

Framing the Servitization Transformation Process: A Model to Understand and Facilitate the Servitization Journey

Tim Baines¹, Ali Ziaee Bigdeli^{1*}, Rui Sousa², and Andreas Schroeder¹

¹ *The Advanced Services Group, Aston Business School, Aston University, Birmingham, B4 7ET, UK.*

² *Catolica Porto Business School, Catholic University of Portugal (Porto)*

Abstract

The concept of servitization is well established in the literature, and yet the processes of organisational change that manufacturers undergo to compete through services have received much less attention. Therefore, this paper develops a model that enables a *description* of the servitization processes, the principal stages of organisational change, and the forces impacting these processes. It is based on a series of 14 case studies of the process of servitization over time in multinational manufacturers. Evidence and analysis from these cases are used to establish that manufacturers undergo four stages of organisational maturity (*Exploration, Engagement, Expansion* and *Exploitation*), through which an organisation progresses according to the pressures of five principal forces (customer pull, technology push, value network positioning, organisational readiness, and organisational commitment). This progression can be characterised as a business growth model with multiple crises or tipping points. This research contributes to our understanding of the process of servitization and proposes a model which can be used to explain progression. It also forms the basis to better prepare manufacturers as to what to expect as they embark on a servitization journey.

Keywords – Servitization, Advanced Services, Process, Transition, Transformation, Organisational Change

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1. INTRODUCTION

Servitization continues to be a topic of growing importance and interest to both the research and practice communities. For both, an overriding challenge is to understand and manage the transformation processes that manufacturing companies must undergo to compete through services rather than through products alone (Kowalkowski et al., 2017b, Baines et al., 2017). These transformation processes may be wide ranging and complex, often requiring significant organisational change involving operating processes, capabilities, and platforms (Martinez et al., 2017). Yet, despite numerous successful examples such as Goodyear's Proactive Solutions, MAN Truck & Buses Drivers' Behaviour Monitoring, and Volvo Construction's Proactive Monitoring and Maintenance, many firms struggle to successfully servitize (Lütjen et al., 2017). This study, therefore, examines the processes by which manufacturers transform to compete through services, giving special attention to the more advanced services. It seeks to understand and characterise how a manufacturing organisation changes and matures in introducing, designing, and delivering services.

Much of the preceding servitization research has examined the *content*, and to some extent its relationship with the *context* (see Pettigrew, 1988), of organisational change within manufacturing firms, in other words, *what have manufacturers changed* and *what were the circumstances when these changes occurred?* (Baines et al., 2017). Much less attention has been given to the *process* of organisational change through servitization and how this is impacted by the *context*; in other words: *how did (or should) change occur* and *what the circumstances were (or should be) when change occurs*. The absence of research in this area has been noted by Martinez et al. (2017), Lütjen et al. (2017), and Kowalkowski et al. (2017b). All highlight the limitations in our knowledge of the change process arguing that, despite the prevalence of services amongst manufacturing firms, many struggle to understand and manage the transition from product-centric to services-centric businesses. Knowledge about the interplay of environmental factors is also lacking (Baines and Shi, 2015, Brax and Visintin, 2017). Indeed, Finne et al. (2013) draw attention to the need to study how contextual factors affect the change process, and that transition can be slow and cautious because of such factors.

Researchers are now responding to this opportunity. In particular, Martinez et al. (2017) have studied three diverse organisations and argue that the change process is best explained by the theory of continuous change; while Lütjen et al. (2017) interviewed senior managers across 14 firms in the energy sector to suggest that innovation theory describes the servitization process.

Overall, these researchers agree that the change process is complex and loosely structured, that there is still much to learn, and that fulfilling this need is best achieved through a broad, in-depth and longitudinal study of a range of manufacturers (Vendrell-Herrero et al., 2014).

The study described in this paper, therefore, explores the organisational change process brought about by servitization and how this is impacted by business contextual factors. As explained in the paper, this is based on multiple case studies across 14 multinational manufacturing firms engaging with servitization, with aspirations to compete through advanced services. Data is captured from a range of expert witnesses from all levels within these organisations. These case studies and their analyses have been guided by three research questions which examine: (i) *the rationalisation of this process into stages or steps*, (ii) *the interplay of contextual factors*, and (iii) *the characteristics of the change process and the theory describing this process*. Our analysis leads to three key findings and contributions to servitization research and practice.

