

## COMPETITIVE PAPER

# IMPLEMENTATION OF INDUSTRIAL SERVICES IN PRODUCT MANUFACTURERS AND THE ROLE OF NETWORK CAPABILITY: A STUDY OF EFFECTS IN TIMES OF ECONOMIC UNCERTAINTY

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### ABSTRACT

Prior research on the implementation of industrial service offerings does rarely take mediation and moderating effects into account in the study of influences on sales performance. Responding to calls for studies to analyze the important links between implementation of industrial service offerings and company sales performance, this study tests the mediating role of service performance. Moreover, to analyze the organizational capabilities required to create and capture value from industrial service interactions, the present study tests the moderating role of network capabilities on the relationships between service offering and service performance and between service offering and company sales performance. Using data on 103 product manufacturing companies in the recent economic downturn, we confirm the hypothesized mediating role of service performance in the relationship between service strategy and company sales performance. More importantly, our results highlight the critical role of network capabilities in value creation, as network capabilities positively moderate the links between a developed measurement of service offering and service performance and between this measure of service offering and company sales growth. For managers of product manufacturing companies, the results suggest the active development of comprehensive service offerings and organizational capabilities, such as network capabilities, to create and capture customer value and to ensure prosperity. We further discuss the need to carefully measure service offerings and position our findings in relation to the counter-cyclical nature of industrial service revenues.

**Keywords:** service offering, industrial service strategy, network capabilities, network competence, alliance capability, company sales performance, manufacturing sector, structural equation modeling, economic recession

## INTRODUCTION

To survive in the global business environment, industrial firms are nowadays often striving to complement their products with a comprehensive set of value-added services and re-position themselves as comprehensive service or solution providers (Helander & Möller 2008; Vargo et al. 2008; Meier et al. 2011; Davies et al. 2007). Increased customer demand (Oliva & Kallenberg 2003), competitive pressures (Anderson & Naras 1995; Gebauer & Friedli 2005) and the aspiration for more stable revenues (Gebauer & Elgar Fleisch 2007; Oliva & Kallenberg 2003) operate as catalysts for this transformation. Therefore, several large product manufacturers, such as ABB, Caterpillar, KONE, Rolls-Royce and Wärtsilä, are increasingly adopting a service logic that may benefit the companies in terms of product, service or solution sales and profitability (Oliva & Kallenberg 2003; Windahl & Lakemond 2010; Salonen 2011).

Studies have proposed that industrial services provide additional revenues throughout the product life-cycle, enable better product sales and provide recession-resistant revenues that enable industrial companies to prosper even during periods of economic uncertainty (Oliva & Kallenberg 2003; Gebauer & Elgar Fleisch 2007). However, the existing research is mostly descriptive or normative in nature (Jacob & Ulaga 2008) providing modest empirical evidence on the performance effects of service strategy (Gebauer, Ren, Valtakoski, & Reynoso, n.d.; Jacob & Ulaga, 2008; Raddats & Burton, 2011). Even more importantly, the evidence that the few existing studies provide is mixed in terms of the performance effects of industrial services implementation (Gebauer, Ren, Valtakoski, Reynoso, et al. 2012; Jacob & W Ulaga 2008; Neu & Brown 2005). For instance, some early studies suggest (Oliva & Kallenberg, 2003; (Davies 2004) a positive performance effect of industrial services, whereas more recent studies such as that one of Neely (2008) found empirical evidence for a negative performance effect of industrial services. Therefore, we expect that the relationship between industrial services and company performance is much more complex than has been anticipated by previous empirical research.

Arguably, one explanation for these mixed results in addition to contextual reasons, may be that studies often consider service organization as a blackbox, and have not carefully developed service offering measurements nor they have rarely discussed of the moderating effect of organizational factors. The present study will respond to calls for studies to analyze the growth effect of industrial service performance particularly in times of economic uncertainty. As suggested by the strategic capability literature (Jiang et al. 2011; Orr et al. 2011; Wittmann et al. 2009; Long & Vickers-Koch 1995), some organizational structures or capabilities may intervene in the link between service strategy and financial performance (Möller et al. 2008; Michel et al. 2008). For instance, prior studies have suggested a central role of routines and processes for coordinating customer service interactions, as value is often co-created in interactions between manufacturers and customers (Grönroos, 2008; Lockett, Johnson, Evans, & Bastl, 2011; Lusch, Vargo, & Tanniru, 2010; Ramirez, 1999). Thus, companies may likely need capabilities, such as network capabilities (the ability to manage, integrate and learn from customer relationships), that enable value creation and capture in service interactions (Nam & Lee, 2010; Walter, Auer, & Ritter, 2006).

We intend to correspond to calls for studies of the financial impact of industrial services (Gebauer,

Ren, Valtakoski & Reynoso 2012), by analyzing the mediating role of service performance (service share of revenue) in the link between service strategy and company sales growth. We execute this analysis by using data of product manufacturers that implemented services in the last economic downturn and make a point of analyzing the role of service implementation in economic uncertainty. More importantly, we intend to test the moderating effect of network capabilities on the links between service offering and service performance and between service offering and company sales performance to better understand the role of network capabilities as value-creating and value-capturing mechanisms in industrial service business. Therefore, our distinct contribution is three-fold: we provide a test and measurement of industrial service offerings, test the moderating role of network capabilities, and discuss the counter-cyclical nature of industrial service revenues.

## THEORY AND HYPOTHESES

### Service strategy and service offering in industrial business

The transformation from a perspective emphasizing merely industrial products to a more comprehensive perspective of a “service offering” is an important trend in industrial companies. Nevertheless, prior research conveys a rather complex picture of the dimensions of what is meant with an industrial service offering. We contend that service offerings, or ‘service provisions’, can be viewed as a central dimension (Homburg et al. 2003) or a manifestation of an industrial service strategy (Gebauer et al., 2010: 106). Consistent with previous studies, we conceptualize service offerings as an emphasis on the sales and marketing of particular services (Homburg et al. 2003). Prior studies apply various dimensions to describe the service offerings of industrial firms. Table 1 below synthesizes the important contributions of prior studies.

**Table 1.** Service dimensions in prior studies.

Author(s)	Service dimensions
Mathieu(2001)	1) Product services 2) Services as products 3) Customer service
Cunningham and Roberts(1974)	1) Convenience service activities 2) Reliability service activities
Morris and Davis(1992)	1) Pre-transaction services related to internal operations 2) Transaction services related to physical appearance 3) Transaction services related to order status 4) Transaction services related to order accuracy 5) Post-transaction services related to start-up 6) Post-transaction services related to problem handling
LaLonde and Zinszer(1976); Samli, Jacobs, and Wills(1992)	1) Pre-transaction or presale services (e.g., written customer policy) 2) Transaction services (e.g., order cycle time) 3) Post-transaction or post-sale services (e.g., maintenance)
Oliva and Kallenberg (2003)	1) Basic installed base services 2) Maintenance services 3) Professional services 4) Operational services
Gebauer, Edvardsson, Gustafsson, and Witell(2010)	1) Customer service 2) Basic service for the installed base 3) Maintenance service 4) R&D-oriented service 5) Operational service

Homburg et al. (2003)	<ol style="list-style-type: none"> <li>1) Information and consulting services</li> <li>2) Services for training and further consulting</li> <li>3) Services in the business-related field</li> <li>4) Services for technical security and optimization</li> <li>5) Services supporting the process of cooperation</li> </ol>
Meier et al. (2011); Tukker (2004)	<ol style="list-style-type: none"> <li>1) Product-oriented: product-related advice and consultancy</li> <li>2) User-oriented: product lease, product rental and product pooling</li> <li>3) Result-oriented: activity management, pay per service unit and functional results</li> </ol>

From the studies listed in table 1, we can recognize different methods of classifying services. The first classification considers the product and process relatedness of services: a) product-related services (e.g., installation), b) process-related services (e.g., the operation of customer processes) and c) service products *per se* (e.g., financing) (Mathieu 2001; Cunningham & Roberts 1974; Oliva & Kallenberg 2003). Another classification centers on the product life-cycle (time dimension): 1) pre-transactional (e.g., R&D), 2) transactional (e.g., customer seminars) and 3) post-transaction services (e.g., maintenance) (Morris & Davis 1992; LaLonde & Zinszer 1976; Samli et al. 1992). Some combination of these dimensions appears to be embedded in most of the existing classifications.

