

# Servitized capital goods offerings: why should the customer accept?

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## Abstract

This study explores servitization from a customer perspective, focusing on the offering of performance-based contracts. Customer decisions to accept such offerings are linked to four underlying theoretical frameworks related to outsourcing decisions. The data used is based on in-depth interviews with executive managers in twelve companies in the marine shipping industry. The findings indicate that the customer motives for accepting servitized offerings can be divided into directly and indirectly cost driven. The latter include market uncertainty, dependency, technological complexity and information asymmetry. These categories are then associated with existing theoretical frameworks for further understanding.

**Keywords:** Servitization, performance-based contracts, outsourcing decisions

## Introduction

The servitization of manufacturing reflects a strategy whereby capital goods manufacturers favour the provision of ‘full maintenance’ or otherwise ‘asset management’ contracts over the offering of piecemeal after-sales maintenance services (Nordin, 2006; Johnstone et al., 2009). Previous research on servitization has focused almost unilaterally on the suppliers’ operational aspects of such a transition while implicitly assuming demand from the customers’ side (e.g. Oliva and Kallenberg, 2003). This study is part of a research programme that lifts the customer demand assumption and seeks to explore the strategic factors that influence an industrial customer’s propensity to accept servitized capital equipment offerings.

To that end, the study considers a particular type of servitized offerings, namely performance-based contracts, and argues that the customer demand assumption may only be held in a limited amount of contexts. Subsequently, the study focuses in an empirical setting where the demand assumption is unreasonable, namely the deep-sea merchant marine shipping industry, and considers the implications of customers accepting such offerings. The study finds that the acceptance of servitized offerings constitutes a form of activities outsourcing on behalf of the customer and thus argues that the propensity to accept them depends on the customer’s willingness to outsource the activities targeted by the offering in question. As such, the study then draws from the outsourcing/make-or-buy literature and identifies a host of theoretical frameworks associated with the explanation of outsourcing practices. Subsequently, the study contrasts the strategic logic and key elements of each theoretical framework against

empirical evidence drawn from interviews with executive managers in the aforementioned context of interest to examine the appropriability of utilizing said frameworks to explore the customer's propensity to accept servitized offerings.

### **Servitized capital goods offerings: Performance-based contracts**

In referring to servitized capital goods offerings, the study focuses on a particular kind, namely, the offering of performance-based contracts for traditionally sourced industrial goods (Kim et al., 2007). With the term traditionally sourced industrial goods, reference is made to capital equipment that has already been purchased by the end-user (i.e. the customer), but whose maintenance and assurance of continued operation remains to be determined. Otherwise known as availability contracts, these offerings are deemed to constitute a form of 'transactional servitization' (Alvizos and Angelis, 2010) whereby the provider seeks to alter the structure and governance regime of a given transaction. In other words, they are viewed as attempts at moving away from the spot-purchase of a good or a service towards a more long-term arrangement aimed at ensuring that the customer enjoys a particular performance or availability level from the functionality of a capital good.

The emergence and wider use of performance-based contract initiatives in a manufacturing context may be traced to the late 1990s and contextually situated within both a business-to-business and a business-to-government setting (Sols et al., 2008). In the former, the paradigm may be posited to have taken a more consolidated form through the works of The International Society of Logistics (SOLE) in performance-based supportability (Rogers, 1997). The concept of performance-based supportability reflected an effort on behalf of logistics professionals and practitioners to systematically consolidate and organize various observed best practices in the support of highly capital intensive systems with long operational life-cycles in domains such as transportation, defence, aerospace and telecommunications infrastructure (Sols et al., 2007).