First, that at an aggregated level, the process of organisational change through servitization can be explained as four macro-stages: *Exploration, Engagement, Expansion and Exploitation*. Second, that progression both between and within these macro-stages is significantly influenced by contextual factors, which can be grouped into five categories relating to the customer, technology, the value network, organisational readiness, and the commitment of the host business. Third, that while progression from one macro-stage to the next does appear as structured and predominantly unidirectional, within these are sub-processes which are characteristically organic, unstructured and iterative, and so the whole process can be characterised as a business growth model with multiple crises or tipping points. These three insights are drawn together to form a model (*the servitization progression model*) that represents how the process of organisational change unfolds as a manufacturer undertakes a servitization journey.

Overall, this study moves forward our understanding of the process of servitization. In particular, it builds on the studies by Martinez et al. (2017) and Lütjen et al. (2017) by understanding how relevant contextual factors affect the servitization process, and reconciling how servitization can be explained theoretically. In addition, it brings together the notions that (i) servitization is a unidirectional and linear *shift* from products to product–service offerings (Turunen and Finne, 2014), with (ii) the servitization process being neither logical nor structured (Martinez et al., 2017). This study establishes that both characteristics (i.e. unidirectional and unstructured) may be exhibited in practice by a business, depending on the level of aggregation at which the change processes are viewed (i.e. at a macro-level the servitization process may appear to progress linearly, yet the underpinning sub-processes are likely to be unstructured and iterative). From a

practical perspective, this understanding better prepares managers to appreciate the likely characteristics of a servitization programme and how this will unfold in practice.

The paper is organised, first, to establish and then present the initial research questions. Then, the case study methodology is described, along with the process for data collection and analysis. Analysis and discussion then follow to develop the propositions and the transformation model. The final section provides the conclusion, outlining limitations and setting out an agenda for future research.

2. THEORETICAL BACKGROUND

This section sets out the definitions and scope, and develops the research questions for this study as illustrated in Figure 1.

2.1 Research context and scope

The origins of servitization research lie with Vandermerwe and Rada (1988) and over the last 30 years servitization has received ever increasing attention by the research community (Baines et al., 2017). Today there is global awareness of the importance of services to manufacturers and yet some important aspects of the processes of servitization are still to be fully explored. This study sets out to contribute to this domain, and so this section summarises the context and scope taken for this work. In particular it provides a foundational (i) definition of servitization, (ii) positioning of servitization against deservitization, (iii) expressing servitization as a transformation process, and (iv) transformation as a process of organisational change. Exploring of these topics are taken in turn.

Servitization is commonly taken to be a transition or transformation which is largely characterised as a linear and gradual move along a product continuum from less to more sophisticated services (Lutjen et al., 2017, and Oliva and Kallenberg, 2003). Such conceptualisation implies a direct relationship between service offerings and the extent of servitization. This is an established view (see Mont (2004), Tukker (2004), Martinez et al. (2010) and Gaiardelli et al. (2014)), and is similar to the notion that a firm's service transformation can be assessed by the number of its service offerings (see Mathieu (2001), Raddats and Burton (2011), Ulaga and Reinartz (2011)). Other researchers, however, see such relationships between service offerings and the extent of servitization as more blurred (see Raddats and Kowalkowski (2014), Windahl and Lakemond (2010)) and that a manufacturer may have a latent capability to offer services, though the commercial environment may limit their saleability and success. These reservations are largely

addressed by taking servitization to be the innovation of an organisation's capabilities and processes, and that, generally, the extent of servitization can be assessed in terms of the sophistication of services offered (Baines et al., 2009).

Service sophistication varies on the level of risk, competition, and potential to create competitive advantages (Oliva and Kallenberg, 2003, and Eggert et al., 2014). Services can be categorised as either base services (warranties and spare parts), intermediate services (maintenance, repair, overhaul) and advanced services (Baines and Lightfoot, 2013). Advanced services are complex value propositions whereby the manufacturer focuses on providing performance *outcomes* to customers, and can be thought of as substituting services (Cusumano et al., 2015) that replace the purchase of the product (Paiola et al., 2013). Iconic examples of these include MAN's Pay-per-Kilometre (Bustinza et al., 2015), which offers comprehensive services around drivers' behaviour and fuel efficiency based on the distance the company's trucks are driven. Such services are also known as Pay-per-Use contracts (Martinez et al., 2017), Outcome-based Contracts (Kowalkowski et al., 2009, Batista et al., 2017), Performance-based Contracts (Kindström and Kowalkowski, 2014) and Capability Contracts (Gebauer et al., 2011). Advanced services are, therefore, a convenient categorisation of more sophisticated services, and have been chosen as the focus for this study.

