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Transitioning from a Goods-Dominant to a Service-Dominant
Logic: Visualising the Value Proposition of Rolls-Royce

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Introduction

To remain viable, manufacturers have bundled equipment sales with support services. This provision has been commonly referred to as the servitization of manufacturing (Neely, 2008), a stream of research often dealt with through manufacturing literature. Servitization has been discussed widely within the literature, frequently through an examination of the move by manufacturers to generate greater returns by providing through life support for their products (Vandermerwe and Rada, 1988; Matthyssens and Vandembempt, 1998; Anderson and Narus, 1995). As manufacturers add 'service' to the body of product-centric knowledge, the tendency is to treat service activities as an extension of the body of knowledge in manufacturing and engineering.

We propose that such a treatment is a consequence of a traditional manufacturing/engineering literature's view of value as that of *exchange value*, where an offering is of value only when it can be exchanged for something else, usually money. This logic implies that the manufacturer's responsibility for value creation ends upon transfer of ownership, since the 'exchangeable' unit produced is purchased through a transaction with the customer. The utilisation of the product, usually less visible to the firm and often in a location away from the firm that manufactured it, is often of secondary importance. Consequently the equipment manufacturer sees the unit of production, the product, as inherently valuable, even before its use. Such a perspective employed in the management of businesses is often referred to as a Goods-Dominant Logic (Vargo and Lusch, 2004; 2008). G-DLogic pervades contemporary business thinking due to a long history of an industrial era where economic growth was achieved through a country's ability to produce an excess quantity of goods and then export this excess to generate wealth. The political economy created by such a fundamental philosophy has been the reason for the dominant view of value as that of exchange, and the interest to increase such a value for business growth, viability and competitive advantage.

G-DLogic, when extended to services, results in the reduction of service offerings into exchangeable units such as man-hours, information and other exchangeable artefacts particularly to 'service and support' the product. While it is often acknowledged that service is more than mere exchangeable units, the service offering, often consisting of integrated tangible products and human activities, struggles with the challenge of a lack of visibility. Even if the offering could be articulated, it is often done so with the customer as a passive entity and the service as an exchangeable offering i.e. what the firm does for the customer that could be exchanged for a price, much like the way a product is an exchangeable offering.

Recently, academic literature has proposed the concept of service as value co-creation where the customer and the firm are jointly involved in co-creating value-in-use within a service system (Vargo *et al*, 2008; Payne *et al* 2008, Ng *et al*. 2011). This stream of literature proposes that value of an offering is achieved in-use, rather than at exchange. By proposing a service-dominant logic (S-DLogic), Vargo and Lusch (2004, 2008) suggest that the firm's offering is merely a proposition for the customer

to realise at point of use. Until the point of value realisation, i.e. in use, an offering is only potentially valuable.

While S-DLogic could be an attractive alternative perspective of the firm's value proposition, the prevailing G-DLogic of exchange value, particularly for manufacturers of equipment, is a mindset that is firmly entrenched and any interest to make a transition to an S-DLogic faces the challenge of seeking methods and empirical research that could aid in that transition. In addition, while it can be argued that value is ultimately that of use, the relationship between the firm co-creating value in use and what can be an exchangeable value proposition of the firm is also unclear.

Our paper presents a visualisation of the firm's offering from a Service-Dominant Logic (S-DLogic) perspective in equipment-based service. The case of *Rolls-Royce* is presented as an avenue through which to explore an alternative view of the firm's value proposition, a visualisation informed by S-DLogic that could aid organisations in their transition from G-DLogic to S-DLogic.

The study finds that the S-DLogic visualisation of the firm's value proposition in equipment-based service consists of its *contribution* to 11 value-creating activities towards value-in-use; where such value-creating activities occur whether carried out by the firm or by the customer. Understanding these value-creating activities/attributes enables the firm to construct its value proposition around the value-in-use realised by the customer. In addition, the paper finds that a S-DLogic visualisation of the value proposition allows the firm to see which resources contribute to which value-creating activity, and thereby assess the firm's own value-creating capabilities as well as the associated customer preferences for them. As a result, firms are able to better determine and align the most *effective* value proposition, in terms of fit to the customer value-creating system and the most *efficient* bundle in terms of the firm's process delivery system.

The paper extends existing literature on S-DLogic by contributing to a methodological and empirical gap. Notably, it makes abstract concepts of S-DLogic concrete, providing a pathway for future empirical work and begins the process of systematising a methodology in S-DLogic. It also provides empirical evidence of the difference between a G-DLogic and S-DLogic view of the firm's value proposition.

The paper is presented as follows: first, the concept of dominant business logics is introduced. This is then discussed in terms of the prevailing G-DLogic and the contemporary perspective of the S-DLogic. From this discussion, the following research question is developed: 'How can an alternative view of the firm's value proposition, informed by S-DLogic, be visualised?' The research is then reported through discussion of the research method and the presentation and discussion of empirical findings.

Literature Review

Business Logics

The notion of a dominant logic is based upon the concept of business schemas, which provide the linkages between a manager's mental representation of the world, as constructed from their experience, and their likely response to change (Kiesler and Sproul, 1982). A dominant logic therefore refers to the shared mental maps which groups of managers use and develop as part of core business operations. This is represented through a common mindset or shared perception of how a business works and the accepted tools and approaches which are in use by the 'dominant coalition', or senior management team, when making decisions (Prahalad and Bettis, 1986). A single dominant logic may exist in an individual firm or multiple strategically similar operations. Moreover, the number and acceptance of dominant logics is not a fixed state and more may be added or developed through processes of organisational learning (Garratt, 1987). For example, a conglomerate may consist of multiple logics and its performance may be limited by the logics accepted and in use by the senior management team. Senior management will, and can only work with and apply the logics that they know, whether they are appropriate or not (Das, 1981).

Organisational learning to develop and adopt new logics is appropriate, if not essential, for firms engaged in servitization as the transition involves a change in the underlying basis of environmental competition. Furthermore, current academic literature suggests that one of the biggest challenges facing servitization, or the product to service transition, is a change in mindset. This change is brought about by a move from offering a manufactured product to offering "*an integrated product and service offering that delivers value-in-use*" (Baines *et al.*, 2007). Many authors have noted that this change requires 'seeing value through the eyes of the customer' (Johnstone *et al.*, 2009), which has presented a significant challenge for manufacturers whose prevailing business logic is centred on product-based thinking.

This is reflected in the consideration of value prevalent in the Operations Management literature. For example, Mollenkopf *et al* (2011) consider how a firm 'creates customer value' through better management of product returns, Sawhney and Piper (2002) define customer value through the traditional operations management performance management objectives of, quality, dependability, speed, cost and high performing products. Similarly, Yung and Chan (2003) consider value as arising from improvements in operational effectiveness and efficiency. There is also a strong tradition of considering 'adding value' in the operations management (OM) literature. Davis (2011) when identifying challenges for service managers, considers how information may be used to 'add value' for customers, Noke and Hughes (2010) consider how SMEs can add value and move up the value chain through developing new product development capabilities, while Zhang and Gregory (2011) investigate nine case studies of engineering firms using the value chain concept to conduct a systematic examination of how engineering contributes to the 'creation and delivery of customer value'.

Value also plays a central role in the section of operations improvement literature that investigates the concept of 'lean'. In their seminal text on lean thinking, Womack and Jones (1996) clearly highlight the central importance of defining value from the 'perspective of the customer' (P311), and they stress that although there may be many intermediaries, value can only be defined by the end customer. However, this perspective has not always permeated other authors of lean papers. Many authors simply omit the customer perspective by making certain implicit assumptions of value and proceed with value stream mapping; see for example, the use of simulation models and value stream maps by Gurusurthy and Kodali (2011) showing the complete absence of any customer perspective of value; and a focus on value stream maps for process efficiency in a steel mill by Abdulmalek and Rajgopal (2007); and in the application of lean to service processes in a telecommunications company (Arbos, 2002). In such literature, the focus is eliminating waste and achieving process efficiency with the customer requirements considered as an exogenous variable.

