

Original citation:

Raja, Jawwad, Chakkol, Mehmet, Johnson, Mark and Beltagui, Ahmad. (2018) Organizing for servitization : examining front- and back-end configurations. International Journal of Operations and Production Management, 38 (1). pp. 249-271.

Permanent WRAP URL:

<http://wrap.warwick.ac.uk/92259>

Copyright and reuse:

The Warwick Research Archive Portal (WRAP) makes this work by researchers of the University of Warwick available open access under the following conditions. Copyright © and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable the material made available in WRAP has been checked for eligibility before being made available.

Copies of full items can be used for personal research or study, educational, or not-for profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

Publisher's statement:

"This is a post-peer-review, pre-copyedit version of an article published in International Journal of Operations and Production Management. The definitive publisher-authenticated version Raja, Jawwad, Chakkol, Mehmet, Johnson, Mark and Beltagui, Ahmad. (2018) Organizing for servitization : examining front- and back-end configurations. International Journal of Operations and Production Management, 38 (1). pp. 249-271. is available online at: <https://doi.org/10.1108/IJOPM-03-2016-0139> "

A note on versions:

The version presented here may differ from the published version or, version of record, if you wish to cite this item you are advised to consult the publisher's version. Please see the 'permanent WRAP url' above for details on accessing the published version and note that access may require a subscription.

For more information, please contact the WRAP Team at: wrap@warwick.ac.uk



**Organizing for servitization: examining front- and back-end
configurations**

Journal:	<i>International Journal of Operations and Production Management</i>
Manuscript ID	IJOPM-03-2016-0139.R3
Manuscript Type:	Research Paper
Keywords:	Servitization, Solutions, Organisational design, Front- and Back-end configurations, Case study

Organizing for servitization: examining front- and back-end design configurations

Abstract

Purpose: Research suggests that to structure for servitization, organizations should separate their front- and back-end units by reference to high versus low contact activities. However, these prescriptions are overly simplistic and largely based on anecdotal evidence that fails to account for context. This research addresses the need to explore the design decisions taken by organizations in support of servitization.

Design/methodology/approach: A large-scale exploratory case study was conducted, consisting of embedded cases in three divisions of a UK-based, global manufacturing firm.

Findings: Each division provided different combinations of offerings (i.e. product-, use- and result-oriented). The findings suggest that front-end / back-end configurations differ according to the offering and can exist concurrently within the same organization, challenging the assumption that different configurations within an organization are not possible. The findings show that underlying contextual factors, such as the complexity and temporality of the offering, as well as the power of the customer, have implications for the structuring of servitizing organizations.

Research limitations: This is a context-specific, qualitative case study conducted within a large original equipment manufacturer, yet the findings are analytically generalized.

Originality/value: In identifying the relevance of different design decisions in terms of customer contact, decoupling of activities and grouping of employees, the findings challenge the extant view that organizations simply split activities between the front- and back-end functions. The research identifies an additional design configuration - Integrated Project Teams – involving a dominant customer dictating organizational interfaces. This research exposes the need for further investigation into how to organize for servitization in project-based contexts.

Keywords: Servitization, solutions, front- and back-end units, organizational design, case study, integrated project teams (IPTs).

Acknowledgments

The authors would like to thank the three anonymous reviewers and the Associate Editor for their insightful and valuable feedback.

1 Introduction

Manufacturers increasingly combine products with services to improve their competitive advantage (Wise and Baumgartner, 1999; Baines et al., 2009), a strategy known as servitization (Vandermerwe and Rada, 1988). When a manufacturer servitizes, it provides different offerings—from relatively uncomplicated ‘product-oriented’ services, such as maintenance (Baines et al., 2009) to more complex, result-oriented services or solutions, where the product is ‘substituted’ with a service (Cusumano et al., 2015). It is suggested that to undergo the transformation from manufacturer to service provider, manufacturers should modify the way in which they are organized to deliver services and solutions (*cf.* Galbraith, 2002, 2005; Sawhney, 2006).

Providing services and solutions requires organizations to reconfigure around specific customer needs and: *“traditional structures and capabilities have to be transformed and continuously refined”* (Davies et al., 2006, p. 40). This entails restructuring the organization to facilitate the delivery of services and solutions (Windahl and Lakemond, 2006; Storbacka, 2011). Beyond outlining the usual separation of front- and back-end activities (Foote et al., 2001; Galbraith, 2005; Davies et al., 2006; Sawhney, 2006), these structures—or organizational designs—have been overlooked to date. Service Operations Management (SOM) research has examined organizational design in relation to customer contact and the decoupling of front- and back-end activities (*cf.* Chase and Tansik, 1983; Metters and Vargas, 2000; Zomerdeijk and de Vries, 2007; Ponsignon et al., 2011), yet these decisions for servitized firms have not been discussed in detail.

Some research suggests that front- and back-end activities should be separated (Oliva et al., 2012), yet the reality of firms competing in different customer segments with different product and service offerings may challenge such reductionist prescriptions (Johnstone et al., 2009; Kowalkowski et al., 2015). A more nuanced understanding is required to better comprehend how the different markets in which servitized manufacturers operate shape those design decisions. This will provide insights for organizations in determining which activities to separate and which to couple. Furthermore, limited attention is given to the potential barriers and challenges organizations encounter in attempting to servitize (Johnstone et al., 2009; Kowalkowski et al., 2015). Importantly, there are significant costs and risks associated with the misalignment of services within organizational structures, as manufacturers are exposed to more internal failure risks, increasing the likelihood of bankruptcy (Benedettini et

al., 2015). Thus, the aim of this research is to investigate the organizational designs used in servitization.

This research contributes by reporting on an in-depth case study (Eisenhardt, 1989), revealing the organizational structures for servitization in an industrial business organization operating in multiple markets. It examines organizational design considerations—namely, the degree of customer contact, decoupling and grouping decisions—within three operating divisions of the case firm. This study reveals that the type of servitized offering (i.e. product-, use- or result-oriented), along with the complexity and temporality of what is being delivered, affects front- and back-end structures. By showing that different configurations can exist concurrently within the same organization, the current knowledge on organizational design considerations for servitization is extended. This challenges the existing assumptions on front- and back-end configurations which claims “*firms that focus on one strategy are more effective than firms that attempt multiple strategies*” (Metters and Vargas, 2000, p. 677). Instead, this research shows that, depending on the market, different organizational designs can exist. This research also suggests organizational design can be dictated by a dominant customer rather than an internal organizational decision. Finally, it identifies an additional design configuration in the form of Integrated Project Teams (IPTs), which begin to address the lack of theorizing of the way project-based organizing may influence design decisions for servitizing manufacturers.

The paper is structured as follows. Section 2 reviews the extant literature pertaining to servitization and the structuring of front- and back-end arrangements. A description of the research method employed follows. Detailed descriptions of each operating division are then provided, followed by a cross-case analysis. Finally, the insights gained from, and the limitations of, the study are presented.

2 Literature review

Motivations for servitization coalesce around competitive, economic and demand perspectives (Baines et al., 2009). Accordingly, manufacturers attempt to develop new revenue streams from services to accompany traditional product offerings (Wise and Baumgartner, 1999; Oliva and Kallenberg, 2003; Davies et al., 2006; Cusumano et al., 2015; Kowalkowski et al., 2015). The provision of servitized offerings is also considered a new means of achieving competitiveness in the marketplace (Foote et al., 2001; Fang et al., 2008; Kastalli and Van Looy, 2013). Moreover, service revenues from an installed asset base can

provide a buffer against fluctuating demand cycles (Windahl et al., 2004) and customers can also directly demand servitization from providers (Vandermerve and Rada, 1988).

Various terms are used to describe the different offerings that manufacturers provide when deploying a servitization strategy (*cf.* Baines and Lightfoot, 2013; Cusumano et al., 2015). These classifications include product-, use- and result-oriented services (Mont, 2002; Tukker, 2004), or smoothing, adapting and substituting services (Cusumano et al., 2015), and base, intermediate and advanced services (Baines and Lightfoot, 2013). Such classifications generally assume a simplistic linear trajectory (see Kowalkowski et al., 2015) from product support services to advanced services in the form of solutions. The most advanced form of servitization is considered to be the provision of a customized ‘solution’ to achieve better outcomes (Sawhney, 2006; Tuli et al., 2007) and customer satisfaction (Raja et al., 2013).

To synthesize these classifications, Table 1 explicates the product, use and result-oriented services (*cf.* Mont, 2002; Tukker, 2004). Product-oriented services are similar to smoothing and adapting services or base services, whereas use- and result-oriented services are in line with substitution-type services (Cusumano et al., 2015) or intermediate and advanced services (Baines and Lightfoot, 2013). Table 1 shows that these different offerings involve varying degrees of integration between providers and customers, and differ in terms of their complexity and outcomes. Firms may adopt different trajectories towards service growth (*cf.* Kowalkowski et al., 2015) and also provide a combination of offering types to customers (Windahl and Lakemond, 2010).

Table 1: Classifications and description of offerings provided under a servitization strategy

<i>Classification</i>	<i>Description</i>
Product-oriented	<ul style="list-style-type: none">▪ Provided at customer’s expense to support a product purchased from a manufacturer.▪ Typically includes support services such as maintenance, repair and sale of spare parts.▪ Require minimal integration between customers and suppliers.
Use-oriented	<ul style="list-style-type: none">▪ Can involve the lease or rental of a product, designed to ensure customers gain the benefits of the product without the responsibility of ownership.▪ Typically demand some integration as processes are often outsourced by the customer to the supplier.
Result-oriented	<ul style="list-style-type: none">▪ The agreement for result-oriented services specifies the end-result to be delivered, not the technical specifications of the product delivering it.▪ A price is paid upon achievement of the specified result, leaving the manufacturer to determine the most cost-effective means of delivery.▪ Can be delivered via a project-based organization.▪ Requires very high levels of integration between the focal firm, customers and suppliers.