This study deals with the servitization of the manufacturing firm. A common perception is that servitization is confined to manufacturing, though this is not necessarily the case (Kawalowski et al., 2017, Vandermerwe and Rada, 1988), and service sector companies can also servitize by increasing the bundling of their service offerings. This distinction here is important as the servitization process may differ based on the form of the host organisation. In a similar vein, it is important to recognise that manufacturing firms may go in the opposite direction and move away from service provision. This is the process of deservitization and occurs when a firm reduces or curtails service provision; indeed the interplay between servitization and deservitization is not yet well understood and deserves closer examination (Valtakoski, 2017, Kowalkowski et al., 2017a). However, in this study we have restricted our scope to manufacturing firms engaging with servitization and excluded services businesses or those undergoing deservitization in our research design.

Servitization can, therefore, be taken as the transition or transformation towards advanced services (Lutjen et al., 2017, and Oliva and Kallenberg, 2003). Yet, this opens questions as to whether it is most appropriate to describe the process of servitization as 'transitional' (Oliva and Kallenberg, 2003) or 'transformational' (Vendrell-Herrero et al., 2014). Although the term *transition* is

perhaps most dominant in the literature, these terms are frequently interchanged and often taken to mean the same. Yet, there are two types of assumptions in the prevalent literature: either companies move away from products into services, or companies extend or expand their coverage (Finne et al., 2013). The term *transition* does suggest more of a *shift* from one state to a second ‘Goods to Services’, while *transformation* allows for an *extension*, where the second state embraces the first ‘Goods and Services’. In this sense, IBM demonstrated a transition in moving from producing products to supplying services, whereas Rolls-Royce demonstrated a transformation by expansion of its product portfolio to include services. In this study, we embrace both transformation and transition. However, throughout the paper, we will favour the term *transformation*, both for brevity in the text and because it suggests a more inclusive approach to servitization.

Given that our chosen definition of servitization focuses on manufacturing organisations, and the innovation of these organisations to offer advanced services, then in this context, transformation is concerned with the processes of organisational change. Organisational change occurs as an interplay between the context, process and content (Pettigrew, 1988, Whipp et al., 1989, Pye and Pettigrew, 2005). Context deals with the circumstances of change (internal and external to organisations), while process deals with how change takes place, and content deals with the actual decisions reached. According to Baines et al. (2017), there is now a relatively well-established body of *content*-focused research on servitization (e.g., co-design processes (Durugbo, 2014), customer-supplier relationships (Kohtamäki et al., 2013a, Selviaridis and Norrman, 2014), buying processes (Lindberg and Nordin, 2008), network structures/configurations (Ziaee Bigdeli et al., 2018, Kohtamäki et al., 2013b, Nordin et al., 2013, Chakkol et al., 2014, Bikfalvi et al., 2013), and complex networks (Finne et al., 2015). By contrast far less attention has been given to the *process* aspects of organisational change associated with servitization (Martinez et al., 2017, Brax and Visintin 2017, Kowalkowski et al. 2017b) and, in particular, how this interplays with contextual factors (Baines et al., 2017, Dmitrijeva et al., 2018). Exploring this topic in-depth is, therefore, the focus of this study.