As a synthesis of prior studies, we initially defined service offerings in six dimensions: 1) maintenance services, 2) R&D services, 3) customer services, 4) finance and insurance services, 5) performance services, and 6) procurement services, including 33 services within these dimensions. Based on our measurement purification process, we decided to apply only the first three dimensions (i.e., maintenance services, R&D services and customer services) in our model because these dimensions result of the measurement purification process (elaborated in the methodology section) as they most accurately reflect the nature of service business in small and medium-sized product manufacturing companies. Due to specialization and lack of internal development resources, small and medium sized manufacturing firms often limit their service offering on maintenance, R&D and customer services. We define service offerings as the emphasis on the sales and marketing of 1) maintenance services, 2) R&D services and 3) product information sharing services. Thus, our final classification focuses on product-related services (maintenance and R&D) and customer services, including pre-sales (R&D), sales (customer services) and after-sales services (maintenance). Our classification is justified by the nature of our population and data from small and medium-sized product manufacturing companies that are in the early stages of servitization. Table 2 highlights the final construct for service offerings (table 2).

**Table 2.** The construct of service offerings.

The dimension of the service offering	Services
Maintenance services	<ul style="list-style-type: none"> <li>Installation service</li> <li>Repair service</li> <li>Product upgrading service</li> <li>Maintenance</li> </ul>
R&D services	<ul style="list-style-type: none"> <li>Research service</li> <li>Prototype design and development service</li> <li>Feasibility studies</li> <li>Problem analyses</li> <li>Analyses of a product's manufacturability</li> </ul>
Customer services	<ul style="list-style-type: none"> <li>Product demonstrations</li> </ul>

	Customer seminars Technical user training Written information material Customer consulting and support by phone
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Although we acknowledge the validity of previous approaches, our measurement method is novel in comparison with prior studies (Homburg et al. 2003), which have primarily measured service strategy by summing dichotomous service items and using the summed items as a proxy of service strategy. Our measurement method is more fine-grained because we measure the promotional emphasis on each service separately and consider the shared variance between service dimensions as a reflection of the existence of industrial service strategy.

### **Network capabilities as an enabler of value co-creation and capture**

The literature on network capabilities provides various labels and dimensions for conceptualizing the capability to manage, use and exploit inter-organizational relationships. The literature is consistent with the strategic capability view, which states that “*resources are productive assets the firm owns; capabilities are what the firm can do*” (Long & Vickers-Koch, 1995; Ulaga & Reinartz, 2011: 6). Thus, building on the general definition of capabilities, we consider that network capabilities enable the use of strategic resources. To analyze the existing evidence on the antecedents, mechanisms and outcomes of network capabilities and related constructs, we systematically searched the top-tier (ABS3 and ABS4 level) journals in marketing, strategic management, organization, entrepreneurship and small business, innovation and management and applied multiple constructs, such as “network capabilities”, “network competence” and “alliance capability”. Literature searches were conducted based on article abstracts and resulted in 41 articles (Appendix 1). We continued a narrative literature search based on the reference lists of those 41 articles and then explored broader literature on inter-organizational networks and the interaction approach.

The search and review of the dimensionality of network capabilities demonstrates a vast variety of definitions and dimensions (table 4). To summarize the review results, we find three groups of dimensions and measures arising from the articles: 1) network management capability (e.g., coordination, management capability, control capability, alliance evaluation) (Smirnova et al. 2011; Schreiner et al. 2009; Walter et al. 2006), 2) network integration capability (e.g., relational skills, bonding, customer linking capability, dialogue and structures) (Smirnova et al. 2011; Schreiner et al. 2009; Walter et al. 2006) and 3) network learning capability (internal communication, alliance learning process and mechanisms, relational capability as a learning process) (Kale et al. 2007; Walter et al. 2006).

We adopted the definition of Walter et al. (2006) and defined the construct of network capabilities as “*a firm’s ability to develop and utilize inter-organizational relationships*” (Walter et al., 2006: 541). This construct stems from the assumption that organizations vary in terms of their capability of developing and coordinating in-depth inter-organizational relationships to gain access to resources that are held by other organizations. According to Walter et al. (2006), network capabilities include four inter-related dimensions: coordination, relational skills, market knowledge and internal communication. We selected this construct because it integrates all of the core dimensions of network capabilities: network management capability

(coordination), network integration capability (relational skills), and network learning capability (market knowledge/internal communication). We suggest that network capabilities enable a manufacturing company to align service relationships for the co-creation and capturing of value from the manufacturer's service activities (Smirnova et al. 2011). We apply network capabilities as a reflective construct to suggest that all of the dimensions are necessary to reflect the existence of network capabilities. Shared variance between dimensions optimally reflects the true state of network capabilities, but no single dimension can provide the full benefits of network capabilities (Kandemir et al. 2006; Wales et al. n.d.).

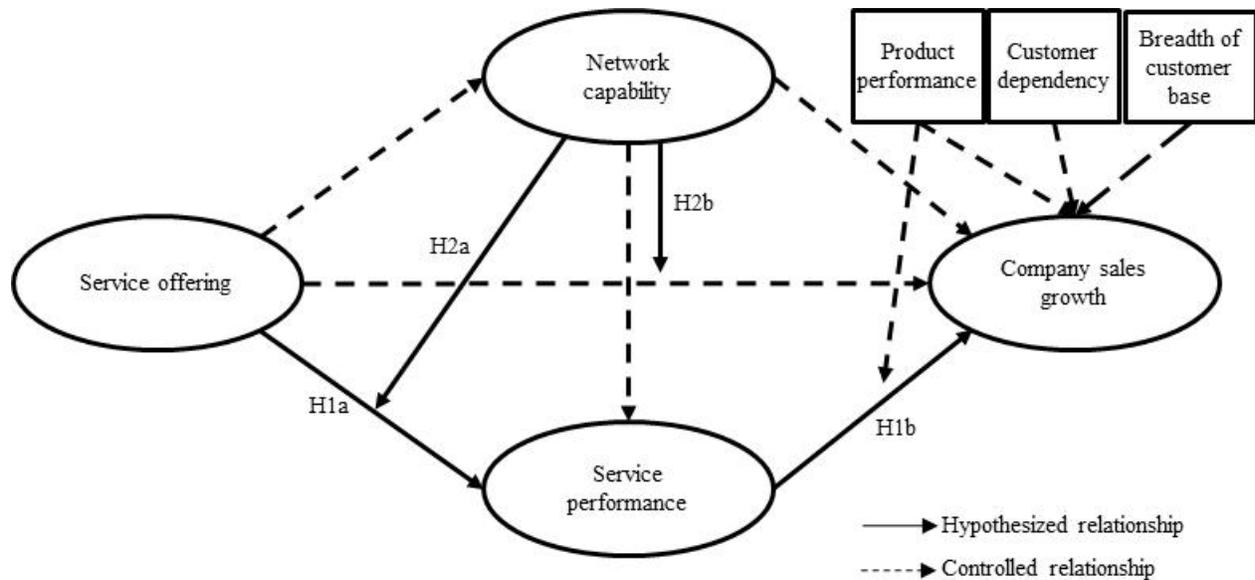
To consider the outcomes of network capabilities, prior studies have demonstrated their enabling effects on new product development, innovation and innovation success (Capaldo 2007; Ritter & Gemünden 2004; Theoharakis et al. 2009), long-term orientation (Jiang et al. 2011), joint alliance success (Lambe et al. 2002), partnership performance (Phan et al. 2005), alliance financial performance (Wittmann et al. 2009), customer value (Kim & Kim, 2009), customer satisfaction (Kim & Kim, 2009; Orr, Bush, & Vorhies, 2011), customer loyalty (Kim & Kim, 2009), customer equity (Kim & Kim, 2009), network status (Schreiner et al. 2009), business performance (Smirnova et al. 2011), the abnormal stock returns of firms (Kale et al. 2002; Swaminathan & Moorman 2009), and financial performance (Orr et al. 2011; Wales et al. n.d.). As the prior list demonstrates, the outcomes vary considerably, and there is relatively little evidence regarding any specific outcome. Only one or two empirical studies can be found for each outcome. Moreover, much of the existing empirical evidence has been identified through the application of sparse proxies for network capabilities, such as alliance experience or the existence of alliance functions. Hence, further empirical research is needed to explore the mechanisms and outcomes of network capabilities.