In a business-to government context, the use of performance-based contracts may be viewed to have originated from initiatives of the U.S. Department of Defence (DoD) aiming at the restructuring of supplier selection procedures in order to maximize the operational effectiveness of military systems (Kim et al., 2007). Accordingly, an indirect definition of performance-based contracts is provided in Kim et al. (2007) who in citing the U.S. Defence Acquisition University note that "The essence of Performance Based Logistics [i.e. contracts] is buying performance outcomes, not the individual parts and repair actions... Instead of buying set levels of spares, repairs, tools, and data, the new focus is on buying a predetermined level of availability to meet the [customer's] objectives". Since 2003, in this specific context the use of such initiatives has been mandated as the de facto mode of operation for the acquisition of maintenance contracts (U.S. Department of Defense, 2007).

### **The assumption of customer demand and the need to lift it**

Both of the aforementioned specific contextual environments that gave rise to the use of performance-based contract initiatives, in spite of their differing operational background, share a key common characteristic. The drive behind the implementation of a performance-based contract approach to the procurement of maintenance or availability principally derives from customer demand. In the case of the U.S. Department of Defence this is evidenced by the mandated status of performance-based contracts, while in a business-to-business context it is illustrated by the customer's demand for sustainable operational performance throughout the related capital intensive system's lifecycle (Sols et al., 2007). Accordingly, most studies conducted in these

fields take the customer-driven demand as a given assumption and seek to optimize the structure of performance-based contracts under various operational conditions (e.g. Kim et al., 2007; Nowicki et al., 2008; Sols et al., 2008).

However, for a manufacturer seeking to servitize a traditionally sourced industrial good through performance-based contracts in other settings, the aforementioned optimization perspective is of little significance. When a manufacturer not operating in the aforementioned contexts, where performance procurement has been customer-driven, promotes its offerings in the form of performance-based contracts, potential customers may or may not choose to favour this new form of offering. Consequently, as customer willingness to engage in such manner remains uncertain, so does the successful implementation of the servitization initiative. Therefore, it is posited that in such settings, it would be profitable to lift the customer demand assumption and to explore the strategic factors that influence an industrial customer's propensity to accept servitized capital equipment offerings.

### **An empirical context where demand is not assured**

Exploring performance procurement, the study focuses on an industrial sector where this particular form of servitization is still an emerging proposition. The elected empirical context of interest is the international deep-sea merchant marine shipping industry and the specific capital equipment for which performance-based contracts are beginning to be offered is the vessels' main propulsion engines (Woodyard, 2009). In this context, engine designers/manufacturers are recognized as the providers of servitized capital goods offerings, while ship-owning marine shipping firms encompass the target customer audience. Archival data from the industry was utilized to examine the content of the proposed servitized offerings and informal semi-structured interviews with executive managers at potential customer shipping firms were employed to explore the strategic considerations influencing the customers' decision to accept or reject such offerings.

### **Servitized offerings requiring the customer to outsource**

According to industry archival sources, servitized offerings in the form of performance-based contracts appeared within this sector near the mid to later years of the previous decade. Such offerings are self-described as "full maintenance management" or "asset management" programs that cover all maintenance needs and guarantee high availability. Several distinguishing characteristics can be identified in the contracts. The offerings commonly include a complete coverage of the maintenance cycle ranging from schedule planning to the provision of original spare parts and manpower for any arising needs. Furthermore, within the manufacturers' marketing pitch, emphasis is put on the increasing technological complexity of the capital equipment which the manufacturers are posited to be in a better position to manage by virtue of their nature. Moreover, reference is made to beneficial synergies arising from having the whole of the maintenance function managed "under one roof". Finally, it is indicated that these offerings may be available on the basis of five, ten or fifteen year contracts where a fixed monthly rate is set as a payment for the "total-care" services rendered.

Of particular interest, however, is the acknowledgement on behalf of manufacturers - through the same archival sources- that this line of offerings marks a 'departure in maintenance programs in that these have traditionally been conducted by ship owners/operators'. At this point, it is primarily evidenced that the servitized offering does not seek to introduce new value unbeknownst to the various industry partners, but rather to restructure the governance of related transactions through the outsourcing of

the maintenance function to the manufacturers. In parallel to this recognition from the manufacturers' side, the same view is adopted almost unanimously by the potential customers. Indeed, for most managers interviewed, the question of how to view and examine performance-based contracts was almost a non-issue. The implicit assumption was that everyone perceives it to be a call to outsource.