In short, the established understanding of value in the OM literature is producer-centric and implicitly assumes value to be the amount of money that can be exchanged for the product. The fact that exchange happens is taken to imply that value is some 'essence' of the product created by the producer through the value chain of activities, and is improved through operations improvement activities based around lean techniques such as value stream mapping. Customer requirement for the 'essence' is taken as ex-ante to production, or manufacturing is not considered to be contextual in any way even though the use, consumption and experience of the product is what some scholars have argued where value is truly 'created' (Ng and Smith, 2012; Chandler and Vargo, 2011; Vargo and Lusch, 2008).

The scale of the challenge in changing managers' perspectives on value was evidenced by Johnstone *et al.* (2009) who found an embedded engineering culture of 'product centricity' present in a firm considered exemplar in its servitization transition, and it was manifested in a lack of understanding of customer 'needs'. Many researchers have to face the challenge of understanding customer consumption processes, (Ballantyne and Varey, 2008), with many using the S-DLogic as a lens through which to make this exploration (Pawar *et al.*, 2009; Macdonald *et al.*, 2011).

Traditional thinking, or the dominant logic, within manufacturing firms is based upon tangible units of production, be it materials or equipment, products or services. This tradition thinking dates back to the work of Adam Smith (1776) which characterises goods through their exchange value. This work should be viewed within its context, written at a time of Empire where nations became wealthy through their overseas trade. As such, exchangeable value became a characteristic of a good, transferring wealth between nations. One can argue that this understanding continues to pervade business today. Within such an understanding, goods embody specialised knowledge and are often highly valued, thus resulting in goods being characterised by their physical and tradable properties (Demsetz, 1993). This perspective also means that the manufacturer's responsibility for value creation ends upon transfer

of ownership. The unit they produce is bought through an exchange transaction by the customer and is utilised for its benefit, usually in another location away from the firm that manufactured it. Consequently, the equipment manufacturer sees the unit of production as inherently valuable; the present value of the unit is attributed to its current owner; and value is realised when the unit is exchanged between parties (Senior, 1863; Hill 1999). The underlying schemas employed in the management of businesses where value is in the exchange of unitary outputs, are those relating to a G-DLogic (Vargo and Lusch, 2004). Goods logic pervades contemporary business thinking due to its long provenance.

Research and understanding of service also has a long provenance (Parry *et al.*, 2011a). The IHIP [intangible, heterogeneous, inseparable, perishable] service characterisation has acted as a touchstone to identify service as different from products (Hicks 1942; Sasser *et al.*, 1978; Kotler, 2003). Such characterisation may be seen to identify service as 'what product is not' and could be taken to be features which characterise 'bad' products [e.g. perishable items]. Such a characterisation also provides a definition of services which makes them inclusive within G-DLogic frameworks. The differences between product and service are often located on a spectrum, with tangibility as the moderator, providing a continuum from product to service which presupposes coherent and shared underlying logics (Shostack, 1977). Detailed critique by Edvardsson *et al.* (2005) into the nature of the IHIP characterisation concludes that the IHIP characterisation is not a useful approach to the development of an understanding of value-creation. Indeed, Vargo and Lusch (2004) make reference to numerous authors who identify that a G-DLogic may block or hinder understanding of how consumers create value from combinations of 'goods' and 'services' and the interactions between them (Grönroos 1994; Kotler 1997; Normann and Ramirez 1993). As such, understanding requires a holistic systems-based approach to the value-creating space without the constraints of the boundaries of 'product' or 'services' (Ng and Briscoe, 2011). Normann (2001) sees the evolution of customers as not merely the receiver of the product or a source of business, but co-producers, co-designers and co-creators of value both to the firm and to themselves. He describes 'density' as the best combination of resources mobilised for a particular context. This density is increasingly being enabled by technology which liberates the world from constraints of time (when things can be done), place (where things can be done), actor (who can do what) and constellation (with whom it can be done). Ultimately, Normann's (2001) notion of density means that customers would have a whole world of specialist knowledge available when and where they like. In light of this perspective, businesses can be viewed as organising value creation rather than delivering 'products' or 'services'. This shifts the underlying dominant logic away from tangible output or functional processes as the central focus of exchange, a central tenet of the goods-dominant view.

In 2004, S-DLogic was proposed by Vargo and Lusch as a novel lens, proposing a new perspective of the world, markedly different from the traditional goods-dominant view (Vargo, 2011). Though S-DLogic may not claim to be a new insight into the nature of service (Sharma *et al.*, 2002; Vargo and Lusch, 2004; Bolton, 2004), the proposal provides a service perspective which places emphasis upon value outcomes

realised with customers, instead of the processes or act of provision to customers in exchange for a price (Vargo and Lusch, 2004). S-DLogic presents a set of foundational premises seen in Table 1 (Vargo and Lusch, 2004, 2006, 2008).

FP1	Service is the fundamental basis of exchange
FP2	Indirect exchange masks the fundamental basis of exchange
FP3	Goods are a distribution mechanism for service provision
FP4	Operant resources are the fundamental source of competitive advantage
FP5	All economies are service economies
FP6	The customer is always a cocreator of value
FP7	The enterprise cannot deliver value, but only offer value propositions
FP8	A service-centered view is inherently customer oriented and relational
FP9	All social and economic actors are resource integrators
FP10	Value is always uniquely and phenomenologically determined by the beneficiary

The language of S-DLogic speaks of service, not product or services. This differentiation has created some confusion and led to criticism of the work (Deighton and Narayandas, 2004; O’Shaughnessy and O’Shaughnessy, 2011). The definition of service within S-DLogic is: the process of using one’s competences (knowledge and skills) for the benefit of another party (Vargo, 2009). Whilst FP1 sets service as the fundamental basis of exchange, S-DLogic does not reject the value of goods (Lusch, 2011). FP3 identifies that they may be integral to a value-creating process and that their effective integration along with other resource is imperative for economic success (Ballantyne and Varey 2008). S-DLogic provides a dyadic view of resource and ascribes labels as ‘operand’ and ‘operant’. Operand resources are passive resources upon which operations or acts are performed. Operant resources are dynamic, largely intangible and can produce effects (Constantin and Lusch, 1994). G-DLogic is centred upon operand resource and may consider customers as operand, to be captured and acted upon (Parry *et al.*, 2011b). FP4 presents operant resources as of primary consideration as these are the resources, which act and therefore lie at the centre of value creation.

In this sense, S-DLogic reframes the perspective of resource and of value. Tangible resource is viewed as no longer inherently valuable and thus the focus of fundamental exchange. Value, under this logic, is no longer an inherent property of a unitary resource or offering, but rather the outcome from the relational enactment and interaction between the providers and receivers of an offering. In other words, value is created not in exchange, but co-created in use or in context (Chandler and Vargo, 2011, Ng *et al.*, 2012).

A G-DLogic supports the concept that value is realised in exchange, meaning that value can be manufactured by a producer as a unit of product or service which is exchanged in a market, usually for money (Vargo and Lusch, 2004). As a result, G-DLogic requires systems in which resources have an assigned, inherent or transcendent value, which is not linked to their context. Following such logic, a manufacturer can produce an object which is inherently valuable and that value can be measured as an entity 'at the factory gate'. As such, G-DLogic creates a distinct separation between producer and consumer and their value systems except at the point of exchange (Vargo *et al.*, 2008). Value chains represent a linked series of activities where the provider of an entity performs an act which adds value and then exchanges the entity with a consumer in the market who forms the next link in the value chain. Consumers destroy value and must return to the provider to supply them with further value (Vargo *et al.*, 2008). In this way, a supplier may add value for a consumer through the provision of a valued entity. Collins (1986) illustrates value-added services in his work on telecoms provision, where any value proposition beyond basic voice service is described as a 'value-added service'.