2.1 The process of servitization: implications for organizational structure

In the early stages of an offering lifecycle, the services are more likely to be smoothing or involve adapting the offering to new uses and contexts, yet when the market matures, simple services, such as maintenance and training, dominate (Cusumano et al., 2015). The transition to servitization necessitates organizational design changes to support the provision of servitized offerings. This is described as a significant managerial challenge “*as services require organizational principles, structures, and processes new to the product manufacturer*” (Oliva et al., 2012; p. 310), yet these services should match with “[...] *organizational structures, processes, and resources of the manufacturing firm*” (Gebauer et al., 2012; p.128). There are significant risks associated with the ‘mismatch’ between the services offered and the organizational structures delivering them. Benedettini et al. (2015) show that implementing servitization increases the risk of bankruptcy, due to the provision of services exposing manufacturers to more internal failure risks than simple product supply.

Servitization also requires diverting valuable resources from traditional manufacturing towards the creation of new organizational structures, competencies and human capital (Oliva et al., 2012). Hence, “*achieving initial results from service initiatives takes longer than products, so [manufacturers] may underestimate the probability that implementing the*

1
2
3 *necessary organizational structure and change processes will lead to the expected results”*
4 (Benedettini et al., 2015; p. 953). Despite the recurring risks and resultant costs and failures
5 associated with evolving organizational structures for servitization, there is little empirical
6 research that describes how manufacturers should structure their organizations when
7 implementing servitization (Johnstone et al., 2009; Gebauer et al., 2012; Oliva et al., 2012).

8
9
10
11
12 Prior research suggests that manufacturers who add services to their portfolio need to re-
13 examine their internal structures (*cf.* Oliva and Kallenberg, 2003; Sawhney, 2006). It has
14 been suggested that front- and back-end units should be established (Galbraith, 2005; Davies
15 et al., 2006; Storbacka, 2011; Oliva et al., 2012), with front-end operations focusing on
16 customers, segments or markets and the back-end concentrating on products, capabilities and
17 technologies (*cf.* Sawhney, 2006). Whilst this separation has been examined in the context of
18 the provision of ‘pure’ services for some time (e.g. Chase, 1981; Larsson and Bowen, 1989),
19 little empirical research has been conducted within a servitization context. Servitization is
20 often treated as a homogenous concept, with little inquiry into, or recognition of, the
21 differences between offerings. More specifically, the differences in complexity and
22 temporality of offering types challenge the simplistic assumption that servitization only
23 results in a front- and back-end split. More complex and longer-term offerings are likely to
24 result in more advanced organizational designs, beyond simple separation. The front- / back-
25 end configurations required for different offering types have yet to be explored empirically.
26 That is the focus of this work.

27 28 29 30 31 32 33 34 35 36 37 38 *2.2 Considerations for structuring front- and back-end activities*

39
40 The discussion of front- and back-end activities has focused on specific sectors, including
41 banking (e.g. Metters and Vargas, 2000), financial services (e.g. Zomerdijsk and de Vries,
42 2007) and energy (e.g. Ponsignon et al., 2011). According to Zomerdijsk and de Vries (2007),
43 when structuring front- and back-end activities, three separate design decisions can be
44 considered, being:

- 45
46
47
48
49 1. Which activities require high customer contact?
- 50
51 2. Which activities can be decoupled?
- 52
53 3. Which activities should be grouped together?

54
55
56 The first design decision entails determining the degree of required customer contact. High
57 contact activities require high interpersonal skills and need to be located close to the
58
59
60

customer, whilst low contact activities may be separated for greater efficiency gains (Chase, 1981). To ascertain what is required, it is necessary to determine the degree of customer contact *“required in a particular service delivery process, or deciding which activities are carried out with customer contact and which ones without”* (Zomerdijsk and de Vries, 2007, p. 111).

The second design decision involves coupling or decoupling front- and back-end activities. Chase and Tansik (1983) recommend that activities are decoupled between front and back, similar to the separation of high contact and low contact activities identified in respect of the first decision. However, Metters and Vargas (2000) propose that there are other ways of structuring activities than simply separating front and back. They suggest that under different strategic conditions, alternative decoupling approaches may be appropriate. These conditions may include cost minimization or service excellence, which do not necessarily require the separation of high and low contact activities, as suggested by the customer contact approach (Metters and Vargas, 2000).

The third design decision concerns the grouping of employees. While the second decision may suggest that front- and back-end activities should be decoupled, the third decision implies—without an attempt to reconcile the two decisions—that functional and/or market groupings need also to be considered (Zomerdijsk and de Vries, 2007). This inference suggests that a trade-off is required between the effectiveness achieved through grouping (or co-locating) back-end activities compared to the efficiency (or cost savings) achieved through functional or market grouping.

These descriptions of different design considerations are predominately derived from a pure service context. Servitization, however, is more complex than pure service provision, as it:

- Takes place over a longer period (Johnson and Mena, 2008);
- Has high levels of technological uncertainty (Nordin and Kowalkowski, 2010);
- Requires co-creation with suppliers and customers (Chakkol et al., 2014), and;
- The integration of different types of knowledge (Matthyssens and Vandenbempt, 2008).

When servitizing, manufacturers should change their organizational structures (Davies et al., 2006; Galbraith, 2005), with some research recommending the separation of customer- and product-oriented units (Foote et al., 2001; Galbraith, 2002; Oliva and Kallenberg, 2003; Davies et al., 2006). This is like earlier calls to separate operations and customer contact (*cf.*

Chase, 1981). It is proposed that existing manufacturing units should continue to manufacture products, yet also become part of the back-end functions. Meanwhile, customer-facing service units should be developed in order to introduce the requisite capabilities to deliver services (Davies et al., 2006). Such a structure is proposed as an 'ideal' approach to organizing for servitization and derives from the underlying assumption that a greater customer focus is required. Different divisions within a firm may also adopt different approaches, depending on contextual factors (Johnstone et al., 2009). This suggests that there is no single best way to organize a firm; rather, that different forms are appropriate, depending on the particular operating context (Woodward, 1965). For result-oriented (or 'solutions') services, systems integration is necessary to address customer needs (Davies and Hobday, 2005). Delivering solutions predicates the need to integrate with customers at a high level and in different ways (Davies, 2004; Davies et al., 2007).

The organizational structures discussed thus far do not, however, fully explain project-based firms providing solution offerings (Davies and Hobday, 2005), nor do they account for the complexity arising from the consortia within which they typically operate. Consortia may consist of internal and external organizational units, including suppliers and customers (Davies et al., 2006). Project-based consortia provide offerings that typically deploy Integrated Project Teams (IPTs), which are finding popularity in the delivery and support of high technology and high value capital goods in the UK public sector (NAO, 2002; Kapletia and Probert, 2010). These teams "*can be rapidly assembled, disbanded and reassembled around each customer's business problem*" (Davies et al., 2006, 2002, p. 44). For example, the UK Ministry of Defence (NAO, 2002) demands the concurrent development and management of technology, as opposed to a transactional purchasing approach in which maintenance is separated. Concurrence necessitates the formation of IPTs, which are responsible for overseeing both the manufacturing of a product and the management of its availability throughout a specified product life-cycle (Kapletia and Probert, 2010). These may include a systems integrator (Davies, 2004; Davies et al., 2007), which typically has design and manufacturing capabilities but is not necessarily involved in the co-ordination and delivery of support services. Importantly, IPTs are required to engage with the different internal and external actors, in a similar manner to that discussed in the solutions literature (*cf.* Windahl and Lakemond, 2006), and are responsible for delivering the project and jointly co-creating value (Nordin and Kowalkowski, 2010; Jaakkola and Hakanen, 2013). Thus, the

extant literature suggests a range of different groupings and couplings for different offerings which have not yet been examined.

The front- / back-end configurations for service and manufacturing contexts and the three different servitized offerings, drawn from the literature, are synthesized in Table 2. The following section describes the research method employed in this study.

Table 2: Organizational design choices for manufacturing: pure service and product-, use- and result-oriented services indicated in the relevant literature

<i>Type of offering</i>	Organizational Design Choice			<i>Examples</i>	<i>Indicative references</i>
	<i>Degree of customer contact</i>	<i>Decoupling of front-end / back-end activity</i>	<i>Grouping</i>		
Pure product (manufacturing)	Transactional contact	No decoupling	Function	Stand-alone product offering e.g. high value equipment such as trains, trucks, jet engines	Hayes and Schemenner, 1978
Pure service	Higher degree of customer contact based on contracts and largely standardized	Limited decoupling	Function	Pure service offering e.g. finance, consultancy, legal services	Chase and Tansik, 1983; Metters and Vargas, 2000; Zomerdeijk and de Vries, 2007; Ponsignon et al., 2011
Product-oriented services	Limited relationship with customer	Limited decoupling	Function	Support services are provided in addition to the product e.g. trucks sold with repair and maintenance contracts	Mont, 2002; Tukker, 2004; Baines et al., 2009; Bastl et al., 2012
Use-oriented services	Increase in high contact activities	Decoupled front-end / back-end activities	Market	Customer pays for the use of product and service mix e.g. Rolls Royce 'Power by the Hour' or Performance-Based Logistics	Mont, 2002; Baines et al., 2009; Bastl et al., 2012
Result-oriented services	Highly complex and increased range of contact activities underpinned by integrated partnerships and alliances	Decoupled front-end / back-end activities	Market or Platform	Customer pays for achievement of the result e.g. availability and capability type contracts used by train manufacturers or defence and military. Also includes solutions such as the delivery of large scale construction projects	Foote et al., 2001; Galbraith, 2002; Davies et al., 2001; 2006; Kapletia and Probert, 2010

3 Research method

To better understand how firms structure for servitization, a case study approach was adopted (Yin, 2003; Ketokivi and Choi, 2014; Voss et al., 2016). This was deemed appropriate as the phenomenon under investigation has not, to date, been studied in depth within servitization.