Consequently, it is argued that the issue of accepting such an offering can meaningfully be equated with the issue of the customer accepting to outsource the relevant activities. While this attempt on behalf of manufacturers to take over "downstream" services has not gone unnoticed in the servitization literature (Wise and Baumgartner, 1999; Spring and Araujo, 2009), its implications have nonetheless received limited attention with regard to the successful implementation of servitization initiatives and have rarely been explored through the customer's perspective as an outsourcing issue.

### **Theoretical perspectives underlying outsourcing decisions**

Recognizing that the acceptance or rejection of servitized offerings depends on the customer firm's insourcing or outsourcing preferences over a particular set of activities, the study is informed by the outsourcing/make-or-buy literature with the aim of identifying a suite of relevant theoretical frameworks that may be used to explore the considerations that influence a company's decision to insource or outsource a given set of activities, and thus, potentially be inclined to accept or reject a servitized offering. Focus was put in identifying previous studies addressing the issue. Such an informative and holistic study is provided by Santos and Eisenhardt (2005). In their study, the authors summarize and collectively report on a host of strategic perspectives utilized in the examination of sourcing decisions through an analysis of organizational boundary conceptions (op. cit.).

Based on the work of Santos and Eisenhardt (2005), at least four theoretical approaches are identified as relevant for this study. The first, illustrating the imperative of efficiency is underscored by Transaction Cost Economics (TCE) arguments (Williamson, 1999; 2000) while the second, underlining the importance of autonomy, is grounded in Resource Dependency Theory (RDT) (Casciaro and Piskorsky, 2005). The third approach focuses on growth, and builds upon specific Resource-Based View (RBV) arguments (Peteraf and Barney, 2003), while the fourth revolves around the concept of Organizational Identity Coherence (OIC) (Santos and Eisenhardt, 2005). While a diverse assortment of further conceptual frameworks may very well be identified to relate to the issues addressed in this paper, resource availability reasons confine us to the consideration of only the four aforementioned frameworks that collectively make up the study's theoretical background.

Finally, it is noted that a comprehensive review and presentation of the rationale of each of the theoretical perspectives taken into account within the study falls outside the scope of this paper. However, the interested reader may refer to Poppo and Zenger (1998), David and Han (2004), Geyskens et al. (2006) and Carter and Hodgson (2006) for further insights into the Transaction Cost perspective, Pfeffer and Salancik (1978) and Hillman et al. (2009) for more information on the Resource Dependency perspective, Newbert (2007), Crook et al. (2008) and Kraaijenbrink et al. (2010) for additional resources on the Resource-Based View perspective. For further insights into the concept of Organizational Identity Coherence, the reader is prompted to refer to Santos and Eisenhardt (2005).

## Method

Having identified the relevant conceptual frameworks, the study subsequently seeks to explore each theoretical perspective's bearing with regard to the considerations taken into account in the acceptance or rejection of servitized offerings by potential customers. This customer standpoint is beneficial since it allows for greater understanding of the logic behind the demand for such offerings. To that end, as reported previously, the deep-sea marine shipping industry is elected as an appropriate empirical context of inquiry with ship-owning shipping firms identified as potential customers of servitized offerings with regard to the maintenance of their vessels' main propulsion engines.

The sampling frame consists of deep-sea dry and wet cargo shipping companies operating vessels upwards of 1000 Dead Weight Tonnage (DWT). The study's sample consists of the member-companies of two international shipping associations, namely, INTERCARGO and INTERTANKO. INTERCARGO is the International Association of Dry Cargo Shipowners, while INTERTANKO is the International Association of Independent Tanker Owners. As of 2010, both organizations' memberships collectively accounted for approximately 17,3% of the world fleet (in number of vessels) and over 35% of the world fleet's carrying capacity (in DWT). The sample includes 239 companies from a total of 38 countries (87% of the companies represent 15 countries). While the sample is technically one of convenience it is considered an acceptable compromise between practical considerations and validity requirements due to its international diversity and world fleet representation rates.