In contrast to the separation of producer and consumer found with goods-dominant thinking, S-DLogic states in FP6 that value is always co-created with the customer (Vargo and Lusch, 2008). The concept of value co-creation rejects the separation of the traditional value chain and proposes a value system where producer and customer in a relational system create value through the integration of their resource (Lusch, 2011). Co-creation further recognises that value is realised and determined by the customer in use, made explicit in FP10 (Ramirez 1999; Grönroos 2004; Payne *et al.*, 2008; Vargo and Lusch, 2008). From this perspective, customers do not make purchases for the sake of making a purchase; they seek a value proposition, which they perceive to be potentially valuable and the value of the entity is only realised within the customers' context. Until the point of value realisation, i.e. in use, the offering is only potentially valuable; the implication for the firm being that they cannot deliver value, but only offer value propositions, as stated in FP7.

Despite discussions of and arguments for an S-DLogic approach, there has been, to date, little work in trying to operationalise the logic. If a firm chooses to make a transition from a G-DLogic to a S-DLogic, what is required is to demonstrate that an empirical construction of an alternative view of the firm's value propositions, informed by an S-DLogic, is *possible*. Only then could firms gain an understanding of why and when S-DLogic might be useful and understand that they have a choice in the two logics. Awareness and knowledge of alternatives can then assist firms in examining the different logics and explore what can and cannot be known for certain, and how to progress the transition. This concept of critical evaluation is described by Kitchener (1983) as epistemic cognition; characterised as the process the individual uses to examine a problem based on their knowledge, beliefs and the truth of alternative solutions.

This paper reports on a study into the following research question: How can we construct an alternative visualisation of a firm's current offering (value proposition), informed by S-DLogic?

Visual representations have been shown to be effective to solicit assistance from others (Henderson, 1999). They are used to assist ways of knowing about a phenomenon across different communities, even though individuals may have different interpretations, and may be presented as 'boundary objects' where understanding is shared (Star and Griesemer, 1989). However, a visual representation may be labelled an 'epistemic object' if it reveals an 'unfolding ontology', remaining incomplete and emergent, giving rise to questions (Knorr Cetina 1997; 2001)

Method

The paper presents an exploratory, single case study conducted for the purpose of operationalising and investigating the firm's offering from the perspective of two logics and to construct an empirical visualisation of the firm's offering, informed by S-DLogic. A single case is deemed appropriate as exploration of the offering, particularly from two logics, requires access to multiple stakeholders and multiple data sources which help to support rich empirical descriptions (Eisenhardt and Graebner 2007, pp.25). Moreover, literature highlights two key variables of contrasting perspective between the G-DLogic and S-DLogic, resource and value. The relationships between the offerings, their proposed value and the resources required to deliver them, particularly those of bundled product and service elements, are deeply complex and multifaceted. Consequently, they are arguably best examined and understood through a variety of data sources and evidence which help to construct "as-near-as-complete" picture of the phenomenon studied (Meredith, 1998).

The case offers a holistic perspective of the offering proposed by a single contract operating in the context of defence aerospace. The contract is for the service, support and maintenance of equipment (usually termed as an *asset*) and support of a multi-purpose military helicopter, which has been in operation for over 30 years. The particular contract examined is held between Rolls-Royce and a European defence department and is deemed to be representative of contracts that bundle elements of product and support services. It also presented an opportunity for uncommon research access and maintenance (Yin, 2003). Research into the offering was carried out in two stages. The first stage studies how value is interpreted, created and achieved in use and in exchange, and the second stage constructs an alternative view of the value proposition through a conjoint study and a visualisation.

Stage 1: Investigating the Value of the offering in exchange and use

In the first stage, data was collected on value associated with the offering. Value data was conducted using a multi-method research design involving analysis of texts,

documents and secondary data, as well as recording and transcribing of interviews and meetings (Dooley 2001). The data was collected from a number of texts and documents including company marketing, customer materials and contract documents. This was supplemented with a number of primary stakeholder interviews. The selection of key informants for the interviews is critical to the process of identifying and describing the value proposed by an offering. First, 11 employees involved in the delivery of the contract were selected, primarily from asset/equipment management and customer-facing support roles as they were considered to have the strongest influence on the potential value proposed and communicated by the firm. Furthermore, given that assessment of value from an S-DLogic perspective requires the development of an understanding of value from the numerous perspectives of those engaged in the value-creating system (Mills *et al*, 2011), interviews were not only conducted from the firm's perspective (Walter *et al.*, 2001) but also from a customer's perspective (Woodruff and Gardial, 1996). Three additional interviews were conducted with members of the customer organisation; one individual was selected based on their involvement with procurement of the offering, one as an operator or user of the offering and the final customer interviewee was selected from a strategic management level. All interviews were recorded and verbatim transcribed.

Analysis

The data was then analysed to construct two perspectives of the offering; a G-DLogic view centred on exchange value and an S-DLogic view centred on value-in-use. A G-DLogic view, also referred to as 'manufacturing logic' (e.g. Normann, 2001) emphasises how firms exchange 'output units' (Chandler and Vargo, 2011). Given this orientation, the outcome of resources deployed for this view by the firm must sit at the point where exchange of such units occurs between the firm and the customer. The analysis therefore sought to abstract these *exchange units* which are seen to be inherently valuable from a G-DLogic perspective. These are units 'owned by the firm' or are seen to have 'sell-ability'. It has to be emphasised that the G-DLogic view was the prevailing view and very little analysis was necessary as the exchange units were the resources in themselves.

An S-DLogic view was also analysed with the same set of data. In the latter analysis, the firm's offering was analysed not as units of exchange, but as 'service streams' (Chandler and Vargo, 2011) i.e. activities that constituted *part* of the *whole* value-creating system where the customer's activities to achieve value-in-use is also part of the system. This meant the need to abstract high level collaborative value-creating activities (VCAs) that constitute the nature and context of realising the value-in-use of equipment, whether such activities are performed by the firm or the customer. Eleven VCAs were abstracted and are reported below. Informant feedback was sought on the 11 VCAs. First, to resolve any inconsistency and to improve content validity, the researchers conducted a participant workshop with firm employees. The study's methodology and the results of the 11 VCAs were presented. Participants received a description of the results and were asked to comment on how well each reflected their experience and practice. The same process was carried out with customer participants.

Moving to Stage 2. In answering the research question, it was not sufficient that the set of value-creating activities were articulated. Rather, since the set of value-creating activities could be performed by either the customer or the firm, an S-DLogic view of the firm’s offering must be the firm’s *part* within the value-creating activities. Finally, to complete the S-DLogic view of the firm’s offering, no longer that of selling exchange units but being part of the value-creating activities, it was also necessary to articulate the combination of the firm’s resources linked to its corresponding value-creating activities so that the resource integration for value-in-use can be demonstrated. The study then proceeded to Stage 2.

Stage 2 –Constructing and Visualising the firm’s S-DLogic Value Proposition

Discovering the firm’s Value Proposition informed by S-DLogic. In the second stage and to obtain insights of the firm’s role within the value-creating system, a conjoint survey was conducted with the customer. Conjoint analysis has been found to be a reliable method of obtaining an understanding of attributes which determine the buying behaviour of the consumer (Green and Srinivasan, 1990; Li *et al.*, 2006; Verma, 2010). In the survey, the six individuals were shown a controlled set of potential VCA bundles where the VCAs were either provided or not provided by the firm, and if provided, to trade-off the performance of the provision. Respondents were asked to evaluate and choose between potential attribute bundles rather than to simply select preferred attributes; this is considered a more realistic choice situation. Each bundle was constituted by multiple conjoined value-creating activities (see Figure 1 for an example of three bundles). By analysing how customers trade off choices between potential VCA bundles, the implicit valuation of the individual VCAs making up the firm’s value proposition in the VCAs can be determined (Verma, *et. al.* 2008).