3.1 Case selection and description

The case firm was selected because it presented characteristics of a revelatory case (Eisenhardt, 1989; Yin, 2003). It is a leading player in the markets in which it operates, known for being innovative and its advanced technological capabilities, and is perceived as being an exemplar organization for servitization.

EngCo (a pseudonym) is an original equipment manufacturer (OEM) which develops, produces and manages engineering products, including through-life support. Traditionally, it provided product support services, include training, maintenance and spare parts sales (i.e. after-sales). Recently, greater emphasis has been placed on exploiting the potential of services by providing advanced offerings over the lifetime of the product. The revenue from services is now higher than from the sale of products. EngCo can therefore be viewed as having transitioned from a manufacturer to providing use-based and availability/result-based services.

EngCo has operations in almost fifty countries, with customers in over 150 countries and over 50,000 employees. It operates in multiple sectors through several independent business divisions, of which three (i.e. Divisions A, B and C) were examined as embedded cases (cf. Voss et al., 2002). Each division within EngCo is organized according to the sector in which it operates and is structured independently to manage its product development, production and service delivery through an expanding global network of service facilities. Although the core technology is shared across divisions, each division produces different offerings to meet the needs of its customers. In Divisions A and B, services accounted for over half of the revenue. In Division C, service revenue has grown but at a slower rate than product sales. Servitization was therefore viewed as an opportunity to be pursued by all divisions within EngCo. Table 3 provides an overview of EngCo and the divisions studied.

Table 3: Description of case firm, divisions and data collection points

EngCo	Products and services provided	Data Collection	Interviewee role(s)
<u>Division A</u>	<ul style="list-style-type: none"> Predominantly provides <i>use-oriented services</i> - contracting based on the time the equipment is used Produces high-value complex products End-products are generally customized versions of the core product Competes with a small number of international competitors Manages a large number of customers worldwide 	<ul style="list-style-type: none"> Semi-structured interviews Internal and external documentation Site visits Workshops Industry presentations 	<ul style="list-style-type: none"> Operations managers Customer service managers and personnel Design engineers Marketing personnel Human resource managers Supply chain manager Operations center manager Repair engineering manager Vice president of services
<u>Division B</u>	<ul style="list-style-type: none"> Provides <i>result-oriented services</i> - contracting on the basis of availability Manufactures high-value, complex products Products are generally bespoke, developed to suit the specific requirements of a customer Limited competition but normally operates as part of consortiums with other partners Limited number of customers which are mainly government agencies worldwide 	<ul style="list-style-type: none"> Semi-structured interviews Internal and external documentation Site visits Workshops Industry presentations 	<ul style="list-style-type: none"> Operations managers Customer service managers and personnel Design engineers Project and programme managers Marketing personnel Human resource managers Supply chain manager Repair engineering manager Vice president of services
<u>Division C</u>	<ul style="list-style-type: none"> Mainly provides <i>product-oriented services</i> with evidence of <i>use- and result oriented services</i> Produces a broad range of different product types which range from high-value and complex equipment to low-value consumables Operates in multiple competitive and volatile customer markets Large and diverse customer base 	<ul style="list-style-type: none"> Semi-structured interviews Internal and external documentation Site visits Workshops 	<ul style="list-style-type: none"> Operations managers Customer service managers and personnel Project and programme managers Human resource managers Supply chain manager Repair engineering manager Vice president of services

3.2 Data collection

A data collection protocol was developed based on the literature reviewed (Miles and Huberman, 1994; Yin, 2003). An iterative approach was adopted, which allowed theory to

inform data collection and vice versa (Dubois and Gadde, 2002) and the protocol evolved over the course of the data collection phase. This mode of enquiry allowed a thorough understanding of the case firm, specifically how it had structured itself.

The study was conducted over four years and data were collected from multiple sources and at different levels within the case organization. 38 semi-structured interviews of between 45 minutes and 2 hours were conducted; the interviewees are listed in Table 3. All interviews were recorded and transcribed verbatim. The interview data were complemented by site tours of the different facilities. Internal documents and publically available archival information (e.g. annual reports, webpages, presentations, etc.) were utilized to enable triangulation of the data. Together, the different data sources allowed for a holistic view to be developed of the case firm and for the design configurations across the different divisions to be understood.

3.3 Data analysis

All data were coded and analyzed by the research team using thematic analysis (Braun and Clarke, 2006; King, 2004), based on the framework derived from the literature for organizational design choices (see Table 2). Table 4 details the steps adopted for the thematic analysis of data. An additional initial step, ‘preparation for fieldwork’, was included and the subsequent steps are as outlined by Braun and Clarke (2006). These steps describe how the thematic analysis was conducted to identify, review and define the themes presented in the findings section.

Emerging data from the different divisions were progressively incorporated into the analysis, allowing for systematic combining of the transpiring issues and the ongoing development of the interview protocol (Dubois and Gadde, 2002). An iterative approach, moving between the emerging data set and the extant literature, was adopted in order to make sense of the data and place it in the appropriate theoretical context. Within each case, data collection was only completed once saturation was achieved (Eisenhardt, 1989; Strauss and Corbin, 1990). The research team performed reliability checks on the coded data emerging from each division (Miles and Huberman, 1994). Figure 1 presents the final coding structure derived from the data analysis. The findings of the analysis were fed back, in the form of reports, presentations and workshops, throughout the period of the study for validation by participants,

Table 4: Process of thematic analysis based on Braun and Clarke (2006)

Steps	Process applied
i. Preparation for fieldwork	<ul style="list-style-type: none"> Review of servitization literature, with emphasis on organizational design Creation of interview protocol and template based on literature for guidance in interviews (Yin, 2003) Revising interview template to incorporate emerging issues and consult literature further on design decisions
ii. Familiarizing oneself with the data	<ul style="list-style-type: none"> All interviews transcribed verbatim Transcripts read and re-read by multiple researchers individually, noting down initial ideas Listening over recordings (or specific points in conjunction with transcripts) Notes from specific interviews discussed and annotations added to transcripts (noting points about structure for each division) for discussion
iii. Creating initial codes	<ul style="list-style-type: none"> Joint presentation and discussion of interviews amongst researchers Initial codes identified based on interview template and reading of interview transcripts One researcher codes data using coding template developed from joint discussion First-order codes for entire data set developed at the end of the process
iv. Identifying themes	<ul style="list-style-type: none"> Analyzing codes to understand how they may combine to form an overarching theme List of codes organized into particular themes (<i>cf.</i> King, 2004). Combining and contrasting emergent data with insights and assumptions in extant literature (e.g. design configuration for IPTs) Collapsing codes into second-order themes Resulting in creation and revision of second order themes
v. Reviewing themes	<ul style="list-style-type: none"> Discussion of identified themes amongst researchers Collaborative discussions of the links between the codes Resulted in comparison across the divisions to examine linkages
vi. Defining and naming themes	<ul style="list-style-type: none"> Collaborative discussion on the multiple organizational designs within each business division Inter-coder reliability checks performed by one researcher on sample of data (researcher not involved in initial coding rounds) Refinement of the coding themes and first-order categories following reliability checks (Miles and Huberman, 1994) Checking and validating understanding of the organizational design considerations within each business division Resulting in refinement of linkages between first-order codes, second order themes and aggregate themes (see Figure 1– final coding structure)
vii. Writing-up analysis	<ul style="list-style-type: none"> Final step of analysis entailing creating meaningful representations of the thematic analysis Feedback workshop with case company conducted, including presentation of report to key stakeholders Results also presented at academic conference for theoretical refinement Further checking, editing and refinement of concepts considering feedback