Given the research setting of the current study, only two of the 41 studies apply the network capability construct in the context of services (Berghman et al. 2006; Theoharakis et al. 2009). Theoharakis et al. (2009) studied the role of relational capabilities in the service-profit chain and demonstrated that employee satisfaction and loyalty positively influence customer linking and strategic partnering. Moreover, customer linking was found to facilitate organizational innovativeness and service responsiveness, both of which had a positive effect on customer performance. Strategic partnering was found to exert a positive effect on organizational innovativeness. Finally, customer performance explained the financial performance of firms. Berghman et al. (2006) highlighted the importance of active value creation and emphasized the role of network and learning capabilities in the value creation process. Because empirical evidence on the role of network capabilities in the context of industrial services is nearly non-existent and the interaction between these phenomena is particularly relevant, further empirical research is needed (Gebauer, Ren et al., 2012; Theoharakis et al., 2009).

### **Research model and hypotheses**

Figure 1 describes the research model, and the next section focuses on the development of the hypotheses. In the empirical study, we controlled only for the direct sales growth effect of service offering because we did not expect service offering to provide direct sales growth effects (controlled relationships are marked in figure 1 by dotted lines). Moreover, we controlled only for the mediating effect of network capabilities because the effects of service offerings on network

capabilities, the effects of network capabilities on service performance and the effects of network capabilities on sales growth were not central to the research questions of this study. In addition, we tested the influence of three control variables and the interaction effect between service and product performance. Our nomological model analyzes the mediating effect of service performance during times of economic uncertainty, particularly the moderating role of network capabilities. The following sections provide the rationale for our nomological model and hypotheses.



**Figure 1.** Theoretical model.

### **The mediating role of service performance in the link between service offerings and company sales performance**

Prior studies discuss the financial performance influence of industrial service business, but these studies provide little and often mixed evidence (Gebauer, Ren, Valtakoski, Reynoso, et al. 2012; Jacob & Ulaga 2008; Neu & Brown 2005). They argue that service offerings create additional revenues during lengthy product life-cycles and thus add value in comparison with products (Oliva & Kallenberg 2003). Adding services as part of a company's total offerings informs customers, at least at the level of advertisements, of the willingness of a manufacturer to create value through services, in some cases throughout the product life-cycle.

Studies have also highlighted challenges, such as shifting organizational mindset, adopting new business models, service delivery and capability development, which may prohibit manufacturing companies from achieving higher revenue (Neely 2008; Martinez et al. 2010). However, we agree with Grönroos (2006) suggesting that manufacturers enable customer value creation by providing certain service offerings as a platform on which customers and suppliers may co-create value through service interactions. Customers' positive experiences of value creation increase their loyalty, their propensity for future exchanges and the future service sales of a manufacturer (Theoharakis et al. 2009). Because of the importance of this issue and the lack of existing empirical evidence in the industrial service literature (Gebauer, Ren, Valtakoski,

Reynoso, et al. 2012), we test whether service offerings could foster service sales by increasing the service share of sales revenues within a company ( $H_{1a}$ ).

$H_{1a}$ : Service offerings will positively influence service performance.

Prior studies have argued that service revenues add value to industrial manufacturing companies. Services may a) create revenues throughout a product's life-cycle, b) support product sales and c) protect a manufacturer against economic uncertainty. Previous studies have suggested that services may create additional revenues for manufacturers because services can be sold throughout the product life-cycle. Many studies also report a number of pre-sales (R&D), sales-phase (consulting) and after-sales (installation, maintenance, product upgrading) services that can add to the product revenues of manufacturers as it would make the product more attractive and different from competitors products (Meier et al., 2010). Furthermore, services may benefit customers by rendering a product easier for them to install, use, maintain and recycle, thus supporting product sales.

Finally, numerous studies emphasize that services produce more stable sources of revenue in comparison with revenues created by industrial products (Oliva & Kallenberg 2003; Gebauer, Ren, Valtakoski & Reynoso 2012) and thus may positively affect the market value of an industrial firm (Fang et al. 2008). Product sales may increase or decrease dramatically depending on the economic times or competitive situation, whereas after-sales services (e.g., maintenance contracts or service agreements) provide a more stable source of revenues for manufacturing companies (Baines et al. 2007; Oliva & Kallenberg 2003). This positive effect of service revenues is particularly highlighted during periods of economic uncertainty, such as economic downturns, when industrial investments decrease throughout the manufacturing sector and companies that provide industrial products lose projects and sales revenues as customers hold or withdraw investments. As a result of service agreements between service providers and customers, service revenues are more resistant to economic turbulence than are product businesses (Mathe & Shapiro 1993). For these reasons, service performance should have a positive influence on a company's sales growth ( $H_{1b}$ ).

$H_{1b}$ : Service performance will positively influence sales performance.

$H_1$ : Service performance will mediate the relationship between service offerings and sales performance.

### **The moderating role of network capabilities**

Existing studies underline the mixed findings for industrial services and company financial performance and suggest an indirect relationship between service strategy and company performance (Gebauer, Ren, Valtakoski & Reynoso 2012). Research models often consider service organization, that is the service structures and capabilities to be a 'black box', with a few rare but positive exceptions (Gebauer, Edvardsson, et al. 2010; Raddats & Burton 2011). Service capabilities, such as network capabilities, play a central role in facilitating the creation and capturing of value from industrial service interactions (Gebauer, Ren, Valtakoski & Reynoso 2012; Theoharakis et al. 2009).

Our construct for network capabilities includes three dimensions: network management capabilities, network integration capabilities, and network learning capabilities (Walter et al. 2006). As a dimension of network capabilities, network management facilitates better coordination and knowledge sharing and thus reduces knowledge asymmetries. Active relationship management enables a manufacturer to ascertain the needs of customers and influence their value experience, loyalty and commitment. Network integration capabilities (or relational skills) enable a manufacturer to develop deep customer relationships and to better understand the needs of both its own customers and the end customers. As an alternative to arm's-length market relationships, integrated relationships enable a manufacturing company to engage customers in open dialogue (Paulraj et al. 2008; Ballantyne 2004) and to increase trust (Jiang et al. 2011), commitment (Schreiner et al. 2009; Wittmann et al. 2009) and loyalty (Theoharakis et al. 2009; Kim & Kim 2009), all of which are critical for the creation and capturing of value (Phan et al. 2005). Finally, effective service value creation requires the ability to absorb knowledge regarding the needs and expectations of existing customers (Ritter & Gemünden 2003). A manufacturer needs market knowledge that can be absorbed and communicated in the manufacturer's organization for market learning and innovation (Kale et al. 2007; Walter et al. 2006). Hence, network learning capabilities play an important role in enabling better understanding of customers to create customer value. In contrast, the inability to absorb customer knowledge results in inadequate fulfillment of the needs of customers.

