

Servitization and Competitive Advantage

The Importance of Organizational Structure and Value Chain Position

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Overview: Servitization represents a business-model change and organizational transformation from selling goods to selling an integrated combination of goods and services. Competitive advantage is one outcome of this shift. During servitization, companies follow stages to realize services as an opportunity to differentiate from goods and achieve higher customer satisfaction. This study analyzes this transition from base, intermediate, and advanced services by presenting results from 102 senior executives in multinational companies. Our results suggest increasing interest in service-led strategies in manufacturing companies. The results also show that increasing differentiation and high customer satisfaction are fundamental to achieving competitive advantage and superior performance with services. The analysis also indicates the importance of a company's position in the value chain and the organizational structure it selects to support services in successful servitization.

Keywords: Servitization strategies; Value chain; Organizational structure

Manufacturing strategy has traditionally been based on one, or a combination, of three paradigms: vertical integration of supplier-buyer production and delivery of processes for controlling and predicting the flow of inputs and outputs, investment in research to bring to market products that are superior to the competition's, or the generation of a sustainable market position to strengthen economies of scale (Wise and Baumgartner 1999). As manufacturers move to service-focused strategies, which require additional and valuable capabilities for firms and reshape value creation channels, those foundations must be revisited.

The addition of services, or the reconception of products as services, allows manufacturers to create value across the entire product life cycle and capture it not just from the firm's current position in the value chain, but along the entire value chain, generating new revenue streams (Vandermerwe and Rada 1988). From this perspective, servitization of business can be seen as a strategic alternative that generates superior performance. However, it is not clear how servitization strategies are related to performance. We undertook an extensive quantitative study to explore the mechanisms by which servitization delivers improved performance and sustainable competitive advantage.

Background

Servitization is an organizational change process that generates new revenue streams through the provision of services associated with a firm's traditional goods (Vandermerwe and Rada 1988). Firms are increasingly exploring the value of integrating goods and services (Baines and Lightfoot 2013), motivated by anticipated improvements in profit margins and the prospect of locking competitors out of their customer base (Bustinza, Parry, and Vendrell-Herrero 2013). Servitization offers the opportunity to generate sustainable competitive advantage, since it frees firms from competing on cost alone (Porter and Ketels 2003), allowing for greater differentiation and increased customer satisfaction.

As a forthcoming special issue of *International Journal of Production Economics* (Baines, Bustinza, and Vendrell-Herrero, forthcoming) makes clear, recent studies analyzing the relationship between servitization and performance have shown a complex relationship between various performance measures and developing service innovations. Suarez, Cusumano, and Kahl (2013), analyzing the performance of 464 US software firms from 1990 to 2006, found a U-shaped relationship between service revenue and profit margin, with initial service sales leading to growth in profit margins followed by a dip in margins as service sales grow and a subsequent return to growth as service offerings mature. Kohtamäki et al. (2013) found a similar U-shaped relationship between industrial service offerings and sales growth. Kastalli and Van Looy (2013), looking at 44 subsidiaries of a multinational firm for the period 2001–2007, also found a complex relationship between service sales and performance: initial increments of service sales had a positive impact on the subsidiary's performance, but this effect gradually decreased with the growth of service sales and then increased again once service sales became large. All of these studies reveal a positive, though nonlinear relationship, between an increasing scale of service inclusion and a company's performance. Overall, researchers generally agree that moving to a services focus can provide long-term advantages for manufacturers.

Generally, companies provide services at three broad levels (Baines and Lightfoot 2013): base (product/equipment provision, spare parts provision), intermediate (help desk, training, maintenance, repair, overhaul), and advanced (customer support agreements, outcome-based contracts). Kastalli, Wiengarten, and Neely (*forthcoming*) argue that coupling servitization with product innovation processes, as advanced service offerings would require, can enhance long-term profitability. The move toward advanced services is garnering attention from researchers (Datta and Roy 2011; Spring and Araujo 2009) and managers, who are beginning to consider such services as part of core corporate offerings (Baines and Lightfoot 2013).