The selected companies originate from five different countries, all of which are renowned for their long naval tradition. They range in size from owning two to 35 ships, and in age from being 15 to 150 years old. For data collection purposes, nine Technical Managers, two Fleet Managers and a CEO from a total of twelve companies were interviewed using semi-structured interviews (one informant per company). Each interview was conducted by telephone and lasted about one hour. The interviews focused on the engine maintenance sourcing profile of each shipping firm (i.e. who performs and who maintains the responsibility of the capital equipment's maintenance) as well as the perceived main reasons for selecting such a configuration (i.e. which considerations affect the company's sourcing profile decision). The questions posed were wide enough to cover a wide range of different elements explored in the different theoretical frameworks. For non-disclosure and confidentiality issues of the research programme it was not possible to tape record the interviews. As such, raw data collection was performed in the form of real-time notes that were extensively written down immediately after the end of the conversation.

Afterwards, the informants' responses with regard to considerations affecting each company's sourcing profile were reconstructed (through grammatical and syntactical modifications) as complete sentences expressing each point made during the interview. Subsequently, the responses were utilized as data in a summative (manifest as well as latent) content analysis (Hsieh and Shannon, 2005) performed in order to explore the existence of any emergent structures. In using summative content analysis, the following assumptions as per Huff (1990) and Duriau et al. (2007) are acknowledged: Analysis of texts permits access to cognitive schemas, groups of words reveal underlying themes and co-occurrences of keywords may be interpreted as reflecting association between underlying concepts. To reach the coding schemes reported, two coders were employed (Author 1 and 2) while convergence was reached through a reiterative coding process (Weber, 1990). The process was repeated until acceptable inter-coder reliability was achieved. It should be noted that the emergence of structure is

expressed purely in qualitative rather than quantitative terms. Unfortunately, issues of credibility and internal consistency cannot be directly addressed through the presentation of the original textual evidence (Weber, 1990) due to the study's non-disclosure regime.

### **Emergent structure: Factors influencing the acceptance of servitized offerings**

To conduct the coding process, two content categories were identified (one manifest and one latent). The manifest content category focused on the identification of the major issue reflected in the informants' responses with regard to the selection of each company's sourcing profile. Given that all of the responses were in one way or another associated with a favourable economic outcome (i.e. all justifications supposed that the elected sourcing profile lead to lower costs for the company) the latent content category focused on the excess costs that are perceived to be avoided through each particular sourcing profile. In other words, the latent category attempted to capture the type of costs that are perceived to be avoided through each company's sourcing strategy. The following paragraphs outline, in no particular order, the structure emerging from the analysis headlined by the respective latent category themes identified.

*'Direct costs'*. The latent category theme of direct, or perhaps otherwise short-term, costs pertains to the consideration of immediate fiscal requirements in order to avoid any present excess costs. The overarching issue throughout the responses coded under this theme revolved around the clear need to select the most economical sourcing profile at hand above any and all other considerations. The key point is identified to be a complete present cost-aversion with no regard for any potential future indirect costs that may arise as a result of the company's circumstances. The associated sourcing profiles indicated variability in the preference between in-house and outsourcing arrangements. Three manifest category themes were related with this consideration: the prevailing economic climate, the shipping firm's top management identity and the shipping firm's status as a listed company in a stock exchange institution.