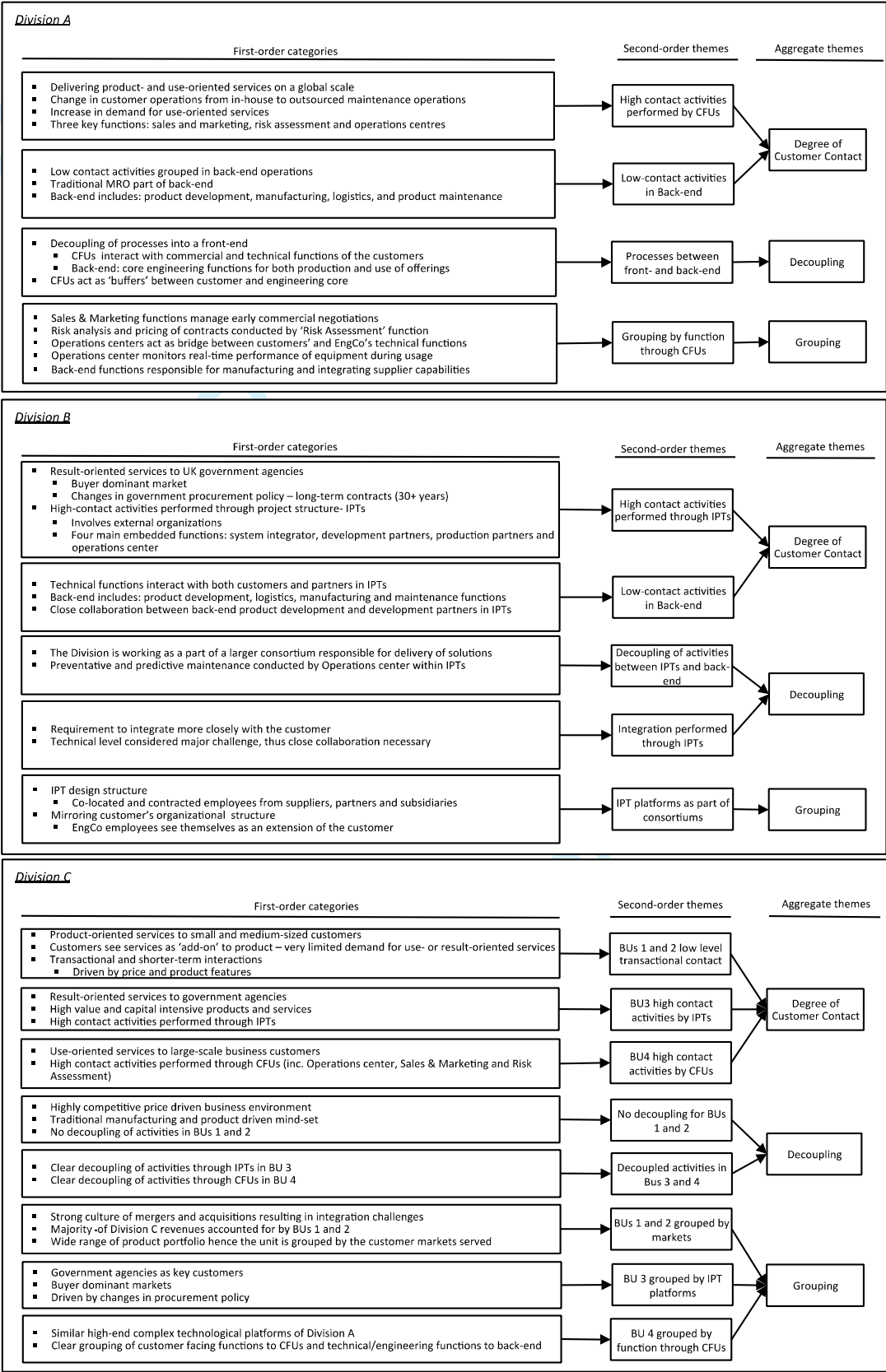


Figure 1: Coding structure

4. Findings

This section presents the empirical findings from the three studied divisions of EngCo.

4.1 Division A

Background: Division A manufactures high value, complex engineered equipment, incorporating several patented, leading-edge technologies. Each offering is modified to meet individual customer needs. The products have a relatively long life-cycle, thus there is a large installed base. Traditionally, Division A offered product-oriented services, principally selling spare parts and offering training for the maintenance of products. Over the last two decades, Division A has seen demand grow for integrated offerings, where the customer pays for usage. This move was triggered by customers wanting to be “*asset light*” and more focused on core competences rather than supported by ancillary activities such as maintenance, repair and overhaul (MRO). As a result, the business has moved to providing use-oriented services, which now account for over half of the division’s revenues.

Competition within the marketplace is limited, with few competitors having the requisite technological capabilities. Within this market, demand for new products is cyclical and driven by the introduction of new platforms. This has dropped significantly in recent times, with only two platforms launched in the past decade. The large installed base ensures that there is an ongoing demand for support services and spare parts. A notable development in the market was the entry of new customers that did not—or did not wish to—possess in-house MRO capabilities. Established customers have also outsourced their maintenance capabilities, opting to focus on core capabilities which, in turn, resulted in increased demand for Division A’s MRO services.

Division A possesses maintenance facilities and capabilities that, to serve its international customer base, are strategically located close to major customer operations. It has also developed the capability to monitor products in operation, using telemetry to transmit performance data to a central operations center. This permits the scheduling of predictive and preventive maintenance if there is a risk of equipment failure and allows Division A to monitor asset performance to reduce customer expenditure on fuel.

Organizational design choices: Servitization in Division A has, through increased maintenance and product management responsibilities, resulted in closer *customer contact*,

due to involvement in the day-to-day operations of customers. Customer Facing Units (CFUs) were established to manage the commercial relations (*cf.* Davies et al., 2006) and part of the front-end operations of the company. The CFUs incorporate both commercial and technical teams, who manage high-contact activities with customers and liaise with back-end colleagues, who are working on product development and production.

The CFUs act as an interface between the customer and the back-end operations. This shows a clear *decoupling* and *grouping* of activities into a front-end (i.e. CFUs) and a back-end (i.e. technical core). Figure 2 shows the structure of Division A.

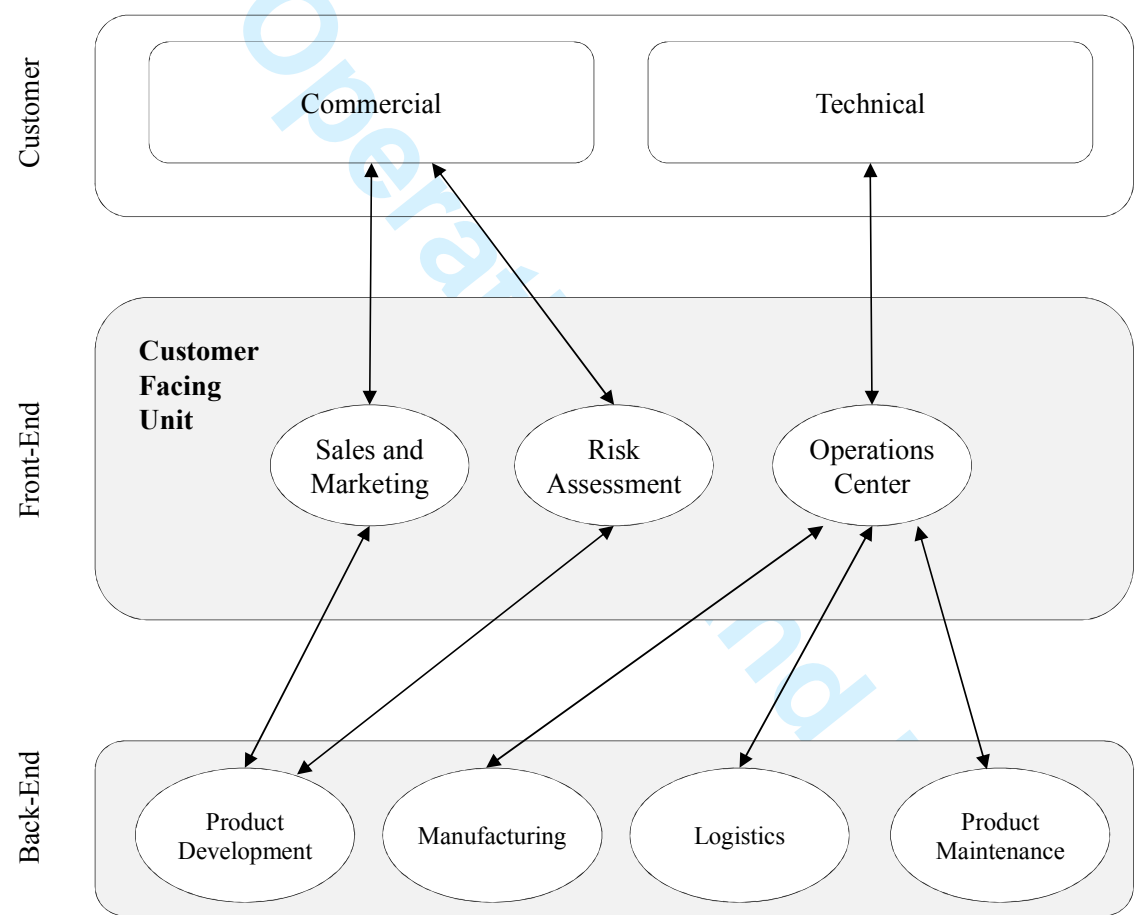


Figure 2: Structure in Division A

Figure 2 also illustrates the functions in the front- and back-end. The functions in the CFUs are grouped by technical staff, capable of dealing directly with customers' engineers, as well as their colleagues in product-focused, technical roles. Functions in the CFUs are high contact and include sales and marketing functions, as well as risk management teams, which

deal with the pricing of service contracts. The operations centers exist alongside the CFUs and co-ordinate the management of customers' usage of products. The CFUs are responsible for providing the traditional product- and use-oriented services. After-sales support is sold by the sales and marketing functions, which co-ordinate with the back-end unit to deliver MRO services through the product maintenance function in respect of products sold on the 'old' model—where the customer purchased the complex equipment. Where a use-oriented contract is sold, the after-sales are the CFU's responsibility. In this scenario, the ownership of the equipment remains with EngCo, the relevant support is specified in the service contract and the customer pays by reference to its usage of the specified services.

Challenges existed in Division A because of the separation of front- and back-end functions into decoupled structures. At the front-end, functions were expanded in scope, whilst the number of staff and associated expertise within functions were also extended. The separation of front-and back-end structures also led to issues between employees. Some back-end managers indicated that, at times, they felt the job of those in the front-end functions was to simply *"pass on the customer problems"* (Repair Engineering Manager, Division A) to back-end engineers to find solutions. As such, there was an evident lack of a uniform understanding of job roles. The importance and relevance of front-end functions for service provision were not adequately understood across the organizational structures. For instance:

"...people always have an envious eye on the ones that are customer facing, because it's merely perceived that it's easier to talk to the customer and get the customer's requirements and feed all the problems back to the guy at manufacturing." (Operations Manager, Division A)

As a result, Division A was investing in training and communications workshops at the time of data collection, to seek to address the issues across the front- and back-end structures.

4.2 Division B

Background: Division B produces high-value engineered products, using more complex and more varied technologies than those used by Division A. These products form part of the solutions developed by a consortium of suppliers of which EngCo is a key member. Solutions were typically developed and delivered to customers and formed part of systems which delivered availability—or uninterrupted access—to product functionality. Therefore, the focus in Division B is on the functionality of the solution, rather than the specification of the

product or service. Condition monitoring is used to enable preventive and predictive maintenance via the operations center. The infrastructure and ability to exploit opportunities is at an early stage in development within the division, given the long service life of the asset (e.g. 30+ years in some instances).

