INDUSTRIAL SERVICE EXCELLENCE – ANTECEDENTS AND MEASUREMENT

Anna Biedersberger, Stefan Mang, David Tempelmayr, Doris Ehrlinger, Christian Stadlmann & Margarethe Überwimmer

ABSTRACT

Purpose: The purpose of this paper and our research is to identify antecedents which are important to reach Industrial Service Excellence (ISE). To give manufacturing companies guidance on their servitization journey we determine the impact of the antecedents on ISE as well as of ISE on financial and non-financial performance indicators in the service field.

Design/Methodology/Approach: To identify potential antecedents of ISE, we used a qualitative approach, consisting of a literature analysis, in-depth interviews and two focus groups. Subsequently, we developed related items for each of the twelve identified antecedents. Based on this findings, we conducted an online survey within manufacturing companies in Austria and Bavaria to analyse, which of the antecedents are important to reach ISE. Furthermore we used a PLS-SEM approach to analyse if company’s financial and non-financial performance is affected by ISE.

Findings: Preliminary findings from a sub-sample show that some of the twelve antecedents, which we identified within the qualitative research, are more important reaching ISE than others. Within this paper, we describe those with the strongest impact. We found significant path-coefficients from organizational structures, organizational processes, sales force capabilities as well as service oriented management and strategy to ISE. Our analysis reveals a considerable impact of ISE on company’s non-financial performance and financial performance within the service business.

Originality/Value: Based on our qualitative findings, this research uses a quantitative approach to test whether and which antecedents lead to Industrial Service Excellence. Furthermore it is examined how financial and non-financial performance indicators of the service business are affected by ISE. This also contributes to the need for enhanced quantitative research and holistic approaches in this field.

KEYWORDS: industrial services, Industrial Service Excellence, antecedents, measurement, servitization

1. INTRODUCTION

Competitive markets in a globalized environment and decreasing profit margins force traditional manufacturers to seek new growth options to generate revenue and profits or even to differentiate from competitors (Wise and Baumgartner 1999). Therefore an increasing number of manufacturing companies add services to their product range. This phenomenon called servitization (Vandermerwe and Rada 1988) allows manufacturers new ways for growth by offering additional services or product-service-solutions (Fang, Palmatier and Steenkamp 2008). However, many companies still struggle on implementing service oriented approaches in a profitable way (Martinez et al. 2010; Neely 2008). The field of servitization research is described as an active one, however an empirically verified aggregated framework for a successful servitization process is missing. According to Baines et al. (2017) there is a lack of prescriptive knowledge for companies. Furthermore they point out that holistic audits and capabilities necessary for servitization require deeper understanding. In addition, Kowalkowski, Gebauer and Oliva (2017) describe the need for quantitative research in this field.

To be profitable and excellent within the servitization process, manufacturing companies have to adjust their internal capabilities, as it is described within the resource-based view (RBV) of the firm (Barney 1991; Wernerfelt 1984). In order to give companies guidance on their servitization journey, the purpose of this paper is to develop empirically verified measures for the construct Industrial Service Excellence (ISE) and its antecedents. Further, we examine how these antecedents affect ISE and performance levels. We focus on financial as well as on non-financial performance indicators in service business.
2. THEORETICAL FRAMEWORK

Wirtz and Zeithaml (2017) state, that high-quality service offerings with an appropriate price can be seen as “cost-effective service excellence”. Based on our qualitative research which also included a comprehensive literature analysis, we can see that excellent industrial services are better than those of the competitors on the market, they are provided in a flexible way and offered in a cost-effective manner. This can be ensured through involvement of the whole company within the process of offering services for business customers (B2B services). Therefore we define Industrial Service Excellence (ISE) by including high service quality and cost-effectiveness, as well as competitive advantage, flexibility, and involvement of the whole company.