In comparing these three equipment based service packages, which service package would you most want? (Any identical features are greyed out for convenience)

(1 of 14)

Brand	Current Brand	Other Brand	Other Brand
Equipment Performance	Exceeds Desired Performance	Exceeds Desired Performance	Exceeds Desired Performance
Technical Query Resolution Speed	Within 'Customer Required By Date'	Within 'Customer Required By Date'	Within 'Customer Required By Date'
Concessions	Granted	Not Granted	Granted
Equipment Repair Service	Off-Site Repair Service	On-Site Repair Service	On-Site Repair Service
Equipment Maintenance Service	On-Site Maintenance Service	On-Site Maintenance Service	On-Site Maintenance Service
Component Forecasting & Provisioning	Provided	Provided	Provided
Through-Life Forecasting & Planning Recommendations	Provided	Provided	Not Provided
Capability Forecasting & Planning Recommendations	Provided	Not Provided	Provided
Equipment Operating Advice	Not Provided	Provided	Provided
Equipment Configuration Advice for Operational and Contextual Capability	Provided	Provided	Provided
	C	C	C

Figure 1

Collection of Resource Data. S-DLogic requires an understanding on how entities integrate resources to create value. Hence, to empirically understand resource integration in the VCAs, actual resource data was collected from a number of secondary data sources including five years of ERP data on problem types, date/time of query, departments involved in dealing with queries, and times of work begun and completed in each department involved with the delivery of the contract. In addition, five years of detailed call centre data on employee grades answering queries and associated labour rates, as well as access to a complete set of process maps were also obtained. Since this work studies the firm's role in the VCAs, it was necessary to understand resources as distinctly different from the context where the VCAs were performed. Hence, resources are "bundles of potential service" (Chandler and Vargo, 2011, p.39) and the activities are the processes through which resources are realised to achieve value. To do so, it was necessary to uncover processes and practices that were often taken for granted by the firm, were not immediately visible or obvious, and were not part of formal processes so as to obtain a more complete understanding of resource utilisation in the firm's role within VCAs. To do so, 12 further interviews with firm employees involved with the firm's processes were also conducted.

Analysis

The resulting conjoint (trade-off) analysis measured the individual customer's perceived value of VCAs. The implicit valuation of the individual service attributes was determined by focusing on how each customer makes preferences between these service bundles. These implicit valuations were used to build a model of customer preference, including associated sensitivity of individual and bundled VCAs. The conjoint survey served to achieve an understanding of trade-offs between the VCAs and understand the customer's preference towards the firm's role within the VCAs. From the resource perspective, S-D Logics suggest that "resources are not, they become." (Vargo and Lusch, 2004, p.2). In other words, resources are only active in enabling processes. This depiction of resources as activities and the focus on process in service is the domain of operations management (Silver, 2004; Ponsignon *et al.* 2011). From the operations and process standpoint, to visualise resources as activities we first developed a process model for each of the VCAs and then developed a discrete event simulation model to visualise the impact of changes in volume and variety of inputs on the resources. The key features of the simulation models are as follows: Each query arrives at the start of a process and undergoes a series of activities. The query is processed and follows a pre-determined sequence of tasks. Activity times and arrival rates are based on statistical distributions. Costs are accumulated as work is done. One year was modelled based on five years of data for all engines. For each process, four scenarios were simulated. Two variables with two possible states each were used as key inputs to the models in order to show the degree to which resource consumption and process costs vary:

1. Query arrival variability (i.e. how even the calls arrive): "Current" state (i.e. fairly smooth) and "increased" state (i.e. more lumpy arrivals)
2. Task variability: "Current" state and "reduced" state (i.e. improved processes)

The above analysis enabled the S-DLogic view of the firm’s value proposition as a contribution to the value-creating activities consisting of activities and attributes such as credence attributes related to the Rolls-Royce brand; they are listed and defined in Table 3. The conjoint survey then generated a customer preference model based on the firm’s value proposition within the value-creating activities, linked with the resources utilised to achieve the VCAs.

We argue that the combination of the firm’s provision of the VCAs backed by resources integrated to perform them would then constitute an S-DLogic view of the firm’s value proposition. To complete the visualisation, a Microsoft Excel demonstrator tool was created to demonstrate the S-DLogic view and screen shots of the programme presented below.

Findings

Value Propositions of Two Logics

G-DLogic view of Equipment-based Value Proposition. Our findings suggest that a traditional view of the firm’s value proposition considers resources as ‘exchange units’.

Table 2: GDLogic Exchange Units

Exchange Units i.e. what we can sell you
Engine (asset) Time in terms of Manhours (skills, information and competencies are embedded within the hours) Spares Information (reports etc.)

In examining the traditional view, four primary exchange units are found: the engine which represents the core asset of the offering; time in terms of man-hours, which represent the time spent on maintaining or ‘servicing’ the asset as well as time spent on requests by customers such as constructing reports and delivering information; spares, which are again assets forming subsystems of the engine; and information such as reports and documents on asset health, monitoring, condition and use.

In combination the four exchange units created the traditional Rolls-Royce value propositions, centred on obtaining high exchange value: sales of the asset; time and materials contracts; spares inclusive contracts and availability contracts.

The four exchange units are the operand resource (resource which is passive and to be used) and the resources were made available in different contractual combinations and traded through exchange with the customer, such that the customer bought the asset, engineer’s time, spare parts or information. We argue that such a characterisation of the offering as operand resource with value in

exchange is consistent with a G-DLogic perspective. Since the focus of G-DLogic was exchange value, less attention was paid to the customer activities to realise the value proposition.

S-DLogic view of Equipment-based Value-creating Activities. In contrast to the G-DLogic view, a S-DLogic view required the abstraction of all VCAs that were shared between the firm and the customer, since the outcome of an S-DLogic view was not exchange value, but to achieve value-in-use. The list of VCAs to achieve value-in-use of equipment found in the study is presented in Table 3, together with its descriptions. While 10 of the attributes are activities, brand was included as an attribute of value creation. This was because the study found that although it may not have been manifested as activities within the system, it was perceived to have created value for the customer. These 11 VCAs are found to be the high level value-creating activities to achieve customer value-in-context of the engine, whether the activities are performed by the customer or the firm. The 11 VCAs, the resources, processes and simulation data are presented in an Excel visualisation as below:

Table 3: SDLogic Value Creating Activities/Attributes (VCAs)

	Value Creating Activity/ Attributes	Activity/ Attribute Definitions	Activity/ Attribute Performance Levels
1	Brand	Preferred brand	·Rolls-Royce ·Other brand
2	Equipment Performance	The alignment of the equipment specification to the desired level of power output, economy, durability or other performance measure.	·Exceeds desired equipment performance · Meets desired equipment performance
3	Technical Query Resolution Speed	The time taken to resolve a customer technical query	·Delivered within 'Customer Required By' date ·Not guaranteed within the 'Customer Required By' date

4	Recovery Concessions	The issue of a technical variance to the original design specification of a piece part or a repair process to allow the continued usage or repair of the equipment enabling a quicker return to serviceable status	<ul style="list-style-type: none"> ·Recovery concessions granted for specified time and/or serialised parts ·Recovery concessions not granted
5	Equipment Repair Service	fixing the piece of equipment should it become out of order or broken (repair, unscheduled or casualty maintenance)	<ul style="list-style-type: none"> ·On-site repair ·Off-site repair ·No repair service provided
6	Equipment Maintenance Service	Performing routine actions which keep the equipment in working order (known as scheduled maintenance) or prevent trouble from arising (preventive maintenance).	<ul style="list-style-type: none"> ·On-site maintenance ·Off-site maintenance ·No maintenance service provided
7	Component Forecasting & Provisioning	A service which forecasts the usage of parts for a particular group of equipment to allow for timely provision of these parts.	<ul style="list-style-type: none"> ·Provided ·Not Provided
8	Through-Life and Obsolescence Forecasting & Planning Recommendations	Forecasting and planning recommendations for a group of equipment in order to maximise the potential usage at minimum cost over the equipment's life time.	<ul style="list-style-type: none"> ·Provided ·Not Provided

