement: ‘perceived increase in dependency’, and statement: ‘perceived decrease in strategic flexibility’. We see here that there, again, is a moderate relationship between the independent variable and the dependent variable. This means that the independent variable moderately explains the dependent variable in this situation.

Sample Size	McFadden's R-squared	Model Fit (AICc)
10	46,1%	53,09038116

Figure 4. Logistic regression scenario 2.

4.1.4 R&D-oriented services

This third scenario has been made to find out the response towards services that are connected to research and development of products by suppliers. These services are for example performing feasibility studies, and designing and developing prototypes. But also, performing problem analyses to identify possible improvements to the product (Parida et al., 2015). This form of servitization can be seen as an intermediate/advanced form of service provision, since the service is focussed on the outcome of the product and less on owning the product itself. The risk and responsibility for the supplier are higher compared to the

previous service based business models that have been discussed previously (Baines & Lightfoot, 2014).

What is interesting to see out of the survey, is that the distribution of the time periods of the contracts, begin to shift more to the left. An increasing share of the participants will choose to try the concept for 1 year. And for the first time, participants will back out of the contract. This gives us already an indication on the decreasing willingness to engage in a contract (Appendix 9).

The reactions on the dependency statement are less skewed than before than before, with the answers reaching from some agreeing towards the largest share of participants disagreeing with the statement (Appendix 10).

The strategic flexibility statement is skewed towards agreeing with the statement. Only a small part of the sample disagrees with the statement, which shows that the majority of the participants thinks that this form of servitization decreases strategic flexibility (Appendix 11).

For this form of servitization we see a strong statistical correlation between the variables ‘perceived increase in dependency’ and ‘perceived decrease in strategic flexibility’. We can see in this sample that most of the participants that do not perceive a decrease in strategic flexibility also significantly choose a related answer to that for the dependency statements. The same counts for participants that vote neutral or agree with the statements (Appendix 12).

Again, by performing a regression test on the two variables ‘perceived increase in dependency’, and ‘perceived decrease in strategic flexibility’ we see that the first variable explains a high proportion of the second variable.

Sample Size	McFadden's R-squared	Model Fit (AICc)
10	51,5%	15,73011667

Figure 5. Logistic regression scenario 3.

4.1.5 Functional and operational services

The final scenario I offered to the participants is one where the aim was on finding responses to a completely different form of servitization: Functional and operational services. In this form of servitization the SME-business customer would, in the case of needing a new machine, only pay for the products that this machine produces. The machine is still owned by the supplier and the customer pays for the products it produces, including services that are needed for maintenance, performance, and insight into the machine. In this way the service of the supplier is to deliver a ‘result’, instead of delivering a machine. It also makes that the supplier is fully responsible for the machine and its performance (Parida et al., 2015). This form of servitization can be seen as an advanced form of service provision. Because the risk is fully for the supplier, and the economic model is strongly linear. This is a service that supports customers, not a service that supports products. (Baines & Lightfoot, 2014).

In this part of the survey it was chosen to not offer the participants the options to have a short contract of less than 5 year. Since in the real world, this is rarely an option. This makes that the answers to the question on the willingness to have a contract with this supplier differ more from the previous forms of servitization. In Appendix 13 we can see the answers to this question. We see a perfect 50/50 split on participants choosing to not have a contract, and participants who choose to have a contract.

The answers towards the dependency statement vary again, but we see that 7 out of 10 participants are agreeing or strongly agreeing, and 3 out of 10 participants are disagreeing or strongly disagreeing. For this form of servitization we thus see that the answers for this statement are more skewed towards agreeing with it (Appendix 14).

For the strategic flexibility statement we also see mixed responses. With only three participants disagreeing, two being neutral, four agreeing and one strongly agreeing. For this perceived strategic flexibility statement, we see that the responses are slightly skewed towards agreeing with the statement (Appendix 15).

Based on a correlation test we can see a strong significant relationship between the variables ‘perceived increase in dependency’ and ‘perceived decrease in strategic flexibility’. The same conclusion can be drawn as with the previous scenario. For this sample that most of the participants that do not perceive a decrease in strategic flexibility also significantly choose a related answer to that for the dependency statements. The same counts for participants that vote neutral or agree with the statement (Appendix 16).

This last regression test on the two variables ‘perceived increase in dependency’, and ‘perceived decrease in strategic flexibility’ shows us that there is again a moderate proportion of the first variable explaining the second variable.

Sample Size	McFadden's R-squared	Model Fit (AICc)
10	43,3%	21,35245573

Figure 6. Logistic regression scenario 4.