The division operates predominately in the UK market, where its traditional customer base is located. Its main customers are government agencies, which procure solutions from EngCo. Recent budget cuts have resulted in customers seeking savings in their operating costs and greater value for money, creating a two-fold challenge for the division: “...*that reduction in budgets has actually coincided with a parallel increase in demands.*” (Senior Manager, Division B). Consequently, Division B has needed to be innovative in delivering its main offering, whilst continuing to manage its relationship with customers.

In Division B, the primary customer has separated its product purchasing and maintenance functions, meaning products and MRO services are procured separately. In an attempt to reduce inefficiencies in the customer’s processes, both functions were integrated so that suppliers—including EngCo—may provide solutions. Changes in government procurement policy have also meant that EngCo is required to work within IPTs in wider consortia.

Organizational design choices: The change from being a pure product provider to ‘contracting on the basis of availability’ in the delivery of solutions had implications for the structuring of the division. It required the *customer contact* approach to be employed, whereby the customer has direct contact with the supplier in relation to product issues. For this service, the customer pays a fixed cost for an agreed level of product availability, meaning that the maintenance and performance of the product becomes the responsibility of EngCo. As a result, it was suggested that customer contact employees were so embedded within the customer organization that they viewed themselves as “*an extension*” of the customer.

Product development, manufacturing, logistics and maintenance functions comprise the back-end within Division B. Front-end activities are performed through the *project structure*, where the division is part of a consortium responsible for the delivery of a solution. This is illustrated in Figure 3, which depicts the different relationships between the customer’s operations and the IPTs. The delivery of result-oriented offerings requires the consortium to work in close collaboration with the back-end function, as well as the customer’s operations.

Due to the high technical complexity of the offering, technical functions within the division are required to interact directly with customers and partners in the consortium.

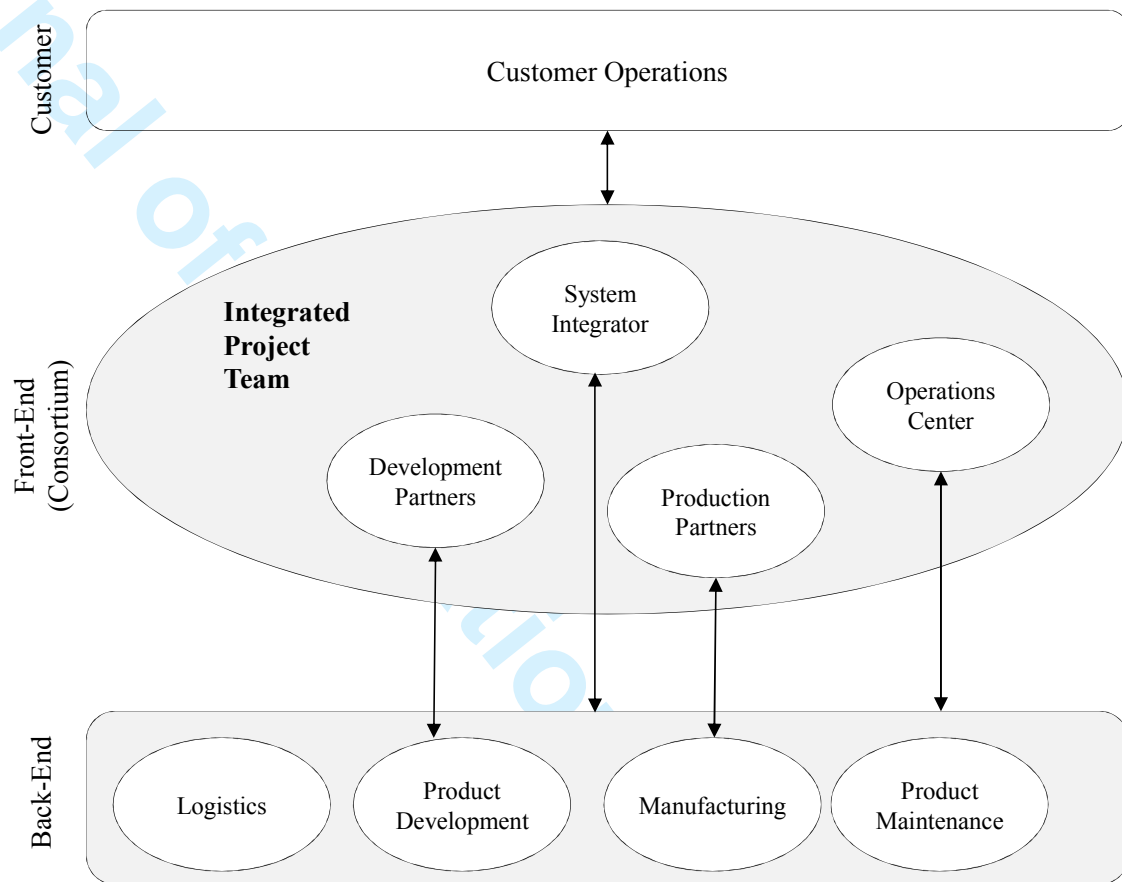


Figure 3: Structure in Division B

The requirement to integrate more with customers on a technical level is challenging. The customers themselves have changed operations by contracting work to IPTs. The development partners usually include employees from suppliers, partners and subsidiaries that are co-located or contracted to work as part of the IPT in a project structure. The systems integrator within the IPT is responsible for providing on-going support for the equipment over the agreed period.

4.3 Division C

Background: Division C offers a vast range of low to high level products and provides associated spares, repair and overhaul services. It also provides solutions. These are delivered to a varied client base spread across different markets. As a result, the division is organized

into four separate business units (BUs), each serving the needs of the different markets in which the division operates (see Figure 4). There was evidence of product-, use- and result-oriented services being provided in the different BUs.

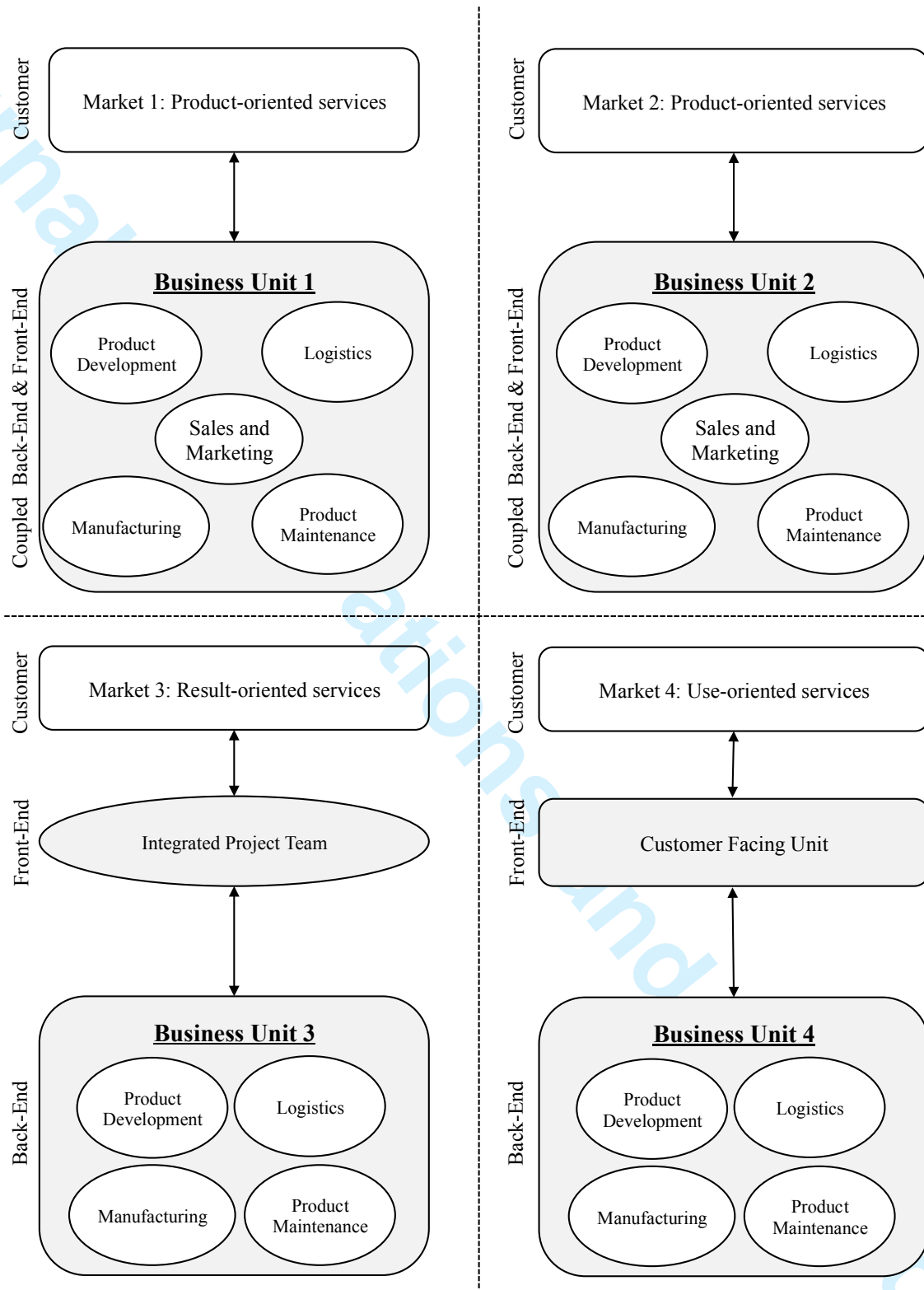


Figure 4: Structure in Division C

Markets 1 and 2 comprised small and medium-sized customers who demanded standardized technologies and related product-oriented services. Markets 3 and 4 comprised larger customers requiring high value, capital intensive products and integrated offerings (see Figure 4). Markets 1 and 2 account for most of Division C's revenues, whilst Markets 3 and 4 are at a very early stage in developing service offerings. The customers of BU 3 are, as in Division B, government agencies. BU4 provides the same complex equipment as Division A but for a different market sector.