A number of firms have made this shift, transcending the simple addition of services to a product-focused offering, including Alstom Transport (Davies 2004), ABB (Slywotzky, Morrison, and Andelman 2002), Thales Training and Simulation (Davies 2004), and Rolls-Royce Aerospace (Howells 2000). Alstom Transport offers its customers complete transport solutions defined in terms of train availability—the trains available for service each day—for a 20-year contract, which encompasses the full life cycle of a train. ABB, a

capital goods manufacturer, has been a pioneer in services innovation, integrating its global organization so that its local, customer-facing profit centers identify customer needs and its global network of suppliers provides customized solutions that integrate products and services. Thales Training and Simulation has shifted from a traditional product focus (selling flight simulators to the defense sector) to an integrated solution focus (selling training solutions and operation services across a 25-year life cycle). Rolls-Royce Aerospace, a particularly well-known example, developed its “Power by the hour” program to provide airlines with fixed engine maintenance costs over the engine’s life cycle.

In developing service businesses, companies must address a number of issues, including organizational structure and position on the value chain. The characteristics of service delivery systems are significantly different from those of production systems (Baines and Lightfoot 2013). The structural design for service development is a critical factor in arriving at successful servitization outcomes. The move to offer advanced services usually affects cross-functional structures and involves important decisions related to the physical aspects of the delivery system, namely capacity, facilities, equipment, and technology (Roth and Menor 2003). Leaders contemplating such a move must consider the existing structure of the firm’s business functions and decide how to integrate service functions. Businesses have taken a number of approaches to this question, including (PTC 2014):

- Create a new business function to oversee all service responsibilities
- Create a new business function to handle specific services (typically, advanced services) while integrating other services into existing business functions
- Allow service operations to run in parallel with existing structures, with a single functional structure managing both products and services
- Outsource some services and allow internal business function to manage the others.

Apart from structural design issues, it is unclear whether servitization strategies really do contribute to both a stronger competitive position in the value chain and superior performance. Research has shown that servitization delivers differentiation (Baines et al. 2009) and customer satisfaction (Raja et al. 2013), but these variables mean little for companies unless they are effectively related to competitive advantage and performance. Empirical work examining this question has lagged behind more qualitative approaches due, in part, to the difficulty of collecting the comprehensive data required to quantify patterns of effects. However, these qualitative studies, often single case studies, cannot be used as a predictive tool because of the nature of their research design (Martinez et al. 2010). Quantitative approaches, such as multiple regression models, can provide predictive validity if the parameters obtained are statistically significant, but the few studies that have been done in this vein (Gebauer et al. 2010; Santamaria, Nieto, and Miles 2012) have generally been limited to one specific industry or geographical market, because data sets that cross industry or geographical boundaries are scarce. Furthermore, few studies, qualitative or quantitative, have focused on the relationship between servitization and performance. Those studies that have analyzed this relationship have

reported that servitization provides long-term advantages for manufacturers (Kastalli and Van Looy 2013; Kastalli, Wiengarten, and Neely 2014).

To determine whether and how servitization can deliver value, we undertook a study to examine the critical factors that may affect the generation of competitive advantage in servitization. Using a unique dataset of organizations operating around the globe, we performed a set of statistical analyses designed to shed light on the relationship between servitization and performance, and thus provide a better understanding of the competitive servitization landscape.

The Study

This study examines the influence of servitization on performance and the dependencies of performance on organizational structure and position in the value network (Figure 1). Specifically, we asked:

1. The influence of the degree of servitization on company's overall business performance and/or growth?
2. To what extent does servitization influence business performance through improved differentiation and higher customer satisfaction?
3. How do value chain positioning and organizational structure influence transformations toward servitization?

As a way to provide context for the study and understand the scale of the shift to servitization, we also looked at managers' intentions to continue or expand servitizing offerings and how firms are evolving from simple after-sale services to complex, advanced services.

---Figure 1 near here---

The focus of this study is industrial value chains, specifically the business-to-business (B2B) value chains in two industries: heavy/industrial equipment (upstream in the value chain, selling to other manufacturers) and medical equipment (downstream in the value chain, selling to end users). This selection allowed independent analyses of each industry, contrasted to assess the relationship between service-led strategies and value-chain positioning (upstream or downstream). It also allowed consideration of varying organizational structures for managing services in manufacturing firms.