		Recommendation of solutions to minimise disruption at equipment end of life.	
9	Capability Forecasting & Planning Recommendations	<p>Provision of advice on the optimal configuration of a group of equipment to ensure maximum equipment availability at minimum cost.</p> <p>Advice on working equipment numbers needed to support a group of equipment month to month.</p>	<ul style="list-style-type: none"> · Provided · Not Provided
10	Equipment Operating Advice	Advisory service on how to operate the equipment to maximise performance and longevity.	<ul style="list-style-type: none"> · Provided · Not Provided
11	Equipment Configuration Advice for Operational and contextual Capability	<p>Advice on the optimal configuration of a group of equipment for a specific operational requirement</p> <p>e.g. - these engines, with these flying hours, in this combination on wing to allow you to fly X helicopters, X miles, in X conditions</p> <p>Advice on the optimal configuration of a group of equipment for a specific operational requirement to achieve a specific task</p>	<ul style="list-style-type: none"> · Provided · Not Provided

		<p>in a specific context</p> <p>e.g. - these engines, with these flying hours, in combination with other platforms to achieve a successful mission (that could be variable in nature) in an optimized manner</p>	
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The Importance and Sensitivity of the Customer to the Value-creating Activities

Figure 2 shows the 11 VCAs, including VCA importance and VCA sensitivity, as well as the process map and process costs of achieving the activities. Taking the ‘Technical Query Resolution Speed’ VCA as an example, the screenshot (as shown in Figure 2) displays the importance of and the sensitivity to this attribute for the customer, as well as the internal process model and process costs of delivering to this VCA.

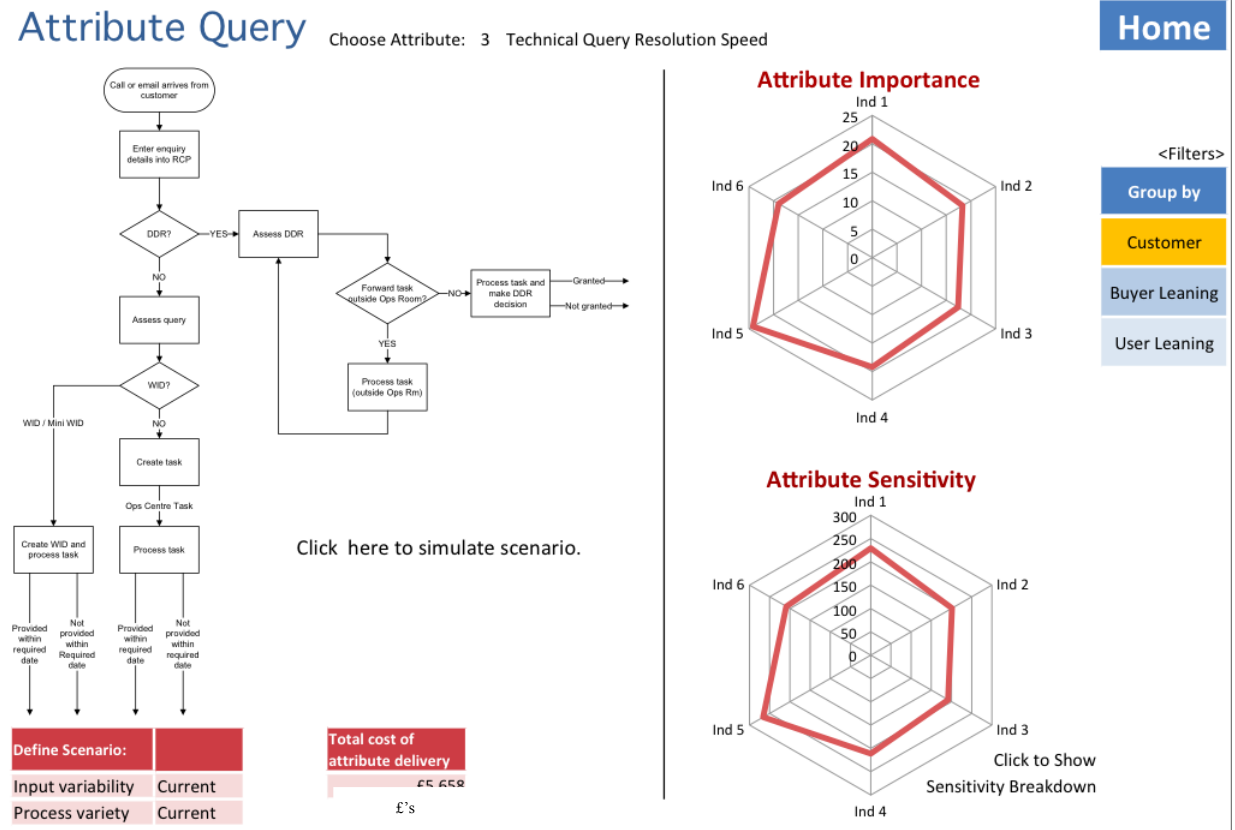


Figure 2: Attribute Query screenshot

VCA importance represents the relative importance, as a percentage, of a particular attribute for the six individuals that compose the selected customer group, where

the 11 VCAs are equal to 100%. It is possible to display VCA importance for the entire customer group as well as for the specific sub-groups within it, presented here as two groups, buyers and users (i.e. Buyer Learning and User Learning). This helps to reveal differences in attribute importance within the customer community.

VCA sensitivity refers to the extent to which a customer’s preference score is affected by a change in attribute level. In other words, attribute sensitivity shows the impact that changes to the service bundle have on customer-perceived value.

Finally, the process map of the activity is displayed on the left hand side of the screen (see Figure 2). Resource consumption and process costs associated with the delivery of each VCA were estimated using simulation models. For each process model, four scenarios were set up to visualise the impact of a change in key process variables (i.e. arrival rate variability and task variability) on total VCA costs. The demonstrator was populated with the seven simulation models. We found that we could then visualise four different cost calculations for providing each of the 11 VCAs. This approach takes the logic of Penrose (1959) when she describes how the same set of resources could contribute to different heterogeneous services. By showing the processes and costs, we are able to demonstrate the resource integration to achieve each of the 11 VCAs, necessary for an S-DLogic visualisation.

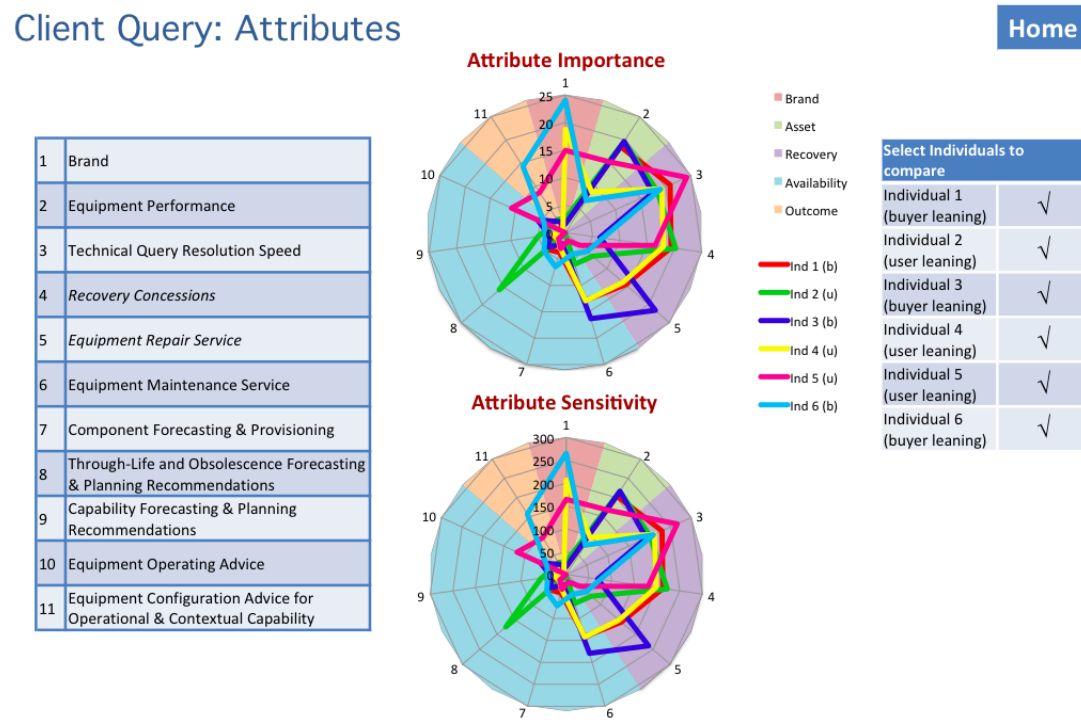


Figure 3: Attributes screenshot

The Firm’s Value Proposition in the Value-creating Service System

For each bundle created, four different scenarios can be simulated to assess the impact on process costs.