The operating environments within which BUs 1 and 2 operate are highly competitive. It is common for customers to possess in-house MRO capabilities and there is also competition from third party service providers. Consequently, BUs 1 and 2 focus on their manufacturing capabilities rather than services, which are considered secondary. However, the service business is perceived as a means of survival, due to the reducing profitability of the division's UK manufacturing operations. Expansion into aftermarket services is seen as a viable strategy for remaining competitive.

The division was rooted in a traditional product mind-set. Many respondents described Division C as at an early stage in moving towards servitization. The division had very different service strategies for the different markets served. The division's services concentrated on the spare parts business, rather than the provision of product support over an extended period. The idea that customers were actually seeking services was also contested within some of the BUs: "...they want to buy the product, and that's all they want to do with it. They don't want to use it for 20 years, and they're not really interested in paying for anything more" (Operations Manager, Division C, Business Unit 1).

One of the major challenges for Division C is its broad product portfolio. The division's operations are highly fragmented across the UK, a result of the division having grown from a set of acquisitions. Due to the different markets in which the BUs operate, Division C is described as having a "highly complex structure" (Programme Manager, Division C).

Organizational design choices: The structure within Division C is the most complex within EngCo and is attributed to the range of technologies employed. As the different BUs serve different markets, the *customer contact* approach within the BUs varied. Within BUs 1 and 2, contact activities were low-level and transactional whereas within BUs 3 and 4, the activities were high contact and requiring greater interpersonal skills.

In BUs 1 and 2, there is no *decoupling* of activities between the front- and back-ends. These units account for most the division's revenues and primarily sell products, with a low service uptake. These BUs were not geared to provide the type of customer interaction necessary for delivering services: "...we don't have, you know, in terms of people who have less contact, I don't like to say back office, 'cause I don't like the term, but people who essentially have limited interaction with the customer" (HR Manager, Division C, Business Unit 2). An executive in BU1 commented that, "I think we have an abundance of technical skills across the business, very good technical skills...I think we are weak in some of our sales and marketing activities, marketing in particular".

In BUs 3 and 4, there is a clear separation between front- and back-end activities. In BU 3, the main customer is a government agency and a project structure, in the form of IPTs, is used. BU 4 provides the same high-end complex technologies utilized in Division A and there is a clear separation of CFUs and back-end operations. Both units account for less than a quarter of the revenues in the division, although the potential for growth was the greatest in BU 3, due to increased demand from government agencies.

In the next section, a cross-case analysis and discussion of the three divisions is provided.

5. Cross-case analysis and discussion

Within EngCo, different divisions have embarked upon servitization in different ways, suggesting that the transition towards service is not as linear or straightforward as may be suggested (*cf.* Oliva and Kallenberg, 2003). These differing organizational designs were clearly influenced by the different markets in which the EngCo divisions operate.

The move towards servitization in Division A was in response to market demand. Respondents commented that customers were demanding better product management, leading to the division taking a more proactive approach in developing services and the capabilities necessary to maintain dominance within the marketplace. In contrast, the move towards servitization in Division B was considered reactive to changing customer needs, with the shift being in response to changes in the procurement policies of the main customers, which required suppliers to deliver, as part of a consortium, on the basis of availability. In Division C, demand for services was not as high across the different markets, resulting in a more complex picture. Due to a diverse range of customers, different servitization strategies

played out concurrently across the BUs in Division C. Moreover, respondents perceived servitization as being forced upon Division C by EngCo’s senior management, in order to increase service revenues in certain markets. While service revenue has grown in Division C, that growth was slower than in respect of product sales. Thus, servitization was not expected to succeed in Division C until service revenue reached a ‘critical mass’ (cf. Fang et al., 2008). The respondents implied this was some way off, partly due to Division C comprising different businesses that had been acquired and not fully integrated.

In terms of *offering types and characteristics*, Division A produced mostly standardized, complex, high value products and had previously offered maintenance services. The division expanded existing service offerings and integrated them more closely into product development. For example, facilities for maintaining products had been expanded and products now incorporated condition monitoring equipment to facilitate more efficient service delivery. Conversely, Division B produced more customized high-value products to meet specific customer requirements. Scope for increasing sales of solutions was found to be limited within Division B compared to Divisions A and C. This was largely due to the sensitivity of Division B’s customers to EngCo monitoring the use of equipment. The need to work as part of a consortium requires close co-operation with customer organizations, which entailed a change in organizational structure to support the offering and to mirror that of the customer. Moreover, Divisions A and B saw a request from customers for services, whilst servitization in Division C was initiated centrally by EngCo senior management. Although there was no one consistent approach to service delivery within Division C. These findings are consistent with other research, which suggests that industry context and sectoral dynamics need to be considered when moving towards providing integrated offerings (Johnstone et al., 2009; Raja et al., 2010; Leiringer et al., 2009).

5.1 *Front- and back-end configurations across business divisions*

The extant literature prescribes that, to structure for servitization, each division within an organization should implement a front- and back-end structure (cf. Foote et al., 2001; Davies et al., 2006; Sawhney, 2006). In this research, a more complex picture emerged. Division A is the closest of the three divisions to the idealized organizational structure described in the literature, having introduced CFUs to manage high contact activities. CFU employees were viewed as being on “the front-line” and providing a “service orientation” that was considered missing in the traditional, product focused, back-end organization.

Simultaneously, this functional separation leads to challenges, such as the recruitment of additional staff with the skills and expertise to manage customer-facing operations. In addition, the findings also identify tensions between front- and back-end employees, mainly stemming from a lack of understanding and communication across functions

In contrast to Division A's separation strategy, Division B engineers in the back-end communicated with customers. In fact, there was a requirement to work with customers' or partners' engineers in IPTs. Thus, in Division B, a conscious decision has been made for engineers to interact with the customer, expanding Zomerdjik and de Vries' (2007) grouping decision, which suggests that when exchange is conducted over a long period of time, a different blend of expertise is required for the customer. This is often done within a project structure and is expected by UK government departments (NAO, 2002; Kapletia and Probert, 2010)

The Division C structure is the most complex. Within the largest two BUs (1 and 2), there was no decoupling but a grouping of back- and front-end employees to manage high and low contact activities (*cf.* Zomerdjik and de Vries, 2007). BU 3 adopted a project structure, while front- and back-end activities are decoupled in BU4—a recent change, through which the unit was attempting to move towards the provision of use-based services. Respondents across Division C suggested services were not as important in their markets as they were in Divisions A and B, and that the range of technologies in Division C was broader in terms of complexity than in Divisions A and B. Thus, the diverse range of offerings, and the different markets in which Division C operates, mitigate against a homogenous and integrated approach to servitization. Accordingly, the findings suggest that prescriptions of separating front- and back-end units are too simplistic for the case organization; rather, what emerges is a more complex way of organizing across divisions by reference to the type of market, customer and offering. Importantly, we contribute to the literature by identifying the project structure for organizing to deliver result-oriented offerings. We also raise questions about how such a structure can be imposed at the behest of external actors (i.e. customers and alliance partners) for delivering the offering, as was the case in Division B. This showed that power dynamics (*cf.* Chicksand, 2015) and power imbalance (*cf.* Hingley, 2005) between actors in supply chains can manifest itself in the supplier being required to change their ways of working in line with the requests of a dominant customer.

Table 5 presents a summary of the cross-case comparison.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 5: Summary of design considerations across the divisions

EngCo				
EngCo Divisions		Division A	Division B	Division C
Type of product-service offering(s):		-Product-oriented -Use-oriented	-Result-oriented	-Product-oriented -Use-oriented -Result-oriented
Design Considerations	Customer contact	-High contact activities performed by CFUs -Low-contact activities performed by back-end	-High contact activities performed through project teams -Low contact activities performed by back-end	-Low level and transactional contact in BUs 1 and 2 -High contact activities performed through IPTs in BU 3 -High contact activities performed by CFUs in BU 4
	Decoupling	-Decoupling of processes between front- and back-end	-Decoupling of activities between IPTs and back-end -Integration performed through IPTs	-No decoupling in BUs 1 and 2 -Decoupled activities in BUs 3 and 4
	Grouping	-Grouping by function through CFUs	-Grouping by IPT platforms, working as part of a consortium to deliver solutions	-BUs 1 and 2 grouped according to markets -BU 3 grouped by IPT platforms -BU 4 grouped by function through CFUs
Exemplar quotes from interviews:		<p><i>"We need a peacekeeping force live, and that's created the Ops Centers to do that to a degree. But also, to improve management support to the customers on a 24/7 basis, so we've got 24/7 Engineers, ... some with the equipment health monitoring Engineers, and the operations planning guys in the campaigns to improve the communication, shorten timely communication, improve decision making, and improve our operational support to the customers."</i></p>	<p><i>"I think both ourselves and [Division A] have recognized the making of market services a priority, and I think we've both moved them forward, but we've tended to follow, to a degree, quite different paths."</i></p> <p><i>"And whereas the [Division A] offerings have tended to be very much a, sort of, one size fits all type offering, made up by a series of fairly clearly defined package options, in [Division B], almost all of our service offerings to date have been individually tailored to an individual customer and their individual operation. I think that has been a very different approach and, of course, what that means is that the kind of levels of resource that you apply have been quite different, you know, and we've benefited a lot less from, sort of, being able to scale things to multiple customers."</i></p>	<p><i>"If you look inside the [Divisions A and B], you will see they now have these services businesses. We haven't done that in [Division C]. We are structured differently to the others."</i></p> <p><i>"We're structured on a market basis, so we've got four sectors. As I said, we are on the start of the journey. And I think, at the moment, it's not appropriate. Because of the level of the service business in [Division C] at the moment. It's well behind, what you would see in the other sectors."</i></p>

6. Conclusions

This research shows the different design considerations (Chase and Tansik, 1983; Metters and Vargas, 2000; Zomerdeijk and de Vries, 2007; Ponsignon et al., 2011) undertaken within an organization that provides servitized offerings and the factors that influence the split between front- and back-end functions.