Data were collected from an international survey of manufacturing practices conducted between in late 2013 and early 2014 by Parametric Technology Corporation (PTC), a US firm specializing in service management solutions, in partnership with Oxford Economics, a global advisory group established at Oxford University. The sample included 370 global manufacturers from industries across the entire value chain. We selected a subsample of 102 firms operating in industries positioned at the end points of the B2B value chain. Firms selected for inclusion were global manufacturers of heavy equipment ($n=52$) or medical devices ($n=50$) with annual revenues of \$1 billion or more

and were actively engaged in introducing services and in the organizational transformation required to support servitization (Table 1). In our subsample, 38 percent of heavy equipment manufacturers and 50 percent of medical device manufacturers were providing services globally; the remainder offered services within their own geographic markets. Across the full sample, 43.5 percent of manufacturers were providing services globally. The full survey methodology is available from PTC (2014).

---Table 1 near here---

The primary goal of the study was “to better understand the extent to which companies are able to create value by evolving their service strategies into an outcome-based model” (PTC 2014, p. 5). To help address this goal, the survey included questions about service and parts management, field service provision, contact centers, service knowledge and engineering, warranty practices, service collaboration, and other operational elements. Survey respondents were services executives at all levels of the corporate structure, including C-level personnel, executive vice presidents, vice presidents for services, and senior managers. All respondents were responsible for at least one cost or profit center within their company’s service business sector; they reported to different business functions within their companies, including service, sales, marketing, engineering, and operations.

For the purposes of the survey, services were defined as:

All processes and services that surround a product after the initial sale until the conclusion of the customer’s use. This includes activities that ensure equipment availability after sale, including installation, monitoring, scheduled maintenance, service parts planning and sales, the repair of complex equipment, and the education on proper operations. Service also includes the configuration and management of warranty processes, extended service contracts such as cost plus services whether in a depot setting, service center facility and/or field service operation, in addition to performance-based contracts and value-added services. (PTC 2014, p. 1)

The PTC study from which this sample was drawn established in advance five defined service areas: parts sales, extended warranty contracts, cost-plus service contracts, performance-based contracts, and value-added services. This segmentation was intended to define a service continuum, providing the basis for a model of service evolution that moves toward greater integration of services and products. To enrich the discussion of the results, the five service areas were linked to Baines and Lightfoot’s (2013) framework, which demonstrates how manufacturers can compete through servitization. In the terms of this framework, service parts sales and extended warranty contracts are base services (that is, outcomes are based on product provision), cost-plus service contracts are intermediate services (outcomes focused on product condition), and performance-based contracts and value-added services are advanced services (outcomes focused on capability).

To facilitate assessment of companies' level of service focus, respondent companies were assigned a service score for each of the service areas they indicated providing; this score captured the company's level of service focus and organization and process maturity with regard to services. The study also asked about the revenue generated by each service offering, with the goal to link financial performance with the evolution from product-focused to customer-focused models, characterized by more advanced service offerings and advanced service models.

Analysis and Key Findings

The PTC dataset is unique in its international scope and in its richness. Extracting information on the two industries on which we focused allowed for a deep, multivariate analysis of the forces driving servitization and the factors in its success at creating value and building competitive advantage.

Appetite for Servitization

We began by looking at the impetus for continued growth in servitization. Data for this analysis were drawn from responses to questions about respondents' expectations with regard to services-generated revenues in the three years following the survey compared to current services revenues. For each of the five servitization stages, respondents indicated on a scale of 1 to 5 whether the stage currently generated no (1), moderate (3), or significant (5) revenue for their firms and what they expected three years in the future.

Results of a statistical hypothesis t-test suggest an expected increase in revenue over the next three years for all service areas, with the greatest growth expected in the case of value-added services, that is, in advanced services (Table 2). Although these results reflect respondents' opinions, they are supported by market forecasts, including input from customers; 92 percent of respondents reported using business enterprise systems to develop their market forecasts. In order of managers' perception of their relevance, these systems included enterprise resource planning (ERP) systems, customer relationship management (CRM) systems, and product lifecycle management (PLM) systems. The results suggest that firms foresee a growing appetite for servitization across all stages of the services continuum, but especially in advanced services, which are expected to generate the highest revenue streams of all stages in the services continuum.