Visualising the Effectiveness and Efficiency of the Firm's Value Proposition

The study presents an S-DLogic view of the firm's value proposition within the customer's value-creating system towards outcomes, and demonstrates the firm's resource integration activities to achieve these value-creating activities. We demonstrate how an S-DLogic view could directly link value-creating activities to the costs and resource integration processes of the firm. Through the S-DLogic view, we can determine the most effective bundle from the perspective of the customer (i.e. outside-in) where the firm's value proposition could fit. The *effective* bundle is defined as the first best feasible bundle of VCA offered by the firm that provides the highest possible benefits (in terms of part-worth utilities) to the customer community, as it best fits with the customer's capability and resources. However, the S-DLogic view also shows the resource integrate necessary to contribute to the value-creating system. This we demonstrated through the simulation models of the processes supporting each value-creating activity, and we can determine the most *efficient* bundle from the perspective of the firm's resources and costs (i.e. inside-out) for the firm to provide. Ultimately, the S-DLogic view of the firm's value proposition informs the selection of the optimal bundle of VCA provided for the customer, the one that contributes most effectively to the customer system and the firm's delivery efficiency.

The Role of the Physical Asset in the Firm's SDLogic Value Proposition of Equipment-based Service

From analysing the interviews and constructing the visualisation, our findings suggest that an asset designed and engineered for a transfer of ownership and to obtain exchange value (G-DLogic) so that the customer achieves the outcomes on their own through the use of the asset, may not be the most optimal asset for achieving outcomes together with the customer (S-DLogic), where such outcomes are now the joint responsibility of both parties. In other words, an asset designed and engineered for achieving outcomes together with the customer allows the firm to have access to some of the customer's resources in use contexts that could change how an asset could be better designed for use.

Discussion

The paper integrates an operations management approach in process mapping, design and simulation with choice modelling in B2B marketing. This is achieved through a systemic visualisation of resource integration for value-in-use, while locating the firm's value proposition within the system. It is argued that this synthesis can be viewed as an operationalisation of S-DLogic. As a result, our research contributes to a methodological and substantive gap in current research in S-DLogic. Through our visualisation of an S-DLogic-informed value-creating service system and resources integrated to achieve them, our study found that it is possible

to articulate what 'effectiveness' is i.e. the fit of the firm's resources to the customer's resources to co-create value-in-use for equipment. Focusing on value-in-use activities results in the understanding of how to adapt, modify and enhance the firm's value proposition for greater effectiveness and efficiency. Our study also shows that an S-DLogic view of the value-creating service system reveals a tension between the effectiveness and efficiency of the firm's service provision.

The findings suggest that transitioning to a S-DLogic through the creation of a visualisation enables the firm *to see what resources contribute to which value-creating activities that are aligned to the value realised by customers in use and in context without predetermining the boundaries of what is served by the 'product' and what is served by the 'service'*. By being able to visualise the firm's offering as only part of the value system, the firm can see how the propositions fit with the customer's mission. Being able to see the resources that contribute towards these hybrid value propositions suggest that the firm needs to re-evaluate its internal structures and boundaries so as to understand which resources are most useful to create capabilities that are less easily replicable.

Our study seeks to disassociate exchange value from exchangeable units, and suggests exchange to be more aligned to value-in-use. In this sense, our study endorses the S-DLogic view that "service is the fundamental basis of exchange" (p.7, Vargo and Lusch, 2008). Our visualisation proposes that the firm's contribution to value-creating activities (its service) becomes a value proposition and the customer's contribution to the value-creating service (*its* service) is what creates the value-in-use. In this sense, the firm's service is exchanged for money so that the customer can 'complete' its value-creating activities, but it is also possible that the money could be substitutable with other resources in the value-creating service system, if the customer could appropriate resources from elsewhere.

However, the study is not without limitations. In particular, our study has not yet investigated the impact of the visualisation on a transition from G-DLogic to S-DLogic in terms of managerial mindsets. In other words, no changes to Rolls-Royce's practices or mindset were implemented or investigated as a result of the visualisation. Furthermore, operationalising a S-DLogic perspective and constructing a visualisation required a research facilitator; this was not a process Rolls-Royce could have engaged in independently. It should also be noted that the paper explores an alternative view informed by S-DLogic; this is only one representation of an alternative logic.

In addition, the research conducted in this paper is exploratory and therefore future research should not only seek to address this limitation but should test the findings through further case research into other outcome-based contracts. Future work to test the wider applicability of the 11 value-creating activities in other equipment service domains would be suited to a methodology that includes multiple cases of both literal and theoretical replication, whereby each case should be selected so that it either predicts similar results (a literal replication), or produces

contrary results to those found in this paper but for predictable reasons (a theoretical replication) (Yin, 1984, pp. 48-49).

Implications

The findings showed that S-DLogic was useful when there is a need to have a *complete understanding of the value-creating service system*, where all entities, be they product or people, rendered a 'service' or a 'competency' into the system for outcomes. This is especially important to inform not merely process design of the human activities, skills or the supply chain, but also the design of the equipment itself. This is especially so when there is a need to re-evaluate the role of the product, processes and technologies in the system. S-DLogic became a valuable approach in considering the design and reconfiguration of the whole system, and proposed that in considering the whole value-creating service system, products within the system could be re-designed not merely for function (which is a contextual) but for what the products should afford (Gibson, 1979). In other words, an S-DLogic approach is useful when there is a need for a product to be redesigned and re-engineered for its relationship with other products and with human activities. By doing so, the product becomes an enabler of value creation. Our study suggests that the visualisation of the S-DLogic-informed value-creating service system can assist the firm in changing mindsets and interrogating existing boundaries and legacy knowledge in manufacturing as well as emerging new business models. In terms of the research applicability, this study suggests a re-examination of value for the service sector as well. For example, financial products, tourism and hospitality and transportation offerings may consider their value proposition only in terms of what they give for what they get i.e. a 'provisioning' mentality, rather than being an organiser of value creation with the customer. 'Provisioning' is analogous to a product that is exchanged and it may set the boundary of an offering such that it could limit potential innovation. Since customer resources are critical to creating value, firms should see their role as enabling, facilitating and designing contexts of experience, appropriating customer resources through collaboration and cooperation. Such a mindset creates a more engaged customer and evolves the firm towards understanding what new value propositions could be possible within the customer space.

Conclusion

This paper has sought to operationalise some of the key aspects of S-DLogic, most notably focusing on the constructs of value and resources. We have explored this through a single case; Rolls-Royce which has provided access to a rich source of internal data and enabled the research team to also conduct independent data collection with their customers.

The results of this comprehensive exercise have been developed into a visualisation of the firm's value propositions. This visualisation depicts both the highest possible bundle of benefits for the customer along with the resources and their costs

associated with delivering those bundles. When brought together, these outside-in and inside-out perspectives enable the identification of the optimal bundle of VCA from both customer and firms' perspective.