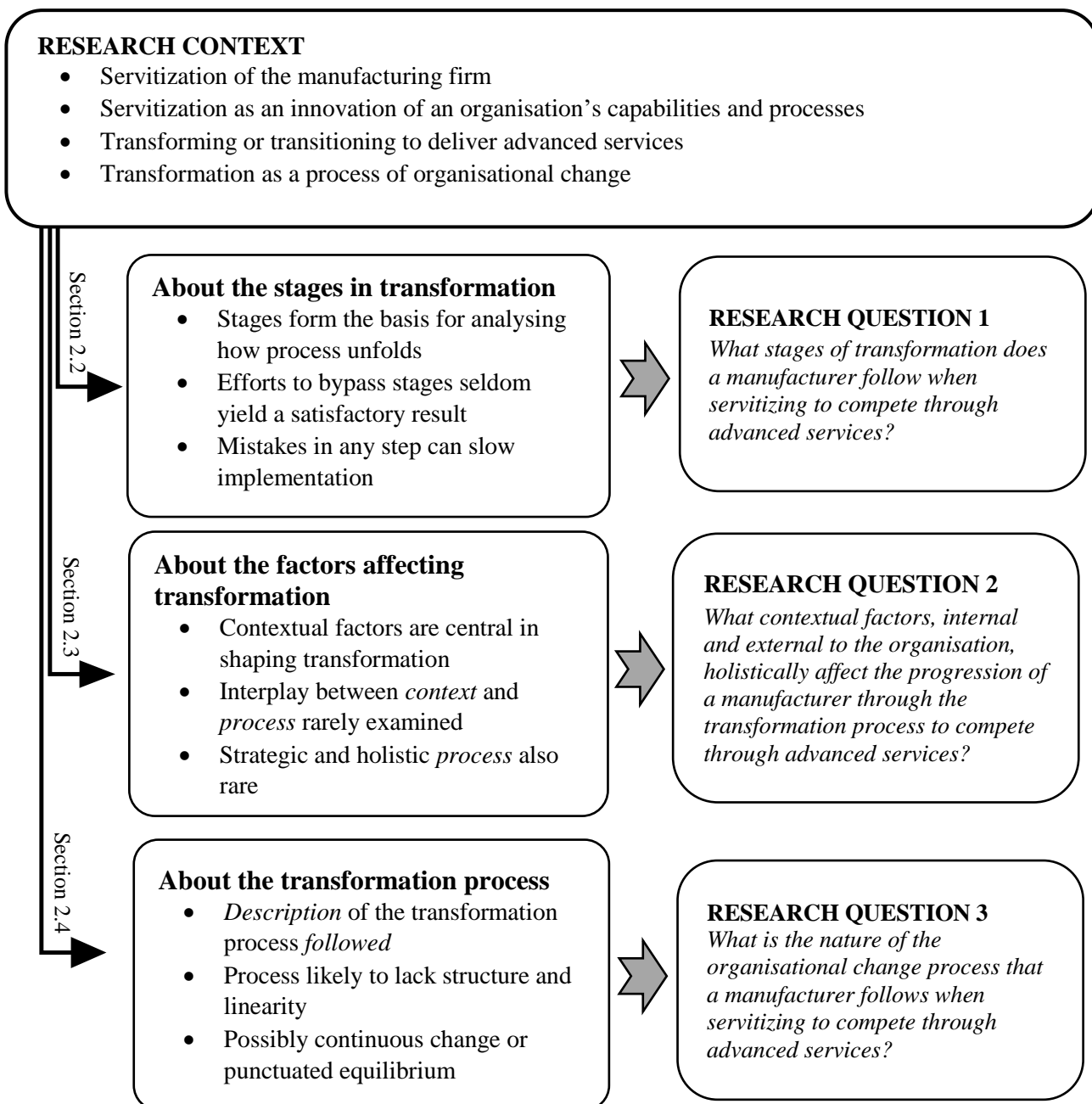


Figure 1. Summary of the theoretical framing of this study

2.2 About the stages in transformation

Studies about *process* differ as to whether they focus on ‘describing’ the transformation process that manufacturers *have followed* or ‘prescribing’ *how to go* about servitization and change management (see Judson (1991), Kotter (1995), Galpin (1996), Armenakis and Bedeian (1999), and Armenakis et al. (2000)). The former suggests a reflective study and capturing a description

of the decisions and actions of a manufacturer as the servitization journey unfolds; while the latter is concerned with prescribing a set of analyses and actions that can be followed to guide servitization. Practitioners are especially interested in this latter case, and yet for such prescriptions to be reliable, they should be founded on a thorough understanding and evidence of the former. In this regard, therefore, this study focuses on capturing the transformation that manufacturers *have* followed (i.e. descriptive).

There is only limited reporting of the step-by-step service journeys of individual firms (Vendrell-Herrero et al., 2014). Martinez et al. (2017) argue that service-driven transformation requires the reconfiguration of fundamental elements of the product–service offering, organisation and value network, and that such change processes may unfold over a number of phases of emergence, development, implementation and diffusion (Hargrave and Van de Ven, 2006). In their review of servitization literature, Brax and Visintin (2017) discuss stepwise progression models that identify progressive stages of increasing servitization. They note that stepwise models are particularly important, as these indicate *stages* and form the basis for analysing how the servitization process unfolds, although they also caution against an assumption of the servitization process as unidirectional. On this basis, Lütjen et al. (2017) suggest that early stages tend to be based on already existing products, resources and technologies (Oliva and Kallenberg, 2003), while later stages require substantial changes in the underlying technologies and competences, and in the customer value and behaviours in a greater extent.