---Table 2 near here---

The projected increase in revenue across the services continuum suggests that firms are focusing on services now to facilitate the development of additional capabilities in the future, understanding that those capabilities will be the basis of sustained competitive advantage. Our results show that the proportion of companies competing through services contracts or products offered as a service was expected to increase by over 60 percent in the three years following the survey. During this period, according to our survey data, the world's largest manufacturing companies—those with revenues of more than \$1 billion—will develop their service offerings to the point where they generate 40 percent of these firms' revenues—20 percent from base, 15 percent from intermediate, and 25 percent from advanced services.

Organizational Structure

Service innovation requires comprehensive organizational transformation (Parida et al. 2014). We examined the effects of four different organizational structures related to service implementation:

- A single, dedicated service executive with all service responsibilities reporting to a C-level executive (Single 1)
- A dedicated service executive with responsibility for core services reporting to a C-level executive and non-core services integrated into other business functions or outsourced (Single 2)
- Services managed separately from and run in parallel with product-focused business functions (Separated by Functions)
- Core services outsourced and other services integrated into other business functions or outsourced separately (Outsourced)

While Single 1 and Separated by Functions both manage all services in the same way, Single 2 and Outsourced separate core from non-core services. Under Single 2, the organization creates a specific business function to develop and support those services considered core for the company, and under Outsourced, the firm develops core services in collaboration with a knowledge-intensive business services provider.

We performed a predictive regression analysis to identify the relationship between each of these structures and the two elements of competitive advantage—differentiation and customer satisfaction (Table 3). In general, our findings demonstrate the importance of organizational structure in generating competitive advantage and improved performance. Higher customer satisfaction is related to competitive advantage when services are managed separately from business functions ($\beta=0.944$, $p<0.01$), while differentiation is associated with competitive advantage when organizations have a dedicated service executive with responsibilities for core services ($\beta=0.334$, $p<0.1$) or outsource core services to a specialist provider ($\beta=0.843$, $p<0.01$).

Organizational structures Single 2 ($\beta=0.334$, $p<0.1$) and Outsourced ($\beta=0.843$, $p<0.01$) provided greater competitive advantage for firms implementing strategies based on differentiation. This finding supports previous studies suggesting that services are crucial to achieving differentiation and reinforce core competencies (Bustinza, Arias-Aranda, and Gutierrez-Gutierrez 2010). Servitization facilitates differentiation when core services are properly managed, either through a specific business function or through a specialist provider.

---Table 3 near here---

This finding has important implications for firms, since it demonstrates that choosing the right approach to managing services can reinforce competitive advantage. In some cases, the “right” approach may actually mean being flexible to use different approaches in different contexts. MAN, a company that supplies trucks and buses for transport companies, uses a variety of organizational approaches to manage its advanced services. Realizing the importance of advanced services in achieving competitive advantage, the

company developed MAN Fleet Management, a complete solution that provides services related to optimizing vehicle performance and ensuring regulatory compliance. In some countries, such as Germany, the technological solution has been developed in-house; in other markets, the tool is provided in collaboration with another firm—in the UK, MAN uses a system provided by a specialist software provider. The different approaches are driven by different technology maturity and regulatory contexts in the many countries in which the firm operates. In both instances, the objective is the same—to differentiate the company's offerings through specialized services and thus reinforce its competitive position.

Results also show how servitization can contribute to competitive advantage based on customer satisfaction. The Separated by Functions structure is highly related to higher levels of customer satisfaction ($\beta=0.944$, $p<0.01$). This suggests that managing services as part of core business functions is the most appropriate way to realize the outcomes of customer satisfaction. This supports previous work, which suggests that such a structure allows each business function to find the best way to develop effective services, whether through in-house or partnership solutions (Jaklič, Čirjaković, and Chidlow 2012), ultimately enhancing customer satisfaction. For instance, Alstom extended its front-office operations to allow personnel to be co-located in its customers' facilities, providing a customized service (Baines and Lightfoot 2013). This service, which is managed by the company's operational function, enhances customer satisfaction. Moreover, the service delivery mechanism allows the company to maintain very close contact with customers, providing opportunities to make follow-on sales and develop a deeper customer understanding. In addition to building deep customer relationships, these kinds of advanced services focused on outcome assurance can also create strong competencies for the company.