In summary, to co-create and capture financial value in service interactions, a manufacturer must create a platform for interaction with its key customers (Grönroos, 2006), understand customer processes and the needs of end customers (Oliva & Kallenberg 2003), actively seek new service and product opportunities (Fischer et al. 2010), co-design and integrate service offerings and resources (Lusch et al. 2010; Ballantyne et al. 2011), and ensure that its offerings correspond to customer needs (Payne et al. 2008) to create service performance and increase company sales revenues. For these activities, a manufacturer needs network capabilities. Network capabilities (the ability to manage, integrate and absorb knowledge from networks) enable a manufacturer to interact with customers to create and capture value from service offerings in the form of service sales performance ( $H_{2a}$ ) and company sales growth ( $H_{2b}$ ), particularly in times of economic recessions.

$H_{2a}$ : Network capabilities moderate the effect of service offerings on service performance.

$H_{2b}$ : Network capabilities moderate the effect of service offerings on company sales performance.

## **METHODS**

### **Data collection, response pattern and respondents**

Detailed data are needed to analyze the influence of service offerings on service sales performance and company sales growth because no public database provides such knowledge. Thus, we collected survey data from a population in the machine and equipment manufacturing industry (SIC 28) in Finland. Our sample consists of all of the machine and equipment manufacturing companies that are liable to pay value-added tax and that employ 20 or more employees. The final sample included 404 companies. The survey data were collected in January and February 2010. These data reflect the existing situation in terms of service offerings, service

performance and network capabilities. Because the main dependent variable measured sales growth (percentage of revenue change) during periods of economic recession, we measured objective sales growth from January 2009 to December 2010 (the change from 2009 to 2010). In addition, we controlled for and reported the effect on sales growth from January 2008 to December 2010.

The data were collected through the application of a web-based questionnaire. We were particularly interested in targeting manufacturing companies that included industrial services as a part of their total offering. Before sending the questionnaires, we contacted the targeted companies by phone to request their participation in this study. When preparing for data collection, we made approximately 2000 calls to reach selected companies and to motivate the key respondents to provide a response. To motivate the respondents, we promised to deliver a report of the results of the survey. In addition, during the data collection, two reminders were sent. We received 122 company responses, of which we removed twelve cases for which financial data were not available. Additionally, we excluded five questionnaires that were incomplete and two cases of outliers based on the interpretation of scree-plot images (Tabachnick & Fidell 2007). The final dataset included 103 company cases with a satisfactory response rate of 25 percent; after accounting for refusals (75), we obtained a final response rate of 31 percent. The response rate that resulted from the vast data collection efforts can be considered satisfactory in comparison to similar survey studies in management (Baruch 1999).

Consistent with the industry population, most of the respondent firms were medium-sized, produced an average annual turnover of 74.2 million Euros, had an average return on equity of 30.4 percent and employed an average staff of 290. We can conclude that the respondent firms and the industry as a whole are at an early stage of transformation toward a service-dominant business model, as the average value for the service share of revenue was approximately 17 percent. Moreover, products generated 63 percent and subcontracting generated 20 percent of the revenues of the industrial firms. Thus, these firms can be considered product manufacturing firms in the early stages of service transformation.

Our survey was addressed to the managers (key respondents) who were responsible for service business development. The respondents were selected by calling companies and speaking with their managing directors. Of the key respondents, 71 percent operated as managing directors, 20 percent as sales managers, 6 percent as business developers, 2 percent as R&D managers and 1 percent as production managers. Despite our high response rate, we analyzed the data for non-respondent bias. During this analysis, the respondents were compared to the entire population of actual respondents using three variables: revenue, profit and balance sheet value. Because the differences between the data and the research population were not statistically significant, we concluded that the data were free from non-respondent bias and were generalizable to the research population of product manufacturing companies.

## **Measurements**

To test the nomological model, we chose to apply a partial least squares (PLS) analysis (Antico, Moenaert, Lindgreen, & Wetzels, 2008; Chin, 1998; Chin, Peterson, & Brown, 2008; Hair, Sarstedt, Ringle, & Mena, 2011) with SmartPLS 2.0 software (Ringle et al. 2005). In addition,

we applied exploratory factor analysis to validate the constructs (Tabachnick & Fidell 2007). For the analysis, we chose partial least squares because this method does not require multivariate normal data, is recommended for testing interaction effects, is suitable for testing small samples and is more appropriate for the application of formative indicators than covariance-based SEM models. In terms of sample size, PLS requires cases of only 10 times the number of affected relationships to a single dependent variable; thus, this study's research model could be estimated with  $n \geq 70$  because there were seven constructs (four main constructs including the interaction variable and three controls) affecting sales performance (Mahwah 1998). PLS is used by an increasing number of marketing and management scholars (Antioco, Moenaert, Feinberg, et al. 2008; Ernst et al. 2010; Sirén et al. 2012; Ringle et al. 2011).

The constructs and items were adapted from prior studies. During the development of the questionnaire, all items were translated and back-translated (English-Finnish-English) by another researcher to confirm translation equivalence (Brislin 1970). In addition, prior to data collection, we asked three managers from manufacturing companies to evaluate the questionnaire and provide feedback to the researchers.

We defined service offerings as the emphasis that a manufacturer places on the marketing of a particular service to reflect the existence of industrial service strategies in product manufacturing companies. Building on the work of previous scholars (Gebauer et al. 2010; Homburg, Fassnacht, and Guenther 2003; Homburg, Hoyer, and Fassnacht 2002; Martinez-Tur, Peiró, and Ramón 2001), we chose to conduct a service-specific assessment of how actively each service is offered to customers using a Likert scale (0=not offered; 1=not actively at all; 7=very actively). In addition to the literature search and review, we received support from 23 interviews/workshops in four case companies and interviews with 5 academic experts to develop our service offering construct. We adapted the measures from prior studies and tested the content validity of both the construct and its dimensions prior to data collection. In this pre-test, we applied the content validity index and asked 9 experts in strategy and service marketing to evaluate whether each item corresponded to the definition of the dimension that it was intended to measure using a scale ranging from one to four (1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant) (Polit, Beck, and Owen 2007). We evaluated the validity of the construct using the content validity index (average I-CVI) with all dimensions exceeding the threshold of .8 (Davis, 1992; Polit et al., 2007). Following the data collection with the final pre-validated questionnaire and 33 industrial services in six dimensions, we tested the dimensionality of the construct by applying the principal axis factoring and oblique rotation method. In the factor analysis, all of the items loaded above .40 onto their main factors without significant side loadings (<.40). As a result of the explorative factor analysis, we identified six dimensions, including maintenance services, R&D services, product information sharing services, finance and insurance services, performance services, and procurement services. In comparison with the previous pre-validation, business services were divided into three dimensions: finance and insurance, performance and procurement services. These three dimensions were excluded from this analysis because their factor loading to the respective latent variable of service offerings was low (<.5) and thus indicated that the factors poorly measured the latent phenomenon. We believe that this result was observed because our data were biased towards small and medium-sized manufacturing companies in an early stage of service transformation. In these companies, some of the services were irrelevant. As a result, the final dimensions of the service offering construct

were 1) maintenance services, 2) R&D services and 3) product information sharing services. Finally, we tested the measurement model in PLS, in which the loadings ranged from .67 to .85 (Appendix 1). The Cronbach's alpha value for each dimension was above the suggested threshold of .70: the values were .81 for maintenance services, .80 for R&D services and .85 for product information sharing services. Finally, the analysis demonstrated satisfactory average variance extracted (.57, threshold .50) and composite reliability (.79, threshold .70).