4.1.6 Concluding the survey

Over the entire survey we see a general trend of moving from more agreeing with the statements towards more disagreeing with the statements, considering the level of advanced service provision. For this sample we can say that the participants in general perceive an increase in dependency, and perceive a decrease in strategic flexibility, considering the level of advanced services that are provided. The willingness to engage in a contract lowered during the survey as well, this also gives us an indication of the trend in this sample.

From this sample we can also see a significant correlation for the answers on the statement: “The addition of this service increases your company's dependence toward the supplier” and “The addition of this service reduces your

company's strategic flexibility.”, during the two more advanced forms of service provision.

For all of the four scenarios about the forms of servitization that have been given to the participants we have seen a moderate to high amount of the answers on the dependency statement explaining the answers to the strategic flexibility statement. This is an interesting observation, but full conclusions cannot be drawn from this observation because the sample size is relatively small.

4.2 Qualitative interview

4.2.1 Introduction

The qualitative interview has been performed with the director of an SME company in the installation industry. They can be considered to be a business customer that has more than a decade of experience within this position in this company. Because of this they have been considered to be suited for this interview. The interview has been performed in a face to face situation, while holding onto the data collecting strategy that has been discussed in the methodology section.

4.2.2 Summary of the interview

The add on-services model, as identified by Parida et al., (2015) is a form of servitization that is used in great numbers in the installation industry and was quickly recognized by the participant of the interview. Mechanics at the build site as well as people that work in the companies office often make use of these services. This counts for more general issues as help with software platforms for drawing, calculating and administration, but just as much for technical products that are being supplied. However, the interviewee sees a trend of a decrease in quality in the help that is offered on the phone by suppliers during the installation of technical products. The helpdesks of suppliers increasingly hire people that have less expertise of the products that are sold. This causes the company of the participant of the interview to make less and less use of the services that are provided by these suppliers.

“We see more and more suppliers becoming ‘Box-movers’. They only deliver the product. The helpdesk being useful really depends on the person on the phone having expertise. The quality of the helpdesks of a lot of suppliers these days is not sufficient.”

Another form of servitization that is being used by the company of the interviewee are maintenance and product support services. This often is the case with expensive highly technical products, in this case they gave an example of a specific heat pump. The installation company makes sure that everything on the installation is connected and ready, and at the commissioning of the machine the supplier is there on request. Within the warranty period the installation company lets the supplier carry out the maintenance, to avoid discussions about the warranty. The experience of the director of the installation company is that if they do their own

maintenance and a machine is defective, the supplier often is not cooperative in giving warranty.

“Warranty should never be a point of discussion, but it is. Letting the supplier carry out the maintenance is a conscious decision, because we want to avoid difficult discussions.”

The director however, does not think that this makes their company more dependent on the supplier. Since these products are often not rare, so choosing another supplier in the future is most of the time no issue. There are only rarely some instances where this is not the case.

In general the interviewee does not have a lot of cases where the strategic flexibility of his company decreased because of service provision, but they could name one instance where a lot of people are dependent on one supplier. This is mostly the case on specific software services. Within the total construction industry, there is one piece of software that is being used: Revit. However, the director of the installation company does not see this as a problem, since the software is working well for the company.

“If the future of the company can’t be ensured because of the high costs of one service, then I would be frustrated. But as long as that is not the case, I don’t have to bother.”

In some instances the director has experienced cases where switching suppliers was necessary to avoid future problems. In the one instance they mentioned a situation where the supplier could not ensure the reliability of ERP services that run all the company’s software. These big changes definitely had influence on how the company now works.

“If working with one supplier becomes too scary, change is necessary, even more when you are really dependent on them.”

When asking about dependencies, some valuable insights were provided by the director. The installation company often outsources work to other parties. Installation work where they do not have the expertise or time for are being distributed to other companies. In this way the installation company functions as a contractor. They take a considerable risk by being dependent on these subcontractors, also because switching suppliers within the project is often not possible. The director recalled a case of the previous week where a subcontractor walked away from a build site because he did not get paid. This causes entire projects to be delayed, which costs the installation company in the end.

“During projects you are extremely dependent on certain suppliers. When they do not do their job, you are stuck, since you do not have the skills or people to do it yourself.”

In the last part of the interview the focus was on finding out if being dependent on certain suppliers for performing services, causes own employees to lose some abilities. The director thinks this is true for a lot of cases, but it is a

conscious decision to let some suppliers do some things. Since they believe that some activities could better be performed by suppliers, and let their own staff tackle other problems. In this way some knowledge may fade away, but this is considered to be unimportant.