The resource-based view of the firm (Barney 1991; Wernerfelt 1984) emphasizes and analyses internal capabilities as a possible resource of competitive advantage. It assumes that capabilities and resources are heterogeneously distributed among firms and can therefore be a source of competitive advantage. This research is based upon the resource based view (RBV) as it focuses on the antecedents of Industrial Service Excellence. These antecedents can be seen as resources. As they impact ISE and ISE is expected to have an impact on performance, the antecedents are valuable resources. Eloranta and Turunen (2015) show, that the RBV is one of the most prominent strategic management concepts applied in servitization research. Literature that adopts the RBV in a servitization context (e.g. Oliva and Kallenberg 2003; Fang, Palmatier and Steenkamp 2008) suggests that services promote the identification and development of valuable resources (Eloranta and Turunen 2015). However, it is suggested that the RBV should be extended in a way that relational capabilities, especially in a servitization context, are included as well (Eloranta and Turunen 2015; Kohtamäki, Rabetino and Möller 2018). As relational capabilities are important especially within servitizing manufacturers, we base this research on an extended version of the RBV that includes a relational aspect as well (Dyer and Singh 1998).

There are studies that focus on capabilities that are important for servitizing companies. Storbacka (2011) develops a framework that lists 64 capabilities and Gebauer, Paiola and Edvardsson (2012) offer a comprehensive framework of capabilities for service business development in SMEs. However, these frameworks are based on case studies and the link between the resources and performance is not quantitatively assessed. Therefore, our research tries to contribute by quantitatively examining resources and capabilities that contribute on ISE and firm performance in a servitization context.

Based on this, our research questions are the following:

1. Which aspects and internal capabilities have an influence on Industrial Service Excellence and can be seen as antecedents?
2. Does Industrial Service Excellence have an impact on firm’s financial and non-financial performance levels of the service business?

3. METHODOLOGY

3.1 Qualitative research

In order to answer our research questions, we used a two-step process. Within the first part of our mixed-method approach we tried to identify antecedents of ISE and develop related items in a qualitative way. Therefore we conducted a literature analysis, 26 in-depth interviews with manufacturing companies from Austria and Bavaria and two focus groups. As a first step, scientific databases were searched with a wide range of keywords which are central to Industrial Service Excellence. In addition, forward and backward author and reference searches were conducted. In total, 69 articles were fully reviewed and codified in MAXQDA with regard to two factors: points of excellence and the importance of the different aspects. The analysis revealed aspects with very high as well as limited importance. Some of them were merged or removed, resulting in a taxonomy of twelve antecedents of Industrial Service Excellence [as shown in Table 1]. To validate the findings from literature, the research is also based on a qualitative study among representatives of manufacturing companies and industrial solution providers in Austria and Bavaria. In total, 26 companies from various industries are serving as good practice examples. Semi-structured depth interviews revealed, which of
the identified antecedents are important in practice. Therefore the transcribed interviews were coded in MAXQDA and relevant statements were assigned to one of the twelve aspects. We developed the related items by using and adopting existing items from literature wherever possible and including the findings from our qualitative interviews and focus groups (Churchill 1979). A pretest within n=28 manufacturing companies confirmed content validity.

Table 1: Twelve Antecedents of ISE

<table>
<thead>
<tr>
<th>Partnership with customers</th>
<th>Service orientation of management and strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network capabilities</td>
<td>Risk assessment and key performance indicators</td>
</tr>
<tr>
<td>Customer and service oriented organizational culture</td>
<td>Organizational processes</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>Customization vs. standardization</td>
</tr>
<tr>
<td>Pricing of services</td>
<td>Service quality</td>
</tr>
<tr>
<td>Sales force capabilities</td>
<td>Development of services</td>
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</tbody>
</table>

3.2 Quantitative research

Our sample within the quantitative research consists of manufacturing companies from Austria and Bavaria. Within these regions servitization plays an important role, because there are many product oriented manufacturers with service approaches. We included SMEs as well as larger companies from different industries. However, the main focus was on machinery and plant engineering. We targeted service, sales or senior managers and invited them via mail to participate in the online survey. To increase the response rate, we offered a report with the results. As the quantitative analysis reported in this paper has been conducted with a sub-sample (n=206), our results are preliminary.