The current study defines network capabilities as the ability of an organization to develop and utilize inter-organizational relationships to gain access to various resources that are held by other organizations. Network capability was operationalized as a four-dimensional construct with the sub-dimensions of coordination, relational skills, partner knowledge and internal communication. Network capabilities were measured by Likert scale items (1=fully disagree, 7=fully agree). All of the items were adapted from the work of Walter et al. (2006). After the data collection and analysis, the dimension of market knowledge was transformed into partner knowledge to improve the face validity of the original network capability construct. These items were averaged into four parcels based on the results of principal axis factoring (Little et al. 2002) with the maximum likelihood rotation method to validate the four-dimensional structure. During the exploratory factor analysis, items that loaded below .40 onto their main factors and items with significant side loadings (>.40) were removed. The remaining 14 items were factored into four parcels: "coordination", "relational skills", "partner knowledge" and "training and assessment". In the PLS analysis, all factors showed satisfactory Cronbach's alpha values above .7 (Nunnally 1978; Peterson 1994). The PLS analysis showed satisfactory average variance extracted (.58), composite reliability (.85) and parcel loadings (.65 to .86). Overall, the construct and its items demonstrated satisfactory reliability and validity.

Service performance was measured as the service share of revenue to reflect the strategic position of service business within a product manufacturing firm (Carbonell et al. 2009; Antioco, Moenaert, Lindgreen, et al. 2008). Previous studies have used the revenue share of services as a performance measure to reflect the relative importance of services (Gebauer & Elgar Fleisch 2007). Service revenues have been considered counter-cyclical and more resistant to economic downturns because they provide a more stable source of revenue than do products (Oliva & Kallenberg 2003). The service share of revenue was measured as a percentage of a company's total revenue as evaluated by a respondent.

Sales performance was assessed by an objective measure as the change in company sales revenues during the economic recession from 2009 until the end of 2010, which encompasses the period in which the recession reportedly and significantly influenced the operations of product manufacturing companies (Statistics Finland 2012). According to Statistics Finland, the revenues of the Finnish product manufacturing sector decreased significantly in 2009 and 2010 in comparison with previous years and began to increase again in 2011. Thus, our measurement approach was justified by the timing of the economic recession, as the application of longer-term growth data would have expanded the data beyond the economic recession.

We controlled for seven effects of different variables on the sales growth of companies. Because we studied the influence of service performance on company sales performance, we decided to control the effect of product performance to compare the effectiveness of service businesses to

that of product businesses. Product performance was measured as the product business share of revenue. Furthermore, we controlled for the moderating effect of product performance on the link between service performance and company sales growth to determine whether and to what extent the growth effect of service performance is related to the existence of a product business model. Industrial services, such as installation, maintenance, and R&D, are often directly linked to industrial products.

We then controlled the effect of the breadth of the customer base, which was measured by the number of customers. The breadth of the customer base provides an additional indicator for a company's business model. A low number of customers reflect a subcontracting business model of high dependency on a smaller number of existing customers, whereas a large number of customers indicates a product business model and lower dependency on any single customer. In addition to the breadth of the customer base, we controlled for customer dependency, which was measured by the relative share of revenue that is generated by the single most important customer in comparison to a company's total revenue. Each manufacturer's customer dependency was derived as an additional measure for the manufacturer's business model. Higher customer dependency reflects in-depth partnership ties to the most important customers, whereas lower dependency reflects arm's-length market relationships and a product business model.

In addition to these control variables, we controlled for the direct effects of service offerings and network capabilities. We controlled the direct effects of service offerings on network capabilities to test whether service offerings facilitate the learning of network capabilities, as complex service exchanges require interactive capabilities. Additionally, we controlled for the influence of network capabilities on service performance to determine whether an increase in interactive network capabilities facilitates an increase in the importance of service business within a company, as services require interactive capabilities (Grönroos, 2008). Then, we also controlled for the sales growth effect of network capabilities to determine whether network capabilities directly facilitate company revenue growth. Finally, we controlled for the direct effect of service offerings on sales growth to determine whether industrial service offerings directly increase business growth.

To consider the construct of discriminant validity, we compared the average variance extracted with the squared latent variable correlation. This comparison suggested satisfactory construct discriminant validity (Chin, 1998; Cool, Dierickx, & Jemison, 1989). In addition, all items loaded higher on their intended construct than on any other construct, and all item loadings were statistically significant; thus, the results indicate high levels of item discriminant validity. Overall, the analysis shows that all items are satisfactory in terms of reliability and validity.

Finally, to avoid potential common method variance, we applied different controls and tests during the data collection and analysis (Podsakoff, MacKenzie, Lee, and Podsakoff 2003). During the data collection, we used various response formats and ensured the brevity of the questionnaire. For instance, service offerings and network capabilities were measured by Likert scale variables, whereas service performance was measured as a share of revenue. Most importantly, our main dependent variable, company sales growth, was measured by an objective measure. However, in the analysis, we tested the data by applying the one-factor test proposed by Harman (1967; Podsakoff & Organ, 1986). In the one-factor test, the first factor accounted for

only 24% of the total variance in the factor matrix. Some researchers suggest that common method variance does not generate a serious threat to the interpretation of results even if the first factor accounts for as much as 50% of the total variance (Rönkkö & Ylitalo 2011). However, given the important issue of common method variance, we conducted another test that is preferred over the one-factor test by comparing the original structural model to the single-factor model (Iverson & Maguire, 2000; Korsgaard & Roberson, 1995; McFarlin & Sweeney, 1992; Podsakoff et al., 2003). In this test, the original research model achieved a significantly better model fit (0.30) than the single-factor model (0.22); thus, the test results suggest that the data are significantly free of common method variance.

## RESULTS

In the following paragraphs, we begin our analysis by presenting a correlation matrix of the constructs that were used. We then present the results of the structural model and interpret the plotted results. To test the path coefficients and statistical significance, we apply the path-weighting scheme (Lohmöller 1989) with a nonparametric bootstrapping procedure with 500 resamples consisting of the same number of cases as in the original sample (103). To test the predictive relevance of our research model, we use the Stone-Geisser criterion. The research model had a satisfying level of predictive relevance, given that the  $Q^2$  values for all endogenous variables were above zero.

Table 5 presents the correlations between the given constructs and control variables and shows that the highest correlation between the independent variables (service performance and service performance\*product performance) is -.59. Because of the moderate correlation between the independent variables, we decided to test for multicollinearity using a VIF index. A typical threshold value for the VIF index is 10, and in this study, the value for each independent variable is below 1.9. Thus, observations suggest that the research model is satisfactorily free of multicollinearity.

**Table 5.** Correlations among the Constructs and Control Variables.

		1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Breadth of customer base	1.00								
2.	Customer dependency	-0.16	1.00							
3.	Network capabilities	0.21	0.13	1.00						
4.	Product performance	0.04	-0.23	0.11	1.00					
5.	Sales performance	-0.06	0.06	-0.01	0.13	1.00				
6.	Service offering	0.15	-0.01	0.29	0.03	-0.03	1.00			
7.	Service offering * Network capabilities	0.12	0.09	0.10	-0.02	0.23	0.28	1.00		
8.	Service offering * Network capabilities	0.07	0.14	0.10	-0.18	-0.01	0.24	0.33	1.00	
9.	Service performance	0.11	-0.08	0.18	-0.37	0.03	0.41	0.00	0.32	1.00
10.	Service performance * Product performance	0.03	0.06	-0.22	-0.04	0.06	-0.13	0.18	-0.25	-0.59

The structural analysis tests the nomological research model under study. During the analysis, we tested the model with a revenue growth variable for 2009-2010. We further validated the result

by applying a revenue growth variable for 2008-2010 to demonstrate that the results remain consistent within that timeframe. Both results are reported in table 6, but the main analysis is conducted with the 2009-2010 revenue growth variable. Survey data were collected in the middle of the January-February 2010 timeframe.