“It is a conscious decision to let some work be carried out by external people, so that our people can work on problems that come up during these processes.”

4.2.3 Concluding the interview

The interview has helped in gaining a more practical understanding about experiences with servitization. From the first statement of the interview we can see a good example of the servitization failure that has been discussed in the theoretical framework. This is a great example of the offered solution not creating enough value for the customer. As well as, the knowledge of the customer being underappreciated, and some suppliers in that way fail to implement the solution or create sufficient value (Valtakoski, 2017).

Out of the interview we can also see that the director of the installation company sees that their company tries to avoid some risks by making use of service options of suppliers. An example of this was their statement about discussions about warranty

The participant of the interview experiences cases of being less flexible in choosing for alternatives because of the dependence on one service. But as long as the benefits are higher than the costs, this is not seen as an issue. When being highly dependent on one service, and it does not work out, the director thinks it is important to then choose for another service. This is to avoid problems in the future.

Being dependent on some services is in some instances not ideal, for example when services are not delivered correctly. The director of the installation company thinks it is a conscious decision to depend on services from suppliers, since this gives own staff the opportunity to tackle other issues.

5. DISCUSSION

In the literature we already dug into the concept of servitization and concepts that are related to it. The data gathered out of the survey and the interview add to this existing theory by giving a clear indication on the relationship between the dependencies and strategic flexibility of SME’s that is caused by servitization. As well as providing an insight into how servitization is experienced in practice.

The existing servitization literature has been mostly focused on the perspectives of service providers however, this research adds to the literature that is aimed at offering insight from lower level upwards. The findings that I will discuss in the conclusion will add to this literature.

6. CONCLUSION

In the start of this project, a research question has been formulated: “What are the strategic considerations in regard to strategic flexibility and increased dependencies of SME business-customers in the construction- and installation industry towards servitisation of suppliers?”.

From gathered data out of the survey we can conclude for this sample that strategic considerations are being made by these SME’s in the construction industry, since we have seen changes in responses for the multiple scenario’s. As well as seeing fluctuations between perceived strategic flexibility and dependencies for the four forms of servitization identified by Parida et al., (2015). In this sample we can also see a relationship between the independent variable ‘perceived dependencies’ and the dependent variable ‘perceived strategic flexibility’. In the qualitative interview we have gotten a practical insight on how these strategic considerations are being implemented.

After gaining the previous results out of the gathered data, it is possible to make the next theoretical and practical contributions to the servitization literature, as well as to the knowledge of the construction and installation industries, and their service providers. And offer further research possibilities.

6.1 Theoretical Contribution

The theoretical implications on dependency/lock-ins and strategic flexibility are supported with this research. On the hand of the servitization business models and levels, it was possible to create scenario’s on which dependency and strategic flexibility could be tested. This showed out that some relationships between dependency and strategic flexibility could be found for the four industrial product-service business model as described by Parida et al. (2015). Analysis of the sample showed out that for the business models that were tested in the sample, the level of perceived dependency was to moderate or high extent explaining the level of perceived strategic flexibility. The interview added to the literature about lock-ins, that even though switching costs are high, it is important to change supplier when its endangers the health of the company.

6.2 Practical Contribution

The practical contribution of this research is that it enables SME business-customers out of the installation and construction industry to view upon the opinions on servitization of companies within their industry. By having insight in this information, potential collaborative decisions could be made industry wide. This research enables service providers to adjust to the opinions of the SME business-customers and improve on their services. For example, by giving solutions to these dependency and strategic flexibility problems. SME’s can give valuable insights on how to improve on these aspects.

7. LIMITATIONS AND FURTHER RESEARCH

I am well aware that there are limitations to the data collection and analysis of this research. Since the survey is small scale and does not completely represent the population, conclusions are difficult to be made. The survey being small scaled can also make it difficult to gather uniform data from which a clear relationship could be found, instead it will provide us with an indication about the relationship. This makes that the survey could provide a valuable insight in the attitudes and behaviours of some SME’s in the installation and construction industry, but can prove to give difficulties in giving hard conclusions.

One of the participants of the survey provided feedback, in which was stated that they found it difficult to answer some of the questions of the survey because as a constructor they believed that the extra services that have been mentioned during the survey questions, are normally chosen by their clients. And in that way the construction company could not really answer for them, since the client decides the services. In our research, we have to be aware of this.

