



Servitization through outcome-based contract – A systems perspective from the defence industry

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ABSTRACT

This paper provides a viable systems perspective of an outcome-based service initiative involving major manufacturers in the defence industry. The viable systems perspective allowed a coherent structuration of the complex servitization context involving provider and customer organizations. It also unveiled critical relationship mechanisms that enable synergy and facilitate the achievement of co-capability by the organizations involved. Through a case study approach, the research finds that interventions in the customer system reduce variability in the provider system as well as in the service system as a whole. The systemic interventions are implemented via key provider/customer relationships the study identifies. The relationships deal with the high level of internal variety in outcome-based service systems. A typology for the identified relationships is developed, offering a helpful basis for the purposeful planning and design of interactions aimed at developing co-capability. The paper also offers theoretical propositions defining fundamental features of outcome-based service systems. The unique characteristics of these systems addressed in this paper provide particularly useful insights concerning the implementation of this type of servitization initiative not only in the defence industry, but also in other industrial sectors where servitization initiatives involve complex configurations of provider and customer organizations.

1. Introduction

To remain competitive, manufacturing organizations have increasingly felt the need to provide uninterrupted availability of their equipment through services such as repair, maintenance and overhaul (Baines et al., 2007; Caldwell and Howard, 2011; Neely et al., 2011). In a manufacturing context, the provision of services attached to core corporate offerings is commonly referred to as servitization (Vandermerwe and Rada, 1988). Usually, most of the service contracts attached to manufacturers' offerings are equipment-based, where the customer is invoiced for the time and materials involved in equipment repairs, maintenances and overhauls (van Weele, 2002; Lee et al., 2016). The performance of such contracts is typically assessed in terms of response time to breakdowns, speed of repairs, price (Crocker and Masten, 1991) and other activities where there is a measurable way to assess the provider's performance (Dehoog, 1990). More recently, servitization has been defined as the implementation of services whose outcome is focused on capabilities delivered by product's performance (Baines et al., 2016).

Of late, there have been a growing number of service contracts attached to equipment outcomes rather than on the traditional activities involved in the service of the equipment. For example, some of Rolls-Royce's service contracts to maintain engines are paid on the basis of how many hours the engine is in the air – a concept known as “Power-by-the-Hour” (Neely, 2008; Vendrell-Herrero and Wilson, 2016). Such outcome-based contracts focus on achieving required outcomes rather than meeting a set of prescribed service levels (Bramwell, 2003). These forms of service contracts have brought an increased complexity to servitization developments, for achieving outcomes in the customer space places a requirement on the provider to have much closer cooperation and coordination with the customer, resulting in more tightly coupled linkages (Ng and Nudurupati, 2010). Despite the crucial role played by the customer, much of the servitization literature involving outcome-based service has focused upon aspects concerning the provider organization to achieve good service outcomes. There is therefore room for investigating issues concerning the involvement of the customer organization using the equipment.

This paper addresses this gap by considering provider and customer

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organizations in a more holistic way when investigating the implementation of outcome-based service contracts by manufacturing firms. The holistic analysis takes into account relationship issues concerning the provider and the customer organization, rather than simply considering just the provider or the customer. More specifically, we investigate how provider and customer organizations achieve joint capability, i.e. co-capability, in outcome-based service contract initiatives, where tightly coupled interactions between the provider and the customer are critical to achieve service outcomes (Ng et al., 2013). We argue that such a fundamental change to the value proposition of a service constitutes a major change in the configuration of the service system as a whole.

The paper extends knowledge in servitization by providing a systems perspective of an outcome-based service initiative in the defence industry. We consider a viable systems approach as a theoretical lens to analyze the linkages between processes and functions operationalized within and between provider and customer organizations in order to deliver expected service outcomes. This is based on the notion that a system's viability is determined by its capability to develop harmonic interactions between sub-systems and related supra-systems over time (Barile and Polese, 2010a; Golinelli, 2010; Pels et al., 2013).

The research findings provide valuable insights into the interaction processes through which the harmonic behaviour of provider and customer organizations can be achieved. The findings suggest that intervening in the customer system to ensure structural and systemic stability reduces variability in the provider system and, therefore, in the service system as a whole. Assisting the customer organization to build competency also implies the provider's participation in the customer system. We propose that a systemic development of customer/provider relationships enables the achievement of greater viability and stability of outcome-based service systems. The paper provides a typology of key relationships and their respective roles in this type of servitization.