Servitization Strategies and Value Chain Position

We examined whether servitization strategies influence competitive advantage and performance by asking respondents to what extent their service businesses influenced a) differentiation and customer satisfaction and b) the company's competitive position and performance. Managers responded on a Likert scale of 1 to 5, with 1 representing a significantly negative effect and 5 a significantly positive effect.

This is an important question because previous work has shown that servitization enables product differentiation by offering services that competitors cannot copy (Vandermerwe and Rada 1988) and supports greater customer satisfaction by facilitating a deeper understanding of customers' requirements (Bustinza, Parry, and Vendrell-Herrero 2013). These, in turn, can lead to better financial performance and sustainable advantage. The results—mean scores of 3.15 indicating increased differentiation and 3.09 indicating increased customer satisfaction—demonstrate that respondents perceived that the introduction of services helped bolster both differentiation and customer satisfaction. This conclusion supports previous work showing that the provision of services has become an explicit and conscious strategy to differentiate firm's offerings (Baines et al. 2009), being customer satisfaction increased through the higher customer needs covered by integrated product-services offerings (Raja et al. 2013).

We then performed a predictive regression analysis to relate these responses to answers to questions about current competitive advantages and financial performance, to determine the variables that influence performance. Where differentiation and customer satisfaction were hypothetically given an absolute value of 0 percent, the parameters obtained through this calculation represent the percentage increase in performance value attributable to these variables. That is, if the parameter between differentiation and competitive advantage is 0.5, that means that a 100 percent change in differentiation will change performance by 50 percent.

Our results suggest that the advantages in competitive differentiation and customer satisfaction provided by servitization predict stronger market positions and better financial performance (Table 4). In particular, the mean change in performance for one unit of change in differentiation is 0.23, or 23 percent; for customer satisfaction, it is 0.45 (45 percent). This result accords with previous studies that highlight the effect of servitization on sales growth (Kastalli and Van Looy 2013).

---Table 4 near here---

To assess the importance of a firm's position in the value chain in determining the advantage gleaned from servitization, we split our sample into two segments: heavy and industrial equipment, which operates in the upstream portion of the value chain, and medical equipment, which is more downstream in the value chain (Table 5). Results of this analysis for the heavy and industrial equipment industry suggest a positive relationship between both competitive differentiation and customer satisfaction, with nearly equal predictive values ($\beta=0.480$, $p<0.01$, and $\beta=0.500$, $p<0.1$). This finding suggests that servitization enables differentiation for these firms and facilitates greater customer satisfaction. In the medical equipment industry, by contrast, no effect was found for differentiation ($\beta= -0.067$); competitive advantage was achieved only through increased customer satisfaction ($\beta= 0.541$, $p < 0.01$). According to our analysis, differentiation and customer satisfaction predict, respectively, a 48 percent and a 50 percent change in performance for upstream firms, while downstream firms achieved a 54 percent increase in performance through increased customer satisfaction. These results demonstrate that servitization strategies must be tailored to the particular context of the value chain to generate competitive advantage and increased performance.

---Table 5 near here---

The different results for these two industries show that servitization strategies facilitate different outcomes according to the firm's position in the value chain. In particular, differentiation is not related to performance in the downstream industry we looked at, medical devices. That finding could be explained by external factors, such as regulation, that can leverage or moderate servitization outcomes. For instance, the UK road transport industry has experienced several legislative changes intended to ensure transportation safety. The outcomes of services designed to address these requirements must all be the same, moderating the effect of differentiation in performance, but firms can increase customer satisfaction through tailored solutions that help downstream firms meet the demands of these regulatory challenges. This reinforces the argument that servitization

strategies must be tailored to the specific context of the value chain in which firms operate. In this context, competitive advantage can arise from knowing the particular customer requirements arising from the regulatory regime and customizing solutions to help customers address those challenges.

These results support our hypothesis that the firm's value chain position may determine what kinds of competitive advantage are possible. Establishing services to differentiate products upstream in the value chain can allow firms to extend their reach down the entire value chain. However, firms further downstream in the value chain may know end users better, allowing them to offer more customized solutions.