For performing our phenomenological inquiry. Key assumptions need to be identified before the interview. The participant of the interview needs to have experienced the phenomenon, in this case servitization. Bracketing personal experiences is seen as one of the main difficulties, and sometimes even seen as impossible. As researcher, I have to decide in what way my personal understandings will be used in the study (Creswell et al., 2016).

Research Opportunities

Further research could be carried out based on this report. For example by performing more widespread research on the relationship between dependencies and strategic flexibility, by performing analysis on a bigger sample. Perceptions dependencies and strategic flexibility because of servitization could differ for different industries as well, research could be performed on these different industries.

8. ACKNOWLEDGEMENTS

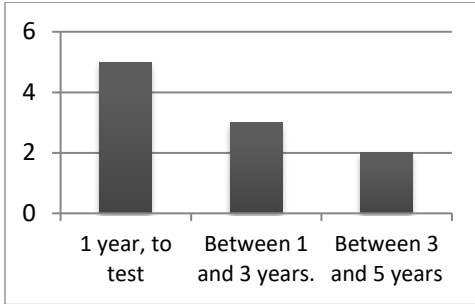
Firs of all, I would like to thank my first supervisor for his help and flexibility during this thesis. Raymond Loohuis has been very quick in responding to questions, and in general has been a very nice person to work and talk with. He helped with gathering responses towards my survey by spreading my message, which paid of in the end. Furthermore, I would like to thank the respondents of the survey for giving their opinion and the director of the installation company for letting me interview them. They gave a nice practical insight in the experiences on servitization. Last of all, I want to thank the people of my thesis circle with the help and advice they gave me.

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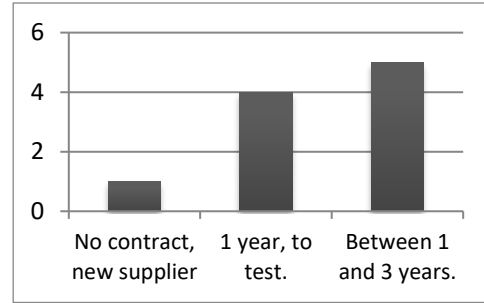
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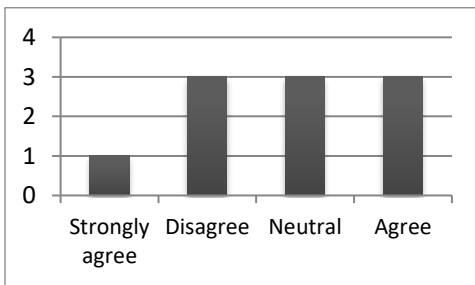
10. APPENDICES



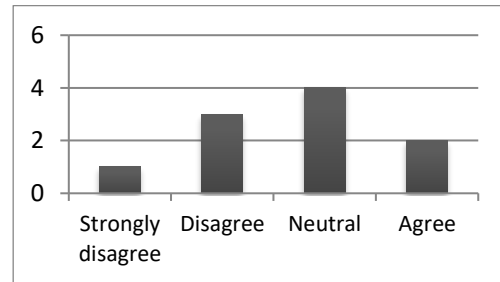
Appendix 1: Scenario 1; Willingness to engage in contract.



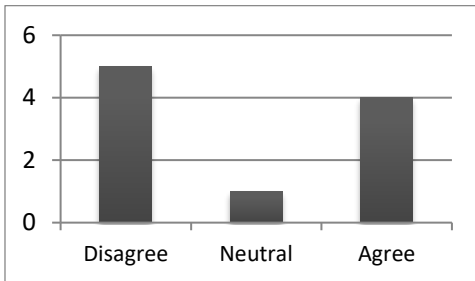
Appendix 5: Scenario 2; Willingness to engage in contract.



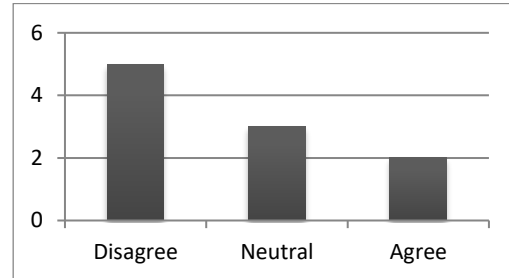
Appendix 2: Scenario 1 Statement; The addition of this service increases your company's dependence toward the supplier.



Appendix 6: Scenario 2 Statement; The addition of this service increases your company's dependence toward the supplier.



Appendix 3: Scenario 1 statement; The addition of this service reduces your company's strategic flexibility.