We then analyzed the mediating effects according to the process and guidelines that were established by Kenny et al. (1998). These authors suggest that mediation does not require a direct link between the independent variable and the dependent variable; rather, it requires direct links only between the independent variable and the mediating variable and the mediating variable and the dependent variable. In mediation, the effect of the independent variable on the dependent variable is channeled through the mediating variable. Finally, the interaction effects are tested and plotted according to the guidelines that were established by Mitchell et al. (2008) to demonstrate the direction of moderation. The results of this analysis are reported in table 3.

**Table 6.** Path coefficients from structural equation modelling.

Hypothesis	Path from	To	Main research model: Revenue growth 2009-2010		Controlled research model: Revenue growth 2008-2010	
			Path Coefficient (t)		Path Coefficient (t)	
	Product performance	Company sales growth	.33**	2.92	.27**	2.74
	Breadth of customer base	Company sales growth	-.10*	1.85	-.05	1.07
	Customer dependency	Company sales growth	.11	1.31	.22*	2.03
	Service offering	Company sales growth	-.23*	2.09	-.08	0.74
	Service offering	Network capabilities	.29***	3.41	.32***	3.15
	Network capabilities	Service performance	.06	0.92	.06	1.00
	Network capabilities	Company sales growth	-.03	0.45	.02	0.26
	Service performance*product performance	Company sales growth	.22*	1.98	.12	1.46
H1 <sub>a</sub>	Service offering	Service performance	.34***	3.57	.32***	3.47
H1 <sub>b</sub>	Service performance	Company sales growth	.40**	2.61	.20*	1.78
H2a	Service offering* Network capabilities	Service performance	.24*	2.00	.24*	2.00
H2b	Service offering* Network capabilities	Company sales growth	.27***	3.25	.41**	2.69
R <sup>2</sup> Service performance			.23		.22	

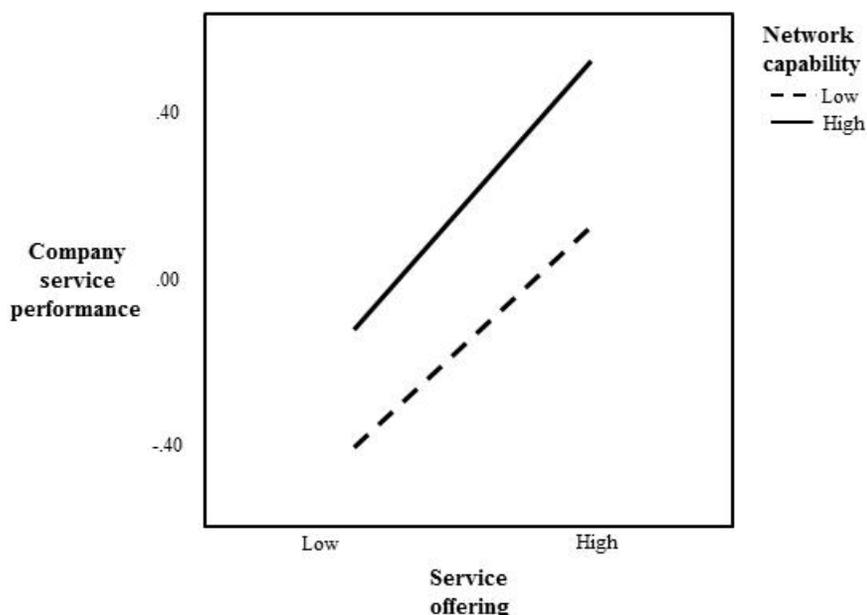
R <sup>2</sup> Network capabilities			.09		.09	
R <sup>2</sup> Company sales growth			.15		.27	
Model fit			.35		.39	

\*\*\* $p \leq 0.001$  \*\* $p \leq 0.01$  \* $p \leq 0.05$  (one-sided test)

In the current study, we controlled for seven effects on company sales growth. Interestingly, the product performance of companies appears to have a positive and statistically significant effect on company sales growth ( $\beta = .33$ ;  $p \leq .01$ ). Furthermore, the influence of the breadth of the customer base on company sales growth is statistically significant but negative ( $\beta = -.10$ ;  $p \leq .05$ ). In the industrial service business, the number of customer relationships appears to be insufficient for explaining business growth. The value that is created in those customer relationships may be more important. The influence of the company's customer dependency on company sales growth is non-significant ( $\beta = .11$ ; n.s.). Service offering demonstrates a negative and statistically significant effect on sales growth ( $\beta = -.23$ ;  $p \leq .05$ ). According to this result, service offerings have a negative direct effect on sales growth; thus, service offerings per se do not generate value in terms of sales growth. Value creation from service offerings requires capabilities that support service sales, such as the close proximity of customers. This finding is also demonstrated by the strong and statistically significant link between service offerings and network capabilities ( $\beta = .29$ ;  $p \leq .001$ ), which facilitate the links between service offerings and service performance (moderation) and between service offerings and company sales growth (moderation). However, the direct effects of network capabilities on service performance ( $\beta = .06$ ; n.s.) and company sales growth ( $\beta = -.03$ ; n.s.) were non-significant. Finally, the effect of the service performance\*product performance interaction was positive and statistically significant ( $\beta = .22$ ;  $p \leq .05$ ); this result suggests that product performance supports service performance and vice versa. The plotted moderation curve is reported in the appendix.

With regard to the main effects, the analysis demonstrated a direct effect of service offering on service performance ( $\beta = .34$ ;  $p \leq .001$ ), which had a statistically significant effect on company sales growth ( $\beta = .40$ ;  $p \leq .01$ ). These results demonstrate the importance of service offerings for service performance and the important effect of service performance on firm sales performance during times of economic uncertainty. The data confirm hypotheses 1a and 1b and indicate that service performance mediated the link between service offerings and company sales growth. The results also demonstrate the influence of service offerings on company sales growth through service performance and thus suggest that companies must be capable of capturing service revenues from service offerings.

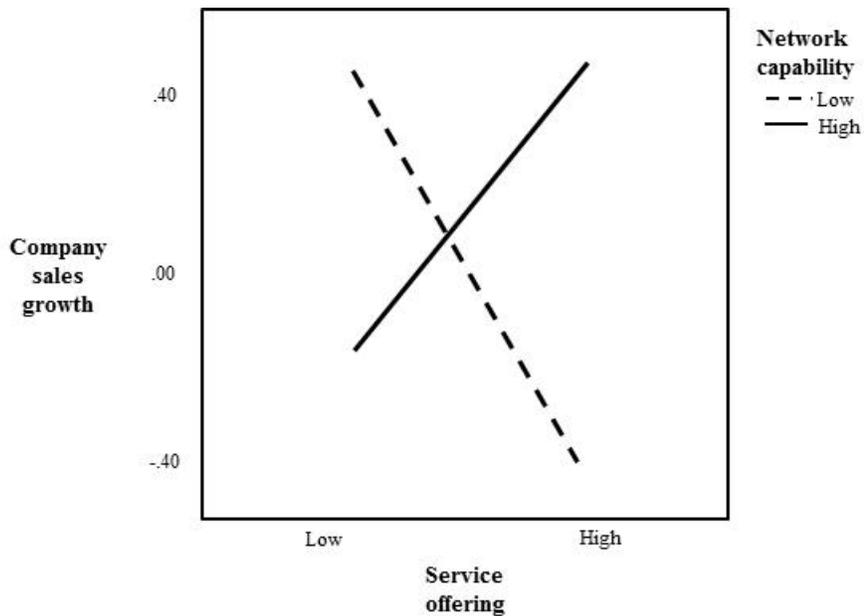
Finally, with respect to the moderating role of network capabilities, the data demonstrated the moderating effect of network capabilities on the link between service offerings and service performance ( $\beta = .24$ ;  $p \leq .05$ ) as well as between service offerings and company sales performance ( $\beta = .27$ ;  $p \leq .001$ ). This result suggested the facilitating role of network capabilities in creating and capturing value from service offerings in terms of service performance and company sales growth. However, the results were plotted to obtain a final interpretation of the interaction effects (Mitchell et al., 2008). The following figures present the plotted figures and the moderating role of network capabilities in the link between service offerings and service performance and between service offerings and company sales performance.