The paper is organised as follows. In the next section we identify the main research gaps and key theoretical aspects underpinning the study. This is followed by the presentation of the research methodology. In the sequence, we discuss the research findings from a viable systems perspective of outcome-based services and define a typology of critical relationships to counteract variety in the service system. We conclude the paper by pointing out theoretical and practical contributions of the study and related issues for future research.

2. Theoretical basis

2.1. Outcome-based contracts (OBC)

Servitization related literature suggest that a product service system (PSS) falls somewhere in a continuum of PSS categories varying from “pure product” to “pure service” systems (Tukker, 2004). On the “pure product” extreme, traditional product oriented service contracts are anchored on billable time and materials, with the cost of spare parts sometimes included in the maintenance, repair or overhaul of equipment, and the customer is billed for the service once the activities have been performed (van Weele, 2002). On the “pure service” extreme, services replace the purchase of a product, i.e. customers purchase not a product with services, but rather they are purchasing a service instead of the product (Cusumano et al., 2015). Oliva and Kallenberg (2003) suggest that the last stage of this service continuum is expanding to relationship-based services, which calls for proper consideration of relationship aspects involving provider and customer organizations. For Bustinza et al. (2015), servitization represents a business-model change that involves organizational transformation from selling goods to selling an integrated combination of goods and services.

The combination of goods and services into service contracts are predominantly result oriented and they are intended to achieve defined outcomes in terms of “availability” of products and related service

resources. The service performance is rewarded on the basis of measurable outcomes in terms of timely availability to the customer (Neely, 2008).

Contracting for availability seeks to sustain a service system at an agreed level of readiness over a period of time through partnering arrangements between the provider and the customer (Datta and Rajkumar, 2010). For Smith et al. (2014), such partnerships require a mindset change where the customer expectations are carefully considered, particularly in outcome-based contract (OBC) contexts.

OBC has been defined as a “contracting mechanism that allows the customer to pay only when the firm has delivered outcomes, rather than merely activities and tasks” (Ng et al., 2009: 377). By definition, service outcome is the dominant value driver. The “availability” of products and related service resources is a necessary requisite for the achievement of outcomes and, as importantly, outcomes can only be achieved with the participation of the customer not only in terms of usage, but also in terms of allocating complementary resources (Ng et al., 2013). The service outcomes can be specified very broadly in terms of results, i.e. outcomes *resulting from* use, such as paying for every day that is incident-free in the security of a building, or they can be specified *in terms of* use, such as a bank of flying hours of a plane (Ng et al., 2009).

A recent study by Nordin and Kowalkowski (2010) showed that many providers underestimate the relational processes to engage customers. Firms’ inattention to these aspects arguably results in dissatisfied customers. They concluded that solution providers would benefit from replacing their product centric view of solutions with a relational process view. This view implies a strong emphasis on service value co-creation processes in which both the provider and the customer mutually align resources towards outcomes (Kale et al., 2002). In the OBC context, changing the focus from value capture to value co-creation entails the development of co-capability in provider and customer systems to yield the expected outcomes as opposed to solutions where only the provider is responsible (Ng and Nudurupati, 2010).

The inclusion of customer capabilities for a provider to achieve outcomes creates increased complexity in OBC service systems. Neely et al. (2011) recognize value-in-use and value co-creation as key features of complexity in PSS. They propose that the product-service transition makes the underlying operational delivery systems and processes more complex to manage. Zhang et al. (2016) add that capability building may involve complex patterns of coordination, cooperation and integration between people and other resources. This is particularly the case in OBC systems.

Recent studies on OBC have proposed that there is a need for understanding the different ways a firm is able to manage collaborations (Ng and Nudurupati, 2010; Ng et al., 2013), since the capability lies in the way a firm is able to achieve service outcomes collaboratively. This calls for further studies to identify underlying characteristics of provider-customer relationships in an OBC system and the related operational and managerial structure of its complex environment.

From the aspects discussed above, it is possible to identify the following problems:

- One sided perspectives of service systems such as product-oriented solutions do not provide a suitable theoretical basis for analyzing OBC systems. There is a lack of holistic approaches that capture the complexity of servitization through OBC as well as the integration aspects linking provider and customer organizations.
- The dynamics between provider and customer relationships in servitized OBC contexts are not sufficiently understood. Since the service delivery capability is achieved in the way a firm is able to achieve customer outcomes collaboratively, there is a need for further studies that investigate the different ways a firm is able to manage collaborations and achieve co-capability.

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