The visualisation and its attendant supporting framework are key steps in developing an approach for operationalising S-D Logic. Such an approach would have a number of stages with activities and questions, pro-formas etc that can subsequently be integrated in such a way as to produce a complete step-by-step approach to visualising value co-creation. At the heart of any process methodology of this type is the final integrating framework.

The integrating framework produced by this research is depicted in the visualisation where we draw together the customer utilities/preferences and the costs of providing those bundles in one framework. In line with the guidance provided by Neely *et al* (2000), this framework requires further testing in additional case companies and subsequently facilitator free testing. All of this must then be documented and disseminated. This will be the focus of the next phase of this research.

References

Abdulmalek, F. and Rajgopal, J. (2007), "Analyzing the benefits of lean manufacturing and value stream mapping via simulation: A process sector case study", *International Journal of Production Economics*, Vol. 107, Iss. 1 (May) 2007, Pages 223–236.

Anderson, J.C. and Narus, J.A. (1995), "Capturing the value of supplementary services", *Harvard Business Review*, Vol. 73 No. 1, pp. 75-83.

Arbos, L. C. (2002), "Design of a rapid response and high efficiency service by lean production principles: Methodology and evaluation of variability of performance", *International Journal Of Production Economics*, Vol. 80, Iss. 2, pp. 169–183.

Baines, T., Lightfoot, H., Evans, S., Neely, A., Greenough, R., Peppard, J., Roy R., Alcock J., Angus J., Bastl M., Cousens A., Irving P., Johnson M., Kingston J., Lockett H., Martinez V., Micheli P., Tranfield D. and Wilson H. (2007) "State-of-the-art in product-service systems", in *Proceedings of the institution of mechanical engineers, Part B: Journal of Engineering Manufacture*, Vol. 221, No. 10, pp. 1543–1552.

Ballantyne, D. and Varey, R.J. (2008) "The service-dominant logic and the future of marketing", *Journal of the Academy of Marketing Science*, Vol. 36, No. 1, pp. 11-14.

Bolton, R. (2004) "Invited commentaries on 'Evolving to a New Dominant Logic for Marketing'", *Journal of Marketing*, Vol. 68, No. 1, pp. 18–27.

Chandler, Jennifer D., and Stephen L. Vargo (2011), "Contextualization and value-in-context: How context frames exchange" *Marketing Theory*, Vol. 11, No. 1, pp. 35-49

Collins, H. (1986) "Value-added services", *Facilities*, Vol. 4, No. 5, pp. 13.

Constantin, J. A. and Lusch, R.F. (1994), *Understanding Resource Management*, The Planning Forum, Oxford, Ohio

Das, R. (1981), *Managing Diversification: The General Management Perspective*, Macmillan, New Delhi

Davis, M.M., Spohrer, J.C., and Maglio P.P. (2011), "Guest editorial: How technology is changing the design and delivery of services", *Operations Management Research*, Vol. 4, No. 1-2, pp. 1-5.

Deighton, J. and Narayandas D. (2004), "Commentary on "evolving to a new dominant logic in marketing". *Journal of Marketing*, Vol. 68, No. 1 (January 2004), pp. 18-27.

Demsetz, H. (1993), *The Nature of the Firm. Origins, Evolution and Development*, Oxford University Press, New York

Dooley, D. (2001), *Social research methods*, Prentice-Hall, Upper Saddle River, New Jersey.

Edvardsson, B., Gustafsson, A. and Roos, I. (2005), "Service portraits in service research: A critical review", *International Journal of Service Industry Management*, Vol. 16, No. 1, pp. 107-121.

Eisenhardt, K. and Graebner, M. (2007), "Theory building from cases: Opportunities and challenges", *Academy of Management Journal*, Vol. 50, No. 1, pp. 25-32.

Garratt, R. (1987), "Learning is the core of organisational survival: Action learning is the key integrating process", *Journal of Management Development*, Vol. 6, No. 2, pp. 38 – 44.

Gibson, J.J. (1979), "The theory of affordances", in *The Ecological Approach to Visual Perception*, Houghton Mifflin, Hopewell, pp. 127–143.

Green, P. and Srinivasan, V. (1990), "Conjoint analysis in marketing: New developments with implications for research and practice," *Journal of Marketing*, Vol. 54, October, pp. 3-19.

Grönroos, C. (1994), "From marketing mix to relationship marketing: Towards a paradigm shift in marketing", *Asia-Australia Marketing Journal*, Vol. 2., August, pp. 9–29.

Grönroos, C. (2004), "The relationship marketing process: Communication, interaction, dialogue, value", *Journal of Business & Industrial Marketing*, Vol. 19, No. 2, pp. 99–113.

Gurumurthy, A. and Kodali, R. (2011), "Design of lean manufacturing systems using value stream mapping with simulation: A case study", *Journal of Manufacturing Technology Management*, Vol. 22, Iss: 4, pp.444 – 473.

Henderson, K. (1999), *On Line and On Paper: Visual representations, visual culture and computer graphics in design engineering*. MIT Press, Boston.

- Hicks, J.R. (1942), *The Social Framework*, Oxford University Press, Oxford, England.
- Hill, P. (1999), "Tangibles, intangibles and services: A new taxonomy for the classification of output", *Canadian Journal of Economics - Revue Canadienne D Economique*, Vol. 32, No. 2, pp. 426–446.
- Johnstone, S., Dainty, A. and Wilkinson, A. (2009), "Integrating products and services through life: an aerospace experience", *International Journal of Operations & Production Management*, Vol. 29 No. 5, pp.520 – 538.
- Kiesler, S. and Sproul, L. (1982) "Managerial response to changing environments: Perspectives and problem sensing from social cognition", *Administrative Science Quarterly*, Vol. 27, No. 4, pp. 548-570.
- Kitchener, K., (1983), "Cognition, meta-cognition, and epistemic cognition: a three-level model of cognitive processing", *Human Development*, Vol. 26, No. 4, pp. 222-32.
- Knorr Cetina, K. (1997), "Sociality with objects: social relations in postsocial knowledge societies", *Theory, Culture and Society*, Vol. 14, No.4, pp 1-30.
- Knorr Cetina, K. (2001), "Objectual practice" in Schatzki, T.R., Knorr Cetina, K. and Von Savigny, E. (Eds) *The Practice Turn in Contemporary Theory*, Routledge,London, pp. 175-188.
- Kotler, P. (1997), *Marketing Management: Analysis, Planning, Implementation, and Control*, 9th ed., Prentice Hall, Upper Saddle River, NJ.
- Kotler, P. (2003), *Marketing Management* , 11th ed., Prentice-Hall, New Jersey.
- Li, S., Madhok, A., Plaschka, G. and Verma, R. (2006), Supplier-Switching Inertia and Competitive Asymmetry: A Demand-Side Perspective, *Decision Sciences*, Vol. 37 No. 4, pp 547-576
- Lusch, R.F. (2011), "Reframing supply-chain management: A service-dominant logic perspective", *Journal of Supply Chain Management*,Vol. 47, No. 1, pp. 14-18.
- Macdonald, E., Wilson, H., Martinez, V. and Toossi, A. (2011), "Assessing value-in-use: A conceptual framework and exploratory study", *Industrial Marketing Management*, Vol. 40, No. 5, pp. 671–682.
- Matthyssens, P. and K. Vandenbempt (1998), "Creating competitive advantage in industrial services," *Journal of Industrial and Business Marketing*, Vol. 13(4/5), pp. 339-355.
- Meredith, J. (1998), "Building operations management theory through case and field research", *Journal of Operations Management*, Vol. 16 No. 4, pp. 441-454.
- Mills, J., Parry, G., and Purchase, V. (2011) "Understanding the clients aspirations and fears", in Ng, I., Parry, G., Wilde, P., McFarlane, D., Tasker, P. (Eds.) *Complex Engineering Service Systems: Concepts and Research*, Springer, London, pp. 87-103.
- Mollenkopf, D.A., Frankel, R. and Russo, I. (2011), "Creating value through returns management: Exploring the marketing–operations interface", *Journal of Operations Management*, Vol. 29, pp. 391-403.