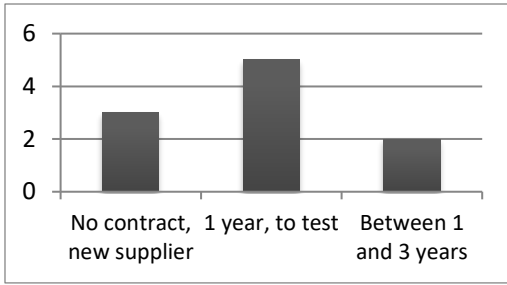
Appendix 7: Scenario 2 statement; The addition of this service reduces your company's strategic flexibility.

Column1	Basic	Advanced
Statistical Significance (P-Value)	Not significant	0,29111746
Effect Size (Cramér's V)	Large	0,60553007
Sample Size		10

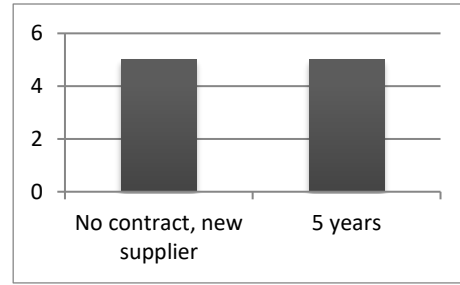
Appendix 4: Chi squared correlation test scenario 1.

Column1	Basic	Advanced
Statistical Significance (P-Value)	Not significant	0,24427233
Effect Size (Cramér's V)	Large	0,62915287
Sample Size		10

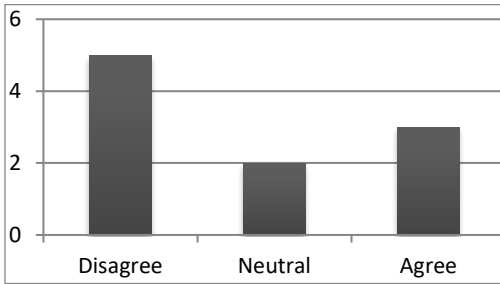
Appendix 8: Chi squared correlation test scenario 2.



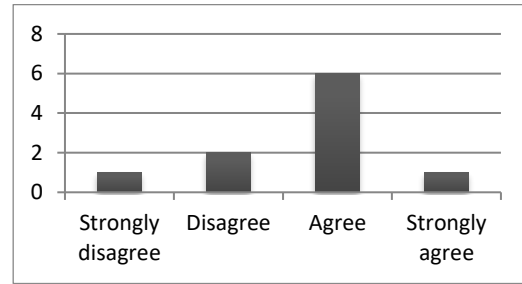
Appendix 9: Scenario 3; Willingness to engage in contract.



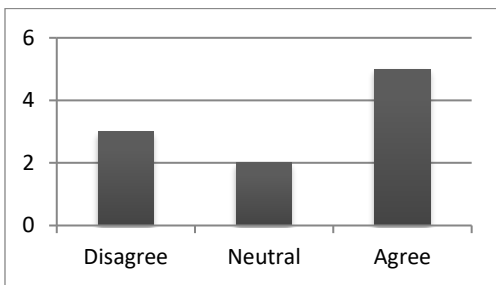
Appendix 13: Scenario 4; Willingness to engage in contract.



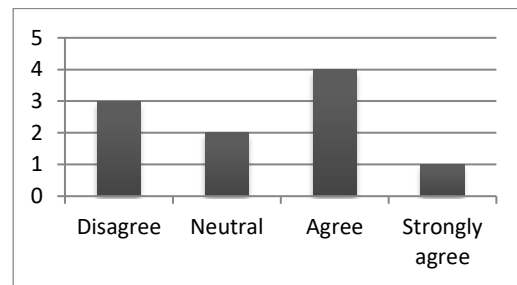
Appendix 10: Scenario 3 Statement; The addition of this service increases your company's dependence toward the supplier.



Appendix 14: Scenario 4 Statement; The addition of this service increases your company's dependence toward the supplier.



Appendix 11: Scenario 3 statement; The addition of this service reduces your company's strategic flexibility.



Appendix 15: Scenario 4 statement; The addition of this service reduces your company's strategic flexibility.

Column1	Basic	Advanced
Statistical Significance (P-Value)	Very clearly significant	0,00868745
Effect Size (Cramér's V)	Large	0,82462113
Sample Size		10

Appendix 12: Chi squared correlation test scenario 3.