*'Indirect costs due to market/volume uncertainty'*. The latent category theme of indirect costs due to market or volume uncertainty (or otherwise market/volume volatility) pertains to the consideration of substantial and detrimental future costs and even the risk of firm mortality arising due to a potential exposure to the shipping market's violent downward swings. The overarching issue throughout the responses coded under this theme revolved around the need to select the most prudent sourcing profile in the face of uncertain future market conditions. The key point is identified to be a significant risk-aversion that favours procurement flexibility and self-reliance over potential immediate gains. The associated sourcing profiles indicated a significant amount of the maintenance function being conducted in-house or through short-term arm's length agreements with independent third-party service providers. Two manifest category themes were related with this consideration: supply chain balances and vessel sales and purchases.

*'Indirect costs due to dependence on locked relationships'*. The latent category theme of indirect costs due to dependence on locked relationships pertains to the consideration of excess future costs arising due to potentially binding long-term agreements that may no longer of economic benefit to the shipping firm. The overarching issue throughout the responses coded under this theme revolve around the need to select a flexible sourcing profile in the face of emerging maintenance supply market circumstances, e.g. lower service prices by other suppliers. The key point is identified to be a temperate aversion to long-term formal arrangements that favours procurement flexibility and self-reliance over potential immediate gains. The associated

sourcing profiles indicated a noticeable amount of the maintenance function being outsourced through short term arm's length agreements with almost all of the function's responsibilities being held in-house. Two manifest category themes were related with this consideration: alternative supply sources and flexibility.

*'Indirect costs due to dependence on oligopolies'*. The latent category theme of indirect costs due to dependence on oligopolies pertains to the consideration of excess future costs arising due to the potential exposure of the shipping firm to economically damaging oligopolistic supplier behaviours. The overarching issue throughout the responses coded under this theme revolve around the need to select a sourcing profile that insulates the firm from the oligopoly-like conditions developing in the marine engine industry. The key point is identified to be an aversion to short or long-term arrangements with the marine engine industry's major players, that favours self-reliance and supply chain manageability over immediate financial or other gains. The associated sourcing profiles indicated variability in the preference between in-house and outsourcing arrangements, with the latter conducted on a limited scale with independent third-party maintenance suppliers. Two manifest category themes were related with this consideration: supplier market consolidation and critical resources and competences.

*'Indirect costs due to information asymmetry'*. The latent category theme of indirect costs due to information asymmetry pertains to the consideration of excess future costs arising due to suppliers' potentially capitalizing on existing information asymmetries between the service provider and the shipping firm and, thus, engaging in undue profiteering. The overarching issue throughout the responses coded under this theme revolve around the need to select a sourcing profile that allows the firm to maintain critical know-how and competences within the bounds of the firm so as to enable it to make informed future sourcing decisions. The key point is identified to be an aversion to the loss of resources considered to be valuable assets to the firm's ability to exercise sound judgement, which favours self-reliance and synergies over immediate financial gains. The associated sourcing profiles indicated a noticeable amount of the maintenance function being outsourced through a variety of agreement structures but with almost all of the function's responsibilities being held in-house. Two manifest category themes were related with this consideration: critical know-how and competences and discernment ability.

*'Indirect Costs due to technological complexity'*. The latent category theme of indirect costs due to technological complexity pertains to the consideration of excess future costs arising due to the shipping firm unduly developing economically damaging competences in order to manage a seemingly ever increasing amount of technological complexity. The overarching issue throughout the responses coded under this theme revolve around the need to select a sourcing profile that allows the shipping to focus on its core business competences (i.e. shipping) rather than on initiatives that are perceived to burden the firm with unwarranted costs and additional managerial complexity. The key point is identified to be an aversion to managing technological uncertainty and imputing significance to non-core business processes, that favours managerial parsimony. The associated sourcing profiles indicated a significant amount of the maintenance function being outsourced through a combination of short and long-term arrangements. The manifest category theme related with this consideration was the shipping firm's top management identity.