The three different divisions examined provide distinct offerings: from use-oriented services in Division A to comparatively more complex result-oriented offerings in Division B and, in Division C, a range of offerings are provided, from simple product-oriented services to complex result-oriented services. This study shows that, in cases where there are use- and result-based offerings, there is a separation of the front- and back-end activities, with the back-end typically retaining the technical ‘core’ of the offering. This allows those working in the back-end to be ‘sealed off’ for greater efficiency. The front-end comprises activities involving higher elements of customer contact. When the complexity of the offering and temporality increased, the expertise in the front-end broadened. At the most complex (i.e. Division B), the front-end comprises an IPT, which also included suppliers and customers. The IPT was highly integrated and used alliance and partnership-type governance mechanisms (Kapletia and Probert, 2010). This combination of expertise is required to deal with the challenges that occur over the long life of these offerings.

A further difference in grouping occurs because of different offerings. When providing more complex result-oriented services, the front-end is grouped around platforms (e.g. IPTs in Divisions B and C, BU 3), while use-oriented services are grouped around functions (e.g. CFUs in Divisions A and C, BU 4) and product-oriented services, around markets (Division C, BU1 and 2). This serves as an extension of previous research (Oliva and Kallenberg, 2003; Galbraith, 2005; Fischer et al., 2010) by empirically showing the overarching differences between assorted offerings of various complexities.

While the extant literature (Gebauer et al., 2012; Oliva et al., 2012) suggests that front- and back-end designs could be ‘pushed’ by the provider (i.e. Division A), the case study provided empirical evidence that dominant customers can also impose front-end/back-end splits upon provider organizations (i.e. Division B). In Division A, EngCo provided use-oriented services and a front-end/back-end design was created. In Division B, customer demand for result-oriented offerings led to the adoption of a modified organizational design from the ‘strong

center' (cf. Foote et al., 2001; Sawhney, 2006). This change in structure was at the request of the customer, indicating that the balance and dynamics of power between buyer and supplier (cf. Hingley, 2005; Chicksand, 2015) can affect organizational design. In Division B there is higher buyer power due to the market comprising a limited number of buyers with significant levels of spending.

In Division C, there was evidence of both centralized initiation and customer demand for servitization. This was due to market demand in some BUs but not all, resulting in evidence of three different design decisions being made within the same division, depending on the market served. The findings support the view that a shift towards servitization changes the way manufacturers design their organizational structures (Oliva and Kallenberg, 2003; Galbraith, 2005; Cusumano et al., 2015). However, this study challenges the simple underlying theoretical assumption that it is a straightforward process, enacted uniformly across an organization.

The contributions of this study are twofold. Firstly, whilst previous research has suggested that there should be a front-/back-end split (Galbraith, 2005; Oliva and Kallenberg, 2003; Davies et al., 2006; Sawhney, 2006), this research goes further by providing insights into how the case company organizes functions and activities in the front- and back-end. The findings indicate that as complexity and temporality increase, the capability within the front-end must also increase and groupings will differ according to the type of offering. The analysis (see: Table 5) of the different design considerations—customer contact, decoupling and grouping—results in a more nuanced understanding of how these play out across different operating divisions. The decoupling of activities was demonstrated in some divisions through the introduction of CFUs, which acted as the front-end (Davies et al., 2006; Sawhney, 2006), whereas there was evidence of the coupling of front- and back-end activities in certain BUs in Division C. In this study, the grouping decision was extended to include project structures—in the case of IPTs, comprising different functions and consortia partners—as another consideration for servitizing organizations when operating in certain environments. This is important, as it is an increasingly prevalent—yet under-researched—form of organizing. Furthermore, this research showed that while servitization was implemented by the manufacturer, a dominant customer for Division B and Division C (BU 3) imposed an organizational design. This adds to the complexity for organizations seeking to servitize.

While the demand perspective is discussed in the literature, due attention has not been paid as to how the customer may impose a demarcation between front- and back-end units.

Secondly, the study shows that there is not a universalistic move to a single type of offering by one firm. Rather, these findings indicate that firms may adopt different trajectories towards servitization according to the type of offerings, dependent on the customer markets (Raja et al., 2010; Kowalkowski et al., 2015). These findings thus provide an important contribution to the literature by demonstrating that different organizational design configurations can exist depending on the product-, use- and result-oriented services, coupled with their associated complexity and temporality. The findings demonstrate that even within the same division, different approaches to structuring for servitization may play out concurrently.

6.1 Managerial Implications

Servitizing manufacturers need to be cognizant of the different markets within which they operate and organize accordingly. The results of this study question simplistic ‘best practice’ prescriptions in structuring for servitization (cf. Foote et al., 2001; Galbraith, 2002). It has been assumed that organizations move from product to enhanced service offerings without taking contextual factors and external contingencies into account. Consequently, managers need to understand the multiple and complex contexts within which their organizations may operate, thus requiring markedly different design configurations to simply prescribing a separation of front- and back-end units. In addition, the findings show that as the complexity and temporality of the offering increases, the capabilities within the front-end become more complex, including both technical and non-technical units. This raises questions on the type of skills and competences required to manage the dynamics of such a diverse group of people, including product engineers, designers, consultants, key account managers and financial accountants, which are increasingly employed by various partners and suppliers as part of consortiums, alliances and IPTs. Managers should consider grouping the front-end activities around platforms (e.g. IPTs) when providing more complex result-oriented services, while use-oriented services can be grouped around functions (e.g. CFUs in Divisions A and C) and product-oriented services, around markets. A further important implication for managers is that they need to be aware of the balance of power between themselves, the manufacturer, and the customer. As this research has shown, a dominant customer can

impose a structure on the manufacturer which may—or may not—align with the manufacturer's ways of working.

6.2 Limitations and future research

The insights provided by this study advance the understanding of the way in which organizations undertake design decisions for servitization. However, this study is not without limitations. Generalizability of the findings is limited, given that the case firm operates in a limited number of markets, yet the insights provided will allow for analytical generalization (Eisenhardt, 1989).

Other researchers may build on this research with a discussion of organizations operating in different contexts, to explore the design decisions undertaken in implementing a servitization strategy. Focusing on project-based forms of organizing and implications for delivering solutions would be welcome additions to the literature. Understanding how internal and external resource integration takes place to deliver such offerings (*cf.* Jaakkola and Hakanen, 2013) over extended periods within IPTs would greatly benefit the academic and practitioner communities.

A further extension to the work could be to examine the role played by power dynamics in servitization. Servitization often requires suppliers to take on significant responsibility for the operations of the customer, leading to lock-in (Lockett et al., 2011). However, in Division B the more dominant customer imposed an organizational design upon the supplier. Thus, a fruitful avenue of research could examine organizational structures in interdependent, independent, buyer dominant and supplier dominant situations. Longitudinal studies that explore the changes organizations undergo in organizing for different markets and customers, over the life of an offering, would also be useful in understanding changing power dynamics over time. Lastly, further research should examine the different actors involved. The research on service triads would be fruitful to pursue, as it examines the management of the indirect relationships present between customer and supplier (see: Bastl et al., 2013; Wynstra et al., 2015).

References

- Baines, T., and Lightfoot, H. (2013), "Servitization of the manufacturing firm: Exploring the operations practices and technologies that deliver advanced services", *International Journal of Operations & Production Management*, Vol. 34 No. 1, pp. 2-35.
- Baines, T.S., Lightfoot, H.W., Peppard, J., Johnson, M., Tiwari, A., Shehab, E. And Swink, M. (2009), "Towards an operations strategy for product-centric servitization", *International Journal of Operations and Production Management*, Vol. 29 No. 5, pp.494-519.
- Bastl, M., Johnson, M., Lightfoot, H. and Evans S. (2012), "Buyer-supplier relationships in a servitized environment: and examination with Cannon and Perreault's framework", *International Journal of Operations and Production Management*, Vol. 32, No. 6, pp. 650-675.
- Bastl, M., Johnson, M. and Choi, T.Y. (2013), "Who's seeking whom? Coalition behavior of a weaker player in buyer-supplier relationships." *Journal of Supply Chain Management*, Vol. 49, No. 1, pp.8-28.
- Benedettini, O., Neely, A., Swink, M. (2015), "Why do servitized firms fail? A risk-based Explanation", *International Journal of Operations & Production Management*, Vol. 35 No. 6, pp. 946 -979.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Chakkol, M., Johnson, M., Raja, J., & Raffoni, A. (2014), "From goods to solutions: how does the content of an offering affect network configuration?" *International Journal of Physical Distribution & Logistics Management*, Vol. 44 No. 1/2, pp. 132-154.
- Chase, R.B. (1981), "The customer contact approach to services: theoretical bases and practical extensions", *Operations Research*, Vol. 29 No. 4, pp. 698-706.
- Chase, R.B. and Tansik, D.A. (1983), "The customer contact model for organization design", *Management Science*, Vol. 29 No. 9, pp. 1037-50.
- Chicksand, D. (2015), "Partnerships: The role that power plays in shaping collaborative buyer-supplier exchanges", *Industrial Marketing Management*, Vol. 48, pp. 121-139.
- Cusumano, M.A., Kahl, S.J., Suarez, F.F. (2015), "Services, industry evolution, and the competitive strategies of product firms", *Strategic Management Journal*, Vol. 36 No. 4, pp. 559-575.
- Davies, A. (2004), "Moving base into high-value integrated solutions: a value stream approach", *Industrial and Corporate Change*, Vol. 13 No. 5, pp. 727-756.
- Davies, A. and Hobday, M (2005), *The business of projects: managing innovation in complex products and systems*. Cambridge University Press: Cambridge.
- Davies, A., Brady, T. and Hobday, M (2006), "Charting a path toward integrated solutions", *MIT Sloan Management Review*, Vol.47 No.3, pp.39-48.
- Davies, A., Brady, T. and Hobday, M. (2007), "Organizing for solutions: systems seller vs system integrator", *Industrial Marketing Management*, Vol. 36 No. 2, pp.183-193.