**Figure 2.** The moderating effect of network capabilities on the ServScope -Company service performance relationship.

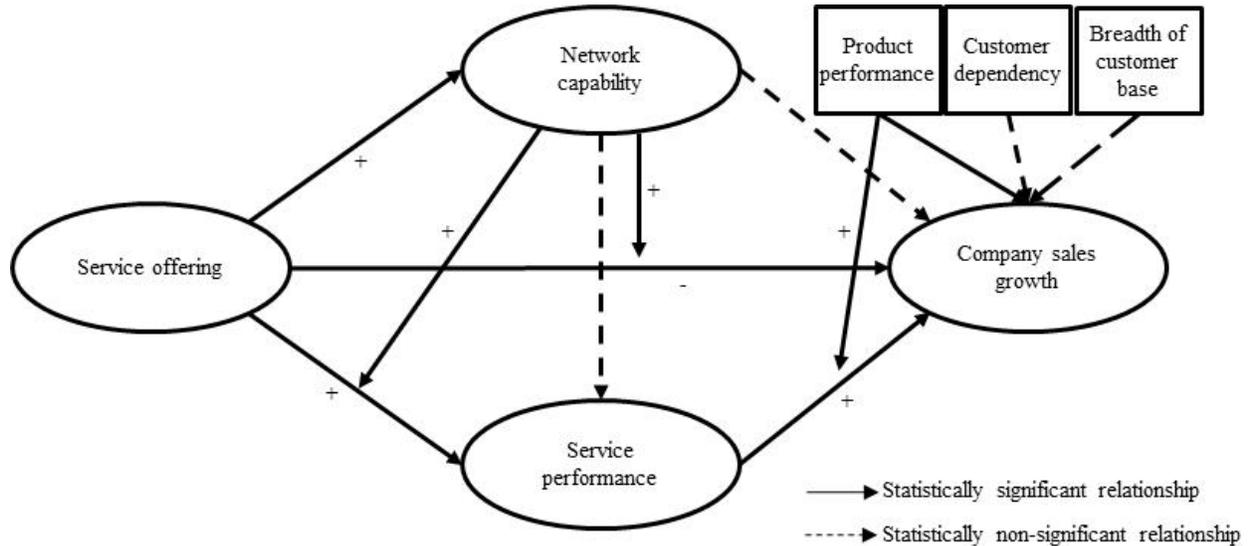
Figure 2 demonstrates the moderating effect of network capabilities on the link between service offerings and service performance. The figure demonstrates how network capabilities facilitate the influence of service offerings on company service performance. Addition of the moderation effect to the research model increases the influence of service offerings on company service performance. However, the difference between the curves (low and high network capabilities) is moderate because of the positive and statistically significant direct link between service offerings and service performance ( $\beta = .34$ ;  $p \leq .001$ ). Nevertheless, a moderate and statistically significant moderation effect ( $\beta = .24$ ;  $p \leq .05$ ) increases the influence of service offerings on service performance and validates hypothesis 2a. Therefore, network capabilities facilitate the link between service offerings and company service performance.

Figure 3 demonstrates how network capabilities affect the relationship between service offerings and company sales growth. The direct influence of service offerings was negative and significant ( $\beta = -.23$ ;  $p \leq .05$ ), and the effect of the interaction variable was positive and statistically significant ( $\beta = .27$ ;  $p \leq .001$ ); figure 3 shows the enabling effect of network capabilities. The difference between the effects of low and high levels of network capabilities is significant. Furthermore, network capabilities add to the explanatory power of company sales growth and thus demonstrate an important influence on company sales growth during periods of economic downturn. Hence, the result also confirms hypothesis 2b.



**Figure 3.** The moderating effect of network capabilities on the ServScope -Company sales performance relationship.

Finally, the model explains 23% of the variance in service performance, 9% of network capabilities and 13% of company sales growth. In terms of service performance, the direct effects explain 17%, whereas the interaction effect contributes 6% to the explanatory power of the direct effects. The direct effects explain 5% of the variance in company sales growth, whereas the interaction effects add additional 10% (4% for service performance\*product performance and 6% for service offering\*network capabilities) to the explanatory power of the direct effects. Finally, considering the global fit measure for PLS (Tenenhaus et al. 2005), we find that our model reaches an appropriate fit of .35. Figure 2 summarizes the significant and non-significant model paths.



**Figure 4.** Significant model paths.

## DISCUSSION AND IMPLICATIONS

### Theoretical contribution

Prior industrial service business research argues for positive relationship between service offer and company revenue during economical uncertainty, based on modest empirical evidence (Gebauer, Ren, Valtakoski & Reynoso 2012). However, we argue that the relationship between service and performance has been considered as a black box because it neglecting the mediating role of service revenue and moderating role of organizational capabilities. The present study aimed to fill these gaps by analyzing by highlighting the mediating and moderating effect.

As an initial contribution, the results of this study demonstrated that service offerings generate service performance, which has a significant effect on company sales growth, and thus suggested that industrial service revenues are resistant to economic recession. Thus, our study responds to calls for research on the counter-cyclical nature of industrial service revenues (Gebauer & Elgar Fleisch 2007). This study is one of the first to provide clear evidence of the influence of service performance on company sales growth during times of economic uncertainty. Although this evidence is somewhat self-evident, it is important for companies that are considering initiating a service business or a service-dominant business model (Grönroos & Helle, 2010; Lusch et al., 2010; Ramirez, 1999; Vargo & Lusch, 2008).

More importantly, our study demonstrated an important moderating effect of network capabilities on the links between service offerings and service performance and between service offerings and company sales growth. In the case of service performance, service offerings had a strong direct effect even without the favorable support of network capabilities. However, the existence of network capabilities increased the effect of service offerings on service performance; thus, the results suggest that network capabilities enable value creation from service offerings.

In terms of the link between service offerings and company sales growth, the influence of network capabilities was critical because it transformed the direct negative effect of service offerings on company sales growth into a strongly positive and statistically significant effect. Hence, the role of network capabilities enables a positive effect of service offerings on sales growth and significantly increases the explanatory power of the model. Hence, our results highlight the important supporting role of network capabilities in industrial service business. We assume that this enabling effect results from the interactive nature of service value creation, which calls for network capabilities. The role of these organizational capabilities may be highlighted by the pressure of the economic recession, in which a manufacturer and its customers must rapidly adapt to changing market conditions (Mintzberg & Lampel 1999). For instance, when product sales decreased during periods of economic recession, companies may need to engage in solution customization, which requires considerable interactive capabilities, such as network capabilities. Moreover, difficult economic conditions may highlight the importance of existing customer relationships as new customers become increasingly difficult to find. In these conditions, managing, understanding and learning from existing customers may be critical for survival. Thus, the timing of our empirical study highlights the role of network capabilities and service performance and represents an important contribution.