To examine the impact of the identified antecedents on ISE and of ISE on performance levels we use a quantitative approach. For each of the twelve antecedents we developed up to seven items. Within the online survey we used a 7-point Likert scale to assess the items of the twelve antecedents. The antecedents of ISE are operationalized as formative, as guided by Diamantopoulos and Winklhofer (2001) and we adopted a PLS-SEM approach. As the antecedents and ISE are formative constructs and performance is reflective, a PLS-approach is suitable, as it works with formative and reflective constructs as well (Hair, Ringle and Sarstedt 2011). To capture the impact of ISE on performance levels we operationalized performance twofold. It consists of financial performance (e.g. profit) and non-financial performance (e.g. customer satisfaction, trust) characteristics on the firm level [as shown in Table 2 and 3]. As PLS-SEM relies on a nonparametric bootstrap procedure to test coefficients for their significance, we used bootstrapping with 500 samples. To assess validity and reliability of the reflective measures we used Cronbach’s alpha, average variance extracted (AVE), factor loadings and composite reliability. All of these criteria are above the recommended thresholds. To ensure construct validity of the formative measures, we tested for multicollinearity using the variance inflation factor (VIF) (Diamantopoulos and Winklhofer 2001). The values were below the cut-off value of 5, implying that there is no multicollinearity. Expert validity was reached through pretests.

Table 2: Financial performance of service business

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Mean</th>
<th>SD</th>
<th>Loadings</th>
<th>AVE</th>
<th>CR</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial performance of service business</td>
<td>The services we offer are profitable</td>
<td>5.451</td>
<td>1.320</td>
<td>0.880</td>
<td>0.751</td>
<td>0.900</td>
<td>0.834</td>
</tr>
<tr>
<td></td>
<td>Our service business contributes to financial business success</td>
<td>5.553</td>
<td>1.584</td>
<td>0.879</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How would you rate the performance of the service business</td>
<td>3.684</td>
<td>0.739</td>
<td>0.840</td>
<td></td>
<td></td>
<td></td>
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</tbody>
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Table 3: Non-Financial performance of service business

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Mean</th>
<th>SD</th>
<th>Loadings</th>
<th>AVE</th>
<th>CR</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-financial performance of service business</td>
<td>Our service customers are satisfied with the quality of our services</td>
<td>5.728</td>
<td>0.972</td>
<td>0.909</td>
<td>0.763</td>
<td>0.941</td>
<td>0.922</td>
</tr>
<tr>
<td></td>
<td>The collaboration with the customer in the service business is very good</td>
<td>5.796</td>
<td>1.023</td>
<td>0.899</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>We are able to retain most of our customers</td>
<td>5.830</td>
<td>1.100</td>
<td>0.826</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Our service customers have great confidence in us</td>
<td>5.835</td>
<td>1.080</td>
<td>0.905</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Our service customers think of us as experts in the service business</td>
<td>5.733</td>
<td>1.098</td>
<td>0.825</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. RESULTS QUALITATIVE RESEARCH - INDUSTRIAL SERVICE EXCELLENCE (ISE) AND ITS ANTECEDENTS