Conclusion

In general, our analysis offers three key findings:

1. Companies are actively engaged in moving forward along a continuum, seeking to deliver increasingly advanced services that integrate services and products more closely through performance-based contracts and value-added services.
2. When customer satisfaction is to be the source of competitive advantage, services should be developed directly by business functions. When differentiation is the key mechanism, a specialist service unit or external partner should develop advanced services.
3. Companies operating upstream in the value chain can generate higher performance through servitization strategies that provide both differentiation and customer satisfaction. Those operating downstream can achieve it only through customer satisfaction.

Manufacturing firms can develop advanced services to differentiate their offerings and increase customer satisfaction. Servitization creates new opportunities in growing markets, operating as an instrument of differentiation. Servitization also builds barriers to competition as service providers build a deep understanding of customers' experiences and needs and may also accumulate an advantage of scale.

The practical implications of this study are fourfold. First, firms are developing advanced services to offer capabilities and deliver value to customers. Second, managers should organize service production to meet the organization's specific objectives. Third, differentiation can be achieved by reinforcing core competencies through servitization. And finally, when it is applied via individual business units, servitization can contribute to customer satisfaction.

The extensive data gathered for the larger survey provide an opportunity for further analysis. It would be particularly valuable to examine whether our results apply to other industries in various positions along the value chain, explore other aspects of advanced services that may support higher performance, identify moderators that may mitigate against a transition to servitization, and map how advanced services lock out competitors by making entry into a market more complex and costly.

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Table 1.—Summary of the data set ($n=102$)

	Heavy Equipment ($n=52$)	Medical Devices ($n=50$)	Full Sample ($n=102$)
<i>Annual revenue (in \$ billion)</i>			
\$1–\$4.9	27%	20%	23%
\$5–\$9.9	21%	28%	25%
\$10–\$15	23%	16%	19%
>\$15	29%	36%	33%
<i>Headquarters location</i>			
North America	27%	20%	24%
Europe	38%	50%	45%
Asia	23%	24%	23%
Oceania	12%	6%	8%
<i>Respondent level</i>			
C-Suite	38%	36%	37%
Executive VP	4%	2%	2%
VP	12%	2%	7%
Director	46%	60%	54%
<i>Respondent function</i>			
Service	12%	18%	15%
Sales	28%	26%	27%
Marketing	31%	26%	28%
Engineering	12%	26%	14%
Operations	17%	14%	16%

Table 2.—Appetite for servitization

Service Continuum Stage	Current (Mean)	In 3 Years (Mean)	t-test
1. Service parts sales	3.12	4.05	t = 14.5
2. Extended warranty contracts	3.28	3.95	t = 10.6
3. Cost-plus service contracts	3.09	3.62	t = 7.6
4. Performance-based contracts	3.39	3.78	t = 5.2
5. Value-added services	3.39	4.08	t = 9.5

Note: All t-tests significant at $p < 0.01$.

Table 3.—Importance of organizational structure

	Single 1	Single 2	Separated	Outsourced
a. Competitive differentiation	0.404 (0.306)	0.334* (0.189)	0.019 (0.237)	0.843** (0.349)
b. Customer satisfaction	0.398 (0.382)	-0.147 (0.326)	0.944*** (0.319)	-0.084 (0.609)
Pseudo R ²	0.063	0.026	0.105	0.114
N	17	31	43	11

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4.—Predictive value of competitive differentiation and customer satisfaction for firm performance

	Full sample
a. Competitive differentiation	0.231* (0.127)
b. Customer satisfaction	0.452** (0.184)
Pseudo R ²	0.042
N	102

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5.—Importance of value chain position in advantages gained from servitization

	Heavy/Industrial Equipment	Medical Devices
a. Competitive differentiation	0.480 ^{***} (0.188)	-0.067 (0.177)
b. Customer satisfaction	0.500 [*] (0.281)	0.541 ^{**} (0.270)
Pseudo R ²	0.073	0.044
N	52	50

Note: ^{*}p<0.1, ^{**}p<0.05, ^{***}p<0.01

Figure 1.—The relationship between servitization outcomes and competitive advantage