In addition to our contribution to the industrial service literature, the current study contributes to the developing discussion on network capabilities (Walter et al., 2006), which considers how companies manage, integrate and learn from network relationships. This study demonstrated how network capabilities enable value creation and capture from service offerings in terms of service performance and company sales growth. Thus, this study further confirms the critical role of network capabilities for organizational competitiveness in the unique context of industrial service business.

### **Managerial contribution**

For managers of industrial companies, these results highlight the importance of service revenues, the service offerings behind these service revenues, and network capabilities that enable value creation and capture from service offerings. First, to avoid the ‘commoditization trap’, industrial service companies should add services as part of their total offerings. A comprehensive and consistent service portfolio appears to have significant potential for value creation. Second, industrial service offerings enable a firm to defend against the influences of economic downturn and to remain viable despite such circumstances.

The results also highlight the importance of network capabilities, particularly in the creation and capturing of value from service offerings. Building on the results of this study and prior studies, industrial companies could consider investments in network capabilities, such as network management, integration and learning capabilities (Kim & Kim 2009; Ritter & Gemünden 2003). Industrial companies need strategies that will assist them in proactively seeking opportunities in customer relationships.

Finally, industrial service capability development begins with the service offerings and strategic decisions of companies (Antioco, Moenaert, Feinberg, et al. 2008). When a service strategy is

implemented and clearly communicated, the creation of interactive, in-depth partnerships with service customers is easier to conceive and implement throughout an organization.

### **Limitations and suggestions for further research**

As with every study, the current study is not without limitations. We apply Finnish data from the product manufacturing industry. Organizational capabilities, such as network capabilities, are culturally related; thus, further evidence is needed from other cultural contexts. In addition, evidence from more dynamic industries, such as software, would be interesting.

Our results were primarily obtained from small and medium-sized companies; thus, our interpretations may be limited beyond that specific context. However, we also consider this aspect of the research to represent one of the strong contributions of this study. Further evidence from large multinational companies would be useful. Large multinational companies can provide richer data on industrial service business models and a broader spectrum of network management practices. Moreover, the proposed between service offer and financial performance may be different due to presence of organizational rigidity.

The current study considers service offerings to be a reflection of industrial service strategies. Future research could examine measurement development consider how to better measure industrial service strategy. However, we believe that our measurement method is more fine-grained than those used in prior studies in terms of accurately reflecting the current service strategies of manufacturing companies.

Finally, we believe that network capabilities constitute important organizational capabilities that explain organizational success and survival. The current methods measure relevant dimensions, such as network management, integration and learning. These dimensions and their measurements appear to require further development. Overall, additional quantitative research is needed to examine the organizational factors that moderate or mediate the relationship between strategy and performance.

### **Conclusion**

The current study contributes to the literature by presenting evidence on the recession-resistant nature of industrial service revenues and the enabling role of network capabilities in the links between service offerings and service performance and between service offerings and company sales growth. For industrial companies, the study suggests an increased emphasis on service offerings and necessary organizational capabilities to create and capture value from the service interactions in which service value is created. Companies should consider network capabilities when searching for appropriate industrial service capabilities. Service offerings in conjunction with network capabilities provide an interesting strategic resource combination.

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**Appendix 1.** Articles found from different journal categories (based on ABS ranking).

Journals	Number of articles found based on abstract search	Number of articles found based on title search	Deleted based on abstract review	Number of articles selected for the final review
Marketing	19	10	1	18
Organization	2	0	2	0
Strategic management	11	4	0	11
Management	9	4	5	4
Innovation	3	0	1	2
Operations management	5	0	4	1
Entrepreneurship	9	0	4	5
Summary	49	18	13	41

**Appendix 2.** Means, standard deviations (SDs), parcel/item loadings, Cronbach's alpha (CA), AVE and composite reliability (CR) values.

<b>Constructs and Items (All measured on 7-point Likert scales, except the number of personnel and current ratio)</b>	<b>Mean</b>	<b>SD</b>	<b>Loadings</b>	<b>Parcel</b>
<b>Service offering (AVE: .57; CR: .79)</b>				
How significant is the share of revenue that the particular service generates for the company, if you provide the service (0= we do not produce the service at all, 1=not significant at all, 7=very significant)?				
<b>Maintenanceservices (CA: .82)</b>			.86***	
Installation service (Activeness in offering the service)	3.28	2.79		Parcel 1
Repair service (Activeness in offering the service)	3.79	2.33		Parcel 1
Product upgrading service (Activeness in offering the service)	2.03	2.26		Parcel 1
Maintenance (Activeness in offering the service)	2.13	2.49		Parcel 1
<b>R&amp;D service offering (CA: .81)</b>			.73***	
Research (Activeness in offering the service)	1.16	1.87		Parcel 2
Prototype design and development service (Activeness in offering the service)	2.82	2.63		Parcel 2
Feasibility studies (Activeness in offering the service)	.66	1.46		Parcel 2
Problem analyses (Activeness in offering the service)	1.38	2.09		Parcel 2
Analyses of a product's manufacturability (Activeness in offering the service)	1.15	1.95		Parcel 2
<b>Customer services (CA: .86)</b>			.66***	
Product demonstrations (Activeness in offering the service)	1.29	2.20		Parcel 3
Customer seminars (Activeness in offering the service)	1.85	2.25		Parcel 3
Technical user training (Activeness in offering the service)	3.13	2.51		Parcel 3
Written information material (Activeness in offering the service)	2.72	2.57		Parcel 3
Customer consulting and support by phone (Activeness in offering the service)	3.17	2.48		Parcel 3
<b>Network capabilities (AVE: .59; CR: .85)</b>				
<b>Coordination (CA: .84)</b>			.86***	
We analyze what we would like to achieve with each partner	4.26	1.62		Parcel 4
We remain informed about the goals, potential and strategies of our partners	4.83	1.13		Parcel 4
We determine in advance which possible partners with whom to discuss the building of relationships	4.85	1.52		Parcel 4
We appoint coordinators who are responsible for the relationships with our partners	5.18	1.53		Parcel 4
We regularly discuss with our partners how we can support one another in our success	4.49	1.69		Parcel 4
<b>Relational skills (CA: .86)</b>			.78***	
We have the ability to build good personal relationships with business partners	5.43	1.22		Parcel 5
We can imagine ourselves in our partners' position	4.83	1.24		Parcel 5
We can act flexibly with our partners	5.41	1.05		Parcel 5
We always solve problems that arise together with our partners in a constructive spirit	5.66	1.03		Parcel 5
<b>Partner knowledge (CA: .87)</b>			.77***	
We know our partners' markets	4.70	1.32		Parcel 6
We know our partners' products/working procedures/services	4.82	1.23		Parcel 6
We know our partners' strengths and weaknesses	4.43	1.08		Parcel 6
<b>Internal communication (CA: .77)</b>			.64***	
In our organization, employees develop informal contacts among themselves	4.46	1.28		Parcel 7
In our organization, communication is common across projects and subject areas	4.83	1.19		Parcel 7
<b>Service performance</b>				
Service business revenue from the total firm revenue	16.78	16.15		
<b>Sales performance</b>				
Sales growth rate 2009–2010 (Median value in parentheses)	15.38 (5.32)	40.05		

Control variables				
Product performance	63.61	29.84		
Number of customers	1788.11	9904.48		
Customer dependency	24.28	21.43		

\*\*\* $p \leq 0.001$  \*\* $p \leq 0.01$  \* $p \leq 0.05$  (one-sided test)

**Appendix 3.** Plotted interaction effect between service performance and product performance on supplier sales growth.