Based on our systematic literature review, in-depth interviews and focus groups we can specify twelve antecedents of ISE [as shown in Table 1]. Partnership with customers refers to capabilities which allow to interact with service customers on a personal level - at best with a clearly defined contact person for the respective customer. Knowledge and information exchange - to a certain extent - and a long-term oriented personal relationship is considered as well. Thus, Tuli, Kohli and Bharadwaj (2007) emphasize, that servitization is based on a relational process of meeting and supporting customer’s needs. Network capabilities refer to the ability to cooperate with institutions, companies or other stakeholders (except customers). Network partners with complementary resources and capabilities in the service sector can be integrated via a contract, which clearly defines responsibilities. Active knowledge exchange on a regular basis foster collaboration and strengthen personal relationships and trust. The organizational culture should be customer- and service-oriented. Therefore the employee’s main objective is supporting customers in a long-term oriented organizational setting. Trainings for employees ensure to offer improved services which also describes customer centricity (Gebauer and Kowalkowski 2012). Service as a key organizational value and clearly defined key service aspects reflect the service orientation (Lytle, Homs and Mokwa 1998; Nuutinen and Lappalainen 2012). As showed by Oliva, Gebauer and Brann (2012) organizational structure should also be considered to achieve service objectives. To be an important antecedent for ISE, organizational structure should support interfirm collaboration and ensure resource and information flow between business units and functions (Neu and Brown 2005). In addition, defined service responsibilities support cooperative collaboration between service and product business. Organizational structure also refers to local presence. Pricing of services is a key aspect to achieve objectives in the service sector (Witell and Löfgren 2013). Price setting - direct or indirect - is determined by costs, market price and value offered to the customer (Indounas 2009, 2014). Sales force capabilities aligned to services, are essential for achieving ISE. Sales representatives with technical knowledge, empathy and flexibility adress the benefits and financial added value (cost savings, increased productivity) of the services to the customer (Hinterhuber 2017). Furthermore, employees who provide the service can use their customer contact to offer further services or products. Service orientation of management and strategy refers to a clearly defined service strategy which can result from a corporate strategy, that includes services and a management which implements this approach. The service-oriented strategy (Eggert et al. 2014) should be embodied by the management, which means that they should support service-oriented behaviour and acting as a role model (Wirtz and Johnson 2003). The managerial commitment towards services supports employees within their service orientation by addressing customer issues. Risk assessment and key performance indicators refer to indicators which are defined, analysed and used for decisions. To manage service related, commercial and operative risks, they should be analysed and service
profitability should be assessed. **Organizational processes** refer to good communication and collaboration between departments. Cross-departmental processes and service processes which are standardized, efficient and fast ensure quick reaction to customer issues. **Customization vs. standardization** refers to the trade-off between individual solutions and efficiency. To meet individual customer needs, service offerings are tailored and priced on a higher level. Standardized offerings, which can be used modular, or the reuse of developed solutions lead to economies of scale (Levitt 1972, 1976). **Service quality** should be improved through concrete actions which can be derived from collected customer feedback. **Development of services** comprises the integration of different departments and the consideration of the whole customer lifecycle within the service development process. These twelve antecedents for Industrial Service Excellence (ISE) arise from our comprehensive qualitative analysis and are the starting point for the quantitative research to validate and measure their impact on ISE and performance indicators in service business.

5. RESULTS QUANTITATIVE RESEARCH

First findings based on a sub-sample of n=206 show that some of the antecedents are more important reaching ISE than others. Antecedents with the strongest impact are shown below. The significant path coefficient (β=0.216, p<0.01) of sales force capabilities indicates an important contribution to ISE. The antecedent service oriented management and strategy is significant (β=0.206, p<0.01), too. Moreover we found a positive and significant relationship between organizational structure (β=0.216, p<0.01) and organizational processes (β=0.206, p<0.01) on ISE. As the $R^2$ of ISE is 0.741 the antecedents explain much of the variance of ISE. The adjusted R$^2$, which takes into account that there are a lot of antecedents, is 0.725. To assess the effect of ISE on performance we focus on several financial and non-financial performance indicators (as shown in Table 2 and 3). The analysis reveal a considerable impact from ISE on companies non-financial performance (β=0.74, p<0.01) as well as on financial performance (β=0.56, p<0.01). The related R$^2$ are 0.548 for non-financial performance and 0.313 for financial performance.

6. CONCLUSION

As prescriptive knowledge is scarce, our approach contributes to servitization research by developing a holistic audit (Baines et al. 2017) in the field of servitization. The identified twelve antecedents and their impact on ISE as well as the impact of ISE on financial and non-financial performance indicators in service business give companies guidance on their servitization journey. As a preliminary result of our quantitative research, we found the strongest impact at four antecedents on ISE. Sales force capabilities, service oriented management and strategy, organizational structure and organizational processes affect the construct of Industrial Service Excellence in a significant way. In regard to our second research question, our analysis revealed, that financial as well as non-financial performance within service business are positively affected by offering excellent industrial services. As a next step, we will examine if the results can be confirmed within our final sample of manufacturing companies from Austria and Bavaria. Based on our final results we will develop an online-based monitor, which allows manufacturers to assess and compare their individual performance in the field of industrial services. This will lead to a better understanding how to reach ISE and improve performance in service business. As our sample consists of manufacturers from Austria and Bavaria, the research in this field could be extended to other regions. Further analysis can also focus on moderating effects (e.g. market turbulence, company size). As the RBV has been criticized for being static, research can also focus on analysing the effect of dynamic capabilities on performance in a servitization context.
REFERENCES

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