Neely, A. (2008), "Exploring the financial consequences of the servitization of manufacturing", *Operations Management Research*, Vol. 1, No. 2, pp. 103–118.

Neely, A.D., Mills, J.F., Platts, K.W., Richards, A.H., Gregory, M.J., Bourne, M.C.S. and Kennerley, M.P. (2000), "performance measurement systems design: developing and testing a process based approach", *International Journal of Operations and Production Management*, Vol. 20, No. 10, pp. 1119-1146.

Ng, I., Parry, G., Maull, R., McFarlane, D. (2011) "Complex engineering service systems: A grand challenge", in Ng, I., Parry, G., Wilde, P., McFarlane, D., Tasker, P. (Eds.) *Complex Engineering Service Systems: Concepts and Research*, Springer, London, pp. 439-454.

Ng, I.C.L., Smith, L.A. and Vargo, S.L. (2012), "An integrative framework of value," paper presented at the 12th International Research Conference in Service Management, 29 May – 1 June, La Londe les Maures, France.

Ng, Irene C.L. and Briscoe, G. (2011) "Value, variety and viability: designing for co-creation in a complex system of direct and indirect (goods) service value proposition", paper presented at the 2011 Naples Forum on Service - Service Dominant Logic, Network & Systems Theory and Service Science: Integrating Three Perspectives For A New Service Agenda, 14-17 June, Capri, Italy.

Noke, H. and Hughes, M. (2010), "Climbing the value chain: Strategies to create a new product development capability in mature SMEs", *International Journal of Operations & Production Management*, Vol. 30, No. 2, pp. 132-154.

Normann, R. (2001), *Reframing Business: When The Map Changes The Landscape*. Wiley, Chichester, New Sussex.

Normann, R. and Ramirez, R (1993), "From value chain to value constellation: Designing interactive strategy," *Harvard Business Review*, Vol. 71, No. 4, pp. 65–77.

O'Shaughnessy, J. and O'Shaughnessy, N.J. (2011), "Service-dominant logic: A rejoinder to Lusch and Vargo's reply", *European Journal of Marketing*, Vol. 45, No. 7/8, pp. 1310-1318.

Parry, G.C., Newnes, L., Huang, X. (2011a), "Goods, Products and Services", in Macintyre, M., Parry, G.C., Angelis, J. ,*Service Design and Delivery*, Springer, London, pp. 19-30.

Parry, G., Mills, J., and Purchase, V. (2011b), "Analyzing a complex service enterprise", in Proceedings of the 2011 Academic Conference on Complex Service Systems, 21-23rd September, Cambridge, UK.

Pawar, K. S., Beltagui, A. and Riedel, J.C.K.H. (2009), "The PSO triangle: designing product, service and organisation to create value", *International Journal of Operations & Production Management*, Vol. 29 No. 5, pp.468 – 493.

Payne, A., Storbacka, K., and Frow, P. (2008), "Managing the co-creation of value", *Academy of Marketing Science*, Vol. 36, No. 1, pp. 83–96.

Penrose, E. T. (1959), *The Theory of the Growth of the Firm*. John Wiley, New York.

Ponsignon, F., P. A. Smart and R. S. Maull (2011), "Service delivery system design: characteristics and contingencies", *International Journal of Operations & Production Management*, Vol. 31, No. 3, pp. 324-349.

Prahalad, C.K. and Bettis, R.A. (1986) "The dominant logic: A new linkage between diversity and performance", *Strategic Management Journal*, Vol. 7, No. 6, pp. 485-501.

Ramirez, R. (1999), "Value co-production: Intellectual origins and implications for practice and research", *Strategic Management Journal*, Vol. 20, No. 1, pp. 49-65.

Sasser, W.E. Jr, Olson, R.P., Wyckoff, D.D. (1978) *Management of Service Operations*, Allyn and Bacon: Boston Senior, N.W. (1863), *Political Economy* 5th ed. Charles Griffin and Co., London.

Senior, N.W. (1863), *Political Economy* 5th ed. Charles Griffin and Co., London.

Sharma, D., Lucier, C., and Molloy, R. (2002), "From solutions to symbiosis: Blending with your customers", *Strategy and Business*, Vol. 27, No. 2), pp. 38-43.

Shawney R., and Piper, C. (2002), "Value creation through enriched marketing-operations interfaces: an empirical study in the printed circuit board industry," *Journal of Operations Management*, Vol. 20, pp. 259-272.

Shostack, L. (1977), "Breaking free from product marketing", *Journal of Marketing*, April, Vol. 41, No. 2, pp. 73-80.

Silver, E. A. (2004), "Process management instead of operations management", *Manufacturing and Service Operations Management*, Vol. 6, No. 4, pp. 273-279.

Smith A (1776), *The Wealth of Nations*, Books I-III, Wiley, Chichester, England.

Star S. L. and Griesemer, J. R. (1989) "Institutional ecology, 'translations' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39", *Social Studies of Science*, Vol.19, No. 3, pp. 387-42 .

Vandermerwe, S. and Rada, J. (1988), "Servitization of business: Adding value by adding services", *European Management Journal*, Vol. 6, No. 4, pp. 314-324.

Vargo, S.L. (2011), "Market systems, stakeholders and value propositions: Toward a service-dominant logic-based theory of the market", *European Journal of Marketing*, Vol. 45, No. ½, pp. 217-222.

Vargo, S.L. and Lusch, R.F. (2004), "The four service marketing myths: remnants of the goods-based, marketing model", *Journal of Service Research*, Vol. 6, No. 4, pp. 324-335.

Vargo, S. L. and Lusch, R. F. (2006), "Service-dominant logic: What it is, what it is not, what it might be", In Lusch, R.F. and Vargo, S.L. (Eds.), *The Service-Dominant Logic of Marketing: Dialog, Debate, and Directions*, ME Sharpe, Armonk, NY, pp. 43-56.

Vargo, S.L. and Lusch, R.F. (2008), "Service-dominant logic: continuing the evolution", *Journal of the Academy of Marketing Science*, Vol. 36, No. 1, pp. 1-10.

Vargo, S.L., Maglio, P.M., Akaka, M.A. (2008), "On value and value co-creation: A service systems and service logic perspective, *European Management Journal*, Vol. 26, No. 3, pp. 145-152.

Verma, R. (2010), Customer Choice Modeling in Hospitality Services: A Review of Past Research and Discussion of Some New Applications, *Cornell Hospitality Quarterly*, Vol. 51, No. 4, pp. 470–478.

Verma, R., Plaschka, G. R., Hanlon, B., Livingston, A. and Kalcher, K. (2008), Predicting customer choice in services using discrete choice analysis, *IBM Systems Journal*, Vol. 47, No. 1, pp. 1-13.

Walter, A., Ritter, T., and Gemunden, H. G. (2001), "Value creation in buyer–seller relationships: Theoretical considerations and empirical results from a supplier's perspective", *Industrial Marketing Management*, Vol. 30, No. 4, pp. 365–377.

Womack, J. and Jones, D.T. (1996 [2003]), *Lean Thinking*, Free Press, Simon & Schuster, New York.

Woodruff, R. B. and Gardial, S. F. (1996), *Know your customer: new approaches to understanding customer value and satisfaction*. Blackwell Business, Cambridge, MA.

Yin, R. K. (1984), *Case Study Research, Applied Social Research Methods Series*, Sage Publications, Beverly Hills, CA

Yin R. K. (2003), *Case Study Research: Design And Methods*, 3rd Ed., Sage Publications, London.

Yung, W. and Chan, D. (2003), "Application of value delivery system (VDS) and performance benchmarking of flexible business process reengineering", *International Journal of Operations & Production Management*, Vol. 23 No. 3, pp. 300-15.

Zhang, Y. and Gregory, M. (2011), "Managing global network operations along the engineering value chain", *International Journal of Operations & Production Management*, Vol. 31, Iss. 7, pp.736 – 764.