*Other considerations.* A limited number of other considerations, mostly underlining secondary imperatives or even the absence of managerial choice also emerged from the content analysis of the managers' responses as latent category themes. These included resource scarcity and the importance of timing and coordination. The issue of resource

scarcity was associated with the absence of managerial choice in that certain desirable resources are in an irreversibly declining supply, thus leading shipping firms to particular sourcing profiles without their consent. Finally the issue of timing and coordination in maintenance operations outlined the need to effectively manage the maintenance function in view of potentially damaging contextual circumstances arising from contractual obligations unrelated to the maintenance function itself.

### **Findings: Correspondence of emergent structures with theoretical perspectives**

Having analysed the customers' views on the considerations perceived to influence the acceptance or rejection of servitized offerings, the study focuses on the appropriateness of utilizing the identified theoretical frameworks to explore the phenomenon. To this end, the strategic logic and rationale underlining each of the theoretical perspectives is juxtaposed with the structure emerging from the informant responses. The following paragraphs outline, in no particular order, the findings derived from the juxtaposition of the theoretical perspectives with the emergent structure.

The transaction cost, efficiency minded, approach to sourcing decisions is found to correspond with various issues raised in the 'indirect costs due to market/volume uncertainty, information asymmetry and technological complexity' themes emerging from the informants' responses. The issues present in the market/volume as well as technological complexity theme are found to correspond with TCE's concept of environmental uncertainty (De vita et al., 2010) which has been specified to include market/volume uncertainty (Walker and Weber, 1984; David and Han, 2004) and technological volatility (Walker and Weber, 1984; Geyskens et al., 2006). The issues present in the information asymmetry theme are found to correspond with TCE's concept of value assessment ability (Jacobides and Hitt, 2005). Finally, a further point of association is identified in the emergent issue of timing and coordination that corresponds with the TCE's concept of temporal specificity (De Vita et al., 2010).

The resource dependency, autonomy minded, approach to sourcing decisions is found to correspond significantly with issues raised in the 'indirect costs due to dependence on oligopolies' theme emerging from the informant's responses. Specifically, the aforementioned issues are found to be directly associated with the RDT concepts of dependence and power imbalance (Emerson, 1962; Casciaro and Piskorski, 2005).

The resource and competence-based view of the firm approach to sourcing decisions is found to correspond primarily with issues raised in the 'indirect costs due to information asymmetry' theme. Specifically, the issues are found to correspond with the RBV theory treatment of potentially valuable resources contributing to competitive advantage through lower costs (Peteraf and Barney, 2003). Secondly, some correspondence is further recognized in the emergent issue of resource scarcity that is an element also directly associated with the concept of valuable resources within RBV (op. cit.).

Finally, the organizational identity coherence approach to sourcing decisions is found to correspond with issues raised in the 'indirect costs due to technological complexity' theme emerging from the structure. The association is made primarily on the premise that the strategic rationale underlying the theme corresponds with the concept of identity coherence (Santos and Eisenhardt, 2005) in that the senior managers' sense of identity is indicated to directly influence a shipping firm's sourcing profile decisions.



## Conclusions

The study presented in this paper explores the issue of servitized capital goods offerings through a customer perspective by lifting the customer demand assumption present in most studies on servitization. The study focused on a particular type of servitized offerings, namely performance-based contracts, and explored the strategic factors that influence an industrial customer's propensity to accept such offerings. The study argued that the acceptance of servitized offerings constitutes a form of activity outsourcing for the customer. In recognizing that association, the study identified a host of theoretical perspectives related to outsourcing that may provide the groundwork for the study of factors influencing the customer acceptance of servitized offerings. The strategic rationale underlying each identified conceptual framework was juxtaposed with empirical evidence produced through a summative content analysis. The study found that all of the proposed theoretical perspectives resonated, in one way or another, with the empirical evidence at hand. A particular weight or hierarchy was not identified, but it may be once the data is explored further. Consequently, the examined theoretical frameworks are identified as potentially fruitful avenues towards the study of strategic factors that influence the acceptance of servitized capital goods offerings.

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