Column1	Basic	Advanced
Statistical Significance (P-Value)	Very clearly significant	0,0179124
Effect Size (Cramér's V)	Large	0,81649658
Sample Size		10

Appendix 16: Chi squared correlation test scenario 4

Guiding questions for the interview (Dutch)

Interview vragen.

Dit interview is onderdeel van een onderzoek voor een bachelor scriptie over servitisation. Dit is een principe waarin bedrijven een stap maken van een productgericht naar een dienstgericht businessmodel. Dit onderzoek probeert uit te wijzen hoe, bij voorkeur directeurs van (MKB) bedrijven uit de bouw- en installatiesector, reageren op leveranciers die vormen van dit businessmodel hanteren. In dit onderzoek wordt er gefocust op de invloed van servitisation op de afhankelijkheid en strategische flexibiliteit die bedrijven ervaren.

Inleidende vragen

Denkt u na deze introductie een leverancier te hebben die een hoog servicegehalte hanteert?

Heeft u een ervaring met leveranciers die telefonische hulp, of andere services aanbieden die te maken hebben met het uitleggen van hun product? Wat voor leveranciers zijn dit?

Heeft u leveranciers die installaties van hun product voor u uitvoeren? En het onderhoud aan dit product zelf uitvoeren? Wat vindt u daarvan?

Vervolg vragen

Zorgen deze services er voor dat u het gevoel hebt dat u meer afhankelijk wordt van deze leverancier? Bijvoorbeeld doordat u op deze manier alleen maar leert te werken met dit product, en het hierdoor lastig wordt om van leverancier te wisselen. Wat voor afhankelijkheid voelt u bij deze leveranciers?

Heeft u liever dat een leverancier geen betaalde extra services afneemt bij uw product in dit specifieke geval? Waarom?

Heeft u het gevoel dat door het invoeren van deze services kennis en kunde bij uw eigen personeel verloren gaat?

Bent u wel eens overstapt naar een ander bedrijf doordat serviceverlening niet op orde was?

Heeft u het gevoel dat in de loop der jaren meer van uw leveranciers een overstap maken naar het aanbieden van meer services?

Heeft u door problemen met een leverancier wel eens een situatie gehad waar u afhankelijk was van een specifiek product, maar niet op afspraak geleverd kon worden? Heeft dit vertragingen opgeleverd?]

Heeft u wel eens het gevoel dat u het liefst een andere leverancier zou hebben van een specifiek product, maar dit te veel moeite zou kosten?

Survey questions/statements (Dutch)

Beste deelnemer,

Deze enquête is onderdeel van een onderzoek voor een bachelor scriptie over servitisation. Dit is een principe waarin bedrijven een stap maken van een productgericht naar een dienstgericht businessmodel. Dit onderzoek probeert uit te wijzen hoe, bij voorkeur directeurs van (MKB) bedrijven uit de bouw- en installatiesector, reageren op leveranciers die vormen van dit businessmodel hanteren. In dit onderzoek wordt er gefocust op de invloed van servitisation op de afhankelijkheid en strategische flexibiliteit die bedrijven ervaren.

U zult in deze enquête 4 scenario's voor u krijgen met bij elk scenario 3 vragen die hier op in gaan. De enquête duurt hoogstens 10 minuten. Uw deelname is vrijwillig en u kunt op elk moment stoppen met het invullen van de enquête.

Er zal in deze enquête geen persoonlijke informatie verzameld worden en de data die uit deze enquête wordt gewonnen zal alleen gebruikt worden voor dit onderzoek. Voor zover bekend zijn er geen risico's verbonden aan dit onderzoek, maar bij elke online activiteit zijn er risico's op inbraken. Ik ga mijn uiterste best doen om de gewonnen informatie te werken onder de ethische onderzoekstandaarden van de Universiteit van Twente.

Tom Oonk

In welke sector bevindt uw bedrijf zich?

Wat is de grootte van het bedrijf?

Wat is uw functie binnen het bedrijf?

Hoeveel ervaring heeft u in deze positie binnen dit bedrijf?

For every scenario:

Zou u wederom een contract willen met deze leverancier? Zo ja, voor welke periode zou u dit contract vastleggen?

Stelling: Door de toevoeging van deze service neemt de afhankelijkheid van uw bedrijf in de richting van de leverancier toe.

Stelling: Door de toevoeging van deze service vermindert de strategische flexibiliteit van uw bedrijf.*

Finish:

Heeft u verdere opmerkingen bij het invullen van deze enquête?

Zou u het eindrapport van dit onderzoek naderhand willen ontvangen?