- Dubois, A. and Gadde, L-E. (2002) "Systematic combining: an abductive approach to case research", *Journal of Business Research*, Vol. 55 No. 7, pp.553-560.
- Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.
- Fang, E., Palmatier, R.W. and Steenkamp, J-B.E.M. (2008), "Effect of service transition strategies on firm value", *Journal of Marketing*, Vol. 72 No. 5, pp. 1-14.
- Fischer, T., Gebauer, H., Gregory, M., Ren, G. and Fleisch, E. (2010), "Exploitation or exploration in service business development?" *Journal of Service Management*, Vol. 21 No. 5, pp. 591-624.
- Foote, N.W, Galbraith, J, Hope, Q. and Miller, D. (2001), "Making solutions the answer", *McKinsey Quarterly*, No. 3, pp. 84-93.
- Galbraith, J.R. (2002), "Organizing to deliver solutions", *Organizational Dynamics*, Vol. 31 No. 2, pp. 194–207.
- Galbraith, J.R. (2005). *Designing the customer-centric organization: A guide to strategy, structure and process*. Jossey-Bass: San Francisco.
- Gebauer, H., Ren, G. J., Valtakoski, A., & Reynoso, J. (2012). Service-driven manufacturing: provision, evolution and financial impact of services in industrial firms. *Journal of Service Management*, 23(1), 120-136.
- Hayes, R.H. and Schmenner, R.W. (1978), "How should you organize manufacturing." *Harvard Business Review*, Vol. 56 No. 1, pp. 105-118.
- Hingley, M.K. (2005), "Power to all our friends? Living with imbalance in supplier–retailer relationships", *Industrial Marketing Management*, Vol. 34, No. 8, pp. 848-858.
- Jaakkola, E., and Hakanen, T. (2013), "Value co-creation in solution networks", *Industrial Marketing Management*, Vol. 42 No. 1, pp. 47-58.
- Johnson, M. and Mena, C. (2008), "Supply chain management for servitized products: a multi-industry case study", *International Journal of Production Economics*, Vol. 114 No. 1, pp. 27-39.
- Johnstone, S., Dainty, A. and Wilkinson, A. (2009), "Integrating products and services through life: an aerospace experience", *International Journal of Operations and Production Management*, Vol. 29 No. 5, pp. 520-538.
- Kapletia, D. and Probert, D. (2010), "Migrating from products to solutions: An exploration of system support in the UK defense industry", *Industrial Marketing Management*, Vol. 39 No. 4, pp. 582-592.
- Kastalli, I.V. and Van Looy, B. (2013). Servitization: Disentangling the impact of service business model innovation on manufacturing firm performance. *Journal of Operations Management*, 31(4), 169-180.
- King, N. (2004), "Template analysis", in G. Symon, C. Cassell, eds. *Essential Guide to Qualitative Methods in Organizational Research*, Sage, Thousand Oaks, London, pp. 256-270.

- Kowalkowski, C., Windahl, C., Kindström, D., and Gebauer, H. (2015), "What service transition? Rethinking established assumptions about manufacturers' service-led growth strategies", *Industrial Marketing Management*, Vol. 45 No. 2, pp. 59-69.
- Larsson, R. and Bowen, D. E. (1989), "Organization and customer: managing design and coordination of services", *Academy of Management Review*, Vol. 14 No. 2, pp. 213-233.
- Leiringer, R., Green, S.D. and Raja, J.Z. (2009), "Living up to the value agenda: the empirical realities of through-life value creation in construction", *Construction Management and Economics*, Vol. 27 No. 3, pp. 271-285.
- Lockett, H., Johnson, M., Evans, S. and Bastl, M. (2011), "Product Service Systems and supply network relationships: an exploratory case study", *Journal of Manufacturing Technology Management*, Vol. 22, No. 3, pp. 293-313.
- Matthyssens, P. and Vandenbempt, K. (2008), "Moving from basic offerings to value-added solutions: Strategies, barriers and alignment", *Industrial Marketing Management*, Vol. 37 No. 3, pp. 316-328.
- Metters, R.D. and Vargas, V. (2000), "A typology of de-coupling strategies in mixed services", *Journal of Operations Management*, Vol. 18 No. 6, pp. 663-82.
- Miles, M.B. and Huberman, A.M. (1994), *Qualitative data analysis: An expanded sourcebook*. Sage: London.
- Mont, O. (2002), "Clarifying the concept of product-service system", *Journal of Cleaner Production*, Vol. 10 No. 3, pp. 237-245.
- NAO (2002), *Implementation of integrated project teams*, National Audit Office: London.
- Nordin, F. and Kowalkowski, C. (2010), "Solutions offerings: a critical review and reconceptualization", *Journal of Service Management*, Vol. 21 No. 4, pp. 441-459.
- Oliva, R. and Kallenberg, R. (2003), "Managing the transition from products to services" *International Journal of Service Industry Management*, Vol. 14 No. 2, pp. 160-172.
- Oliva, R., Gebauer, H., & Brann, J. M. (2012), "Separate or integrate? Assessing the impact of separation between product and service business on service performance in product manufacturing firms", *Journal of Business-to-Business Marketing*, Vol. 19 No. 4, pp. 309-334.
- Ponsignon, F., Smart, P.A. and Maull, R.S. (2011), "Service delivery system design: characteristics and contingencies", *International Journal of Operations and Production Management*, Vol. 31 No. 3, pp. 324-349.
- Raja, J.Z., Green, S.D. and Leiringer, R. (2010), "Concurrent and disconnected change programmes: strategies in support of servitization and the implementation of business partnering", *Human Resource Management Journal*, Vol. 20 No. 3, pp. 258-276.
- Raja, J. Z., Bourne, D., Goffin, K., Çakkol, M., and Martinez, V. (2013), "Achieving customer satisfaction through integrated products and services: An exploratory study", *Journal of Product Innovation Management*, Vol. 30 No. 6, pp. 1128-1144.

- Sawhney, M. (2006). Going beyond the product. In *The service-dominant logic of marketing: Dialogue, debate, and directions*, edited by Robert L. Lusch and Stephen L. Vargo. M.E. Sharpe: New York, pp. 365-380.
- Storbacka, K. (2011). A solution business model: Capabilities and management practices for integrated solutions. *Industrial Marketing Management*, Vol. 40 No. 5, 699-711.
- Strauss, A.L. and Corbin, J. M. (1990), *Basics of qualitative research*. Newbury Park, CA: Sage.
- Tukker, A. (2004), "Eight types of product-service system: eight ways to sustainability? Experiences from SusProNet", *Business Strategy and Environment*, Vol. 13 No. 4, pp. 246-60.
- Tuli, K.R., Kohli, A.K. and Bharadwaj, S.G. (2007), "Rethinking customer solutions: From product bundles to relational processes", *Journal of Marketing*, Vol. 71 No. 3, pp. 1-17.
- Vandermerwe, S., and Rada, J. (1988), "Servitization of business: adding value by adding services", *European Management Journal*, Vol. 6 No. 4, pp. 314-24. .
- Voss, C., Johnson, M. and Godsell, J. (2016), "Case Research", in *Research Methods for Operations Management*, Edited by C. Karlsson. Routledge: London.
- Voss, C., Tsikriktsis, N. and Frohlich, M. (2002), "Case research in operations management", *International Journal of Operations and Production Management*, Vol. 22 No. 2, pp. 195 -219.
- Windahl, C., Andersson, P., Berggren, C. and Nehler, C. (2004), "Manufacturing firms and integrated solutions: characteristics and implications", *European Journal of Innovation Management*, Vol. 7 No. 3, pp. 218-28.
- Windahl, C., and Lakemond, N. (2006). Developing integrated solutions: The importance of relationships within the network. *Industrial Marketing Management*, Vol. 35 No. 7, 806-818.
- Windahl, C. and Lakemond, N (2010), "Integrated solutions from a service-centered perspective: Applicability and limitations in the capital goods industry", *Industrial Marketing Management*, Vol. 39 No. 8, pp. 1278-1290.
- Wise, R. and Baumgartner, P. (1999), "Go downstream: the new profit imperative in manufacturing", *Harvard Business Review*, Vol. 77 No. 5, pp. 133-41.
- Woodward, J. (1965), *Industry Organization: Theory and Practice*, Oxford University Press: Oxford.
- Wynstra, F., Spring, M., and Schoenherr, T. (2015), "Service triads: a research agenda for buyer-supplier-customer triads in business service", *Journal of Operations Management*, Vol. 35 No. X, pp. 1-20.
- Yin, R.K. (2003). *Case study research – Design and methods*. Thousand Oaks: Sage Publications.
- Zomerdijk, L.D. and de Vries, J. (2007), "Structuring front office and back office work in service delivery systems: An empirical study of three design decisions", *International Journal of Operations and Production Management*, Vol. 27 No. 1, pp. 108 – 131.