Stages or steps are common in *prescriptive* models, and one of the best-known change management models is that of Kotter and Cohen (2002). Their model consists of eight steps to be followed when implementing fundamental changes: (i) establishing a sense of urgency; (ii) forming a powerful coalition of individuals; (iii) creating a vision and strategy; (iv) communicating the vision; (v) empowering others to act; (vi) creating short-term wins; (vii) consolidating improvements; and (viii) anchoring the new approaches. Such work has its roots in the primary model proposed by Lewin (1947), which consists of unfreezing, moving, and freezing phases. Building on this, Judson (1991), Kotter (1995), Galpin (1996), Armenakis and Bedeian (1999), Armenakis et al. (2000), and Kotter and Cohen (2002) have all proposed multi-staged models to be followed in implementing changes as an organisation's commitment and progress develops. In particular, they extend the Kotter (1995) model to include: (i) readiness for change, and (ii) dealing with resistance when executing a change management programme.

Stages are also common in models *describing* organisational change. Scott and Bruce (1987) develop a model of organisational transformation and growth, which is based on the classical

product life-cycle stages. These are (i) inception (which focuses on the idea development), (ii) survival and growth (which focuses on gaining backing), (iii) expansion (which focuses on organisational structures), and (iv) maturity (which focuses on stability). However, both descriptive and prescriptive models emphasise two key points: (i) the change process typically occurs in multiple steps that take a considerable amount of time to unfold, and efforts to bypass steps seldom yield a satisfactory result, and (ii) mistakes in any step can slow implementation as well as negate hard-won progress. These insights lead to our first question about the change process.

RQ 1: What stages of transformation does a manufacturer follow when servitizing to compete through advanced services?

2.3 About the factors affecting transformation

Finne et al. (2013) demonstrate that contextual factors are central in shaping the organisational transformation towards servitization. In general, contextual factors are seen as wide-ranging and can be both internal and external to the organisation (Kelly and Amburgey (1991), Pye and Pettigrew (2005), Hatch (2012)). Internal factors include: (i) organisational structure, (ii) corporate culture, (iii) power and leadership, (iv) internal political characteristics, (v) strategic directions, (vi) level of trust and stage of the board development. Whereas external factors include: (vii) external political characteristics, (viii) economics, (ix) social aspects, (x) technology, (xi) environment, (xii) industry, and (xiii) regulations. Several servitization studies have explored some of these factors, such as Gebauer (2008), who has studied how market growth impacts favourable service strategies, and Turunen and Finne (2014), who have examined how servitization success might be affected by technologies and political conditions. Table 1 captures the wide range of such studies that currently exist and illustrates whether they deal with factors that are internal or external to the manufacturer, and the relationship to the content or process of organisational change.

Table 1 illustrates that, predominantly, studies focus on relationships between *context* (internal & external) and *content*. For instance, Ahamed et al. (2013) examine how the internal processes of goal-setting mediated staff concerns during servitization. By contrast, only a few studies consider the relationships between *context* and *process*. Those that have can be subdivided into two broad groups: the first dealing with the more strategic and holistic aspects of organisational change, and the second focusing on operational and tactical levels. The former is characterised by

Kowalkowski et al. (2017a), who examine how agile leadership within a manufacturer impacts the service growth route. An example of the latter is Eloranta and Turunen (2016), who provide a rationale for using platform approaches in the manufacturing context and demonstrate how complex inter-organisational relationships impact value creation processes in service networks.

The paucity of research examining the interplay between context, both internal and external to the organisation, and the strategic and holistic process of servitization transformation, leads us to our second research question.

RQ 2: What contextual factors, internal and external to the organisation, holistically affect the progression of a manufacturer through the transformation process to compete through advanced services?

Authors	Factor(s) under investigation	Context		Content	Process
		Internal	External		
(Alghisi and Saccani, 2015)	Service design capabilities for successful implementation of service transition strategy.	★		★	
(Alghisi and Saccani, 2015)	Top management commitments on investment in service growth.	★		★	
(Kowalkowski et al., 2017a)	Agile leadership on service growth routes.	★			★
(Alghisi and Saccani, 2015, Lienert, 2015, Martinez et al., 2010, Johnstone et al., 2009, Gebauer and Friedli, 2005)	Internal marketing to create the internal buy-in that establishes the service culture.	★		★	
(Burton et al., 2017)	New responsibilities/organisational realignment for service delivery.	★		★	
(Parida et al., 2014)	Network management capabilities to facilitate the servitization transformation.	★			★
(Ulaga and Reinartz, 2011)	Availability of resources and knowledge on new service development.	★		★	
(Gebauer and Friedli, 2005)	Employee education to facilitate the piloting of the service offering.	★		★	
(Ahamed et al., 2013)	Clear goal-setting and performance criteria development to streamline internal processes for service development.	★		★	

(Bastl et al., 2012)	Shifts towards user process-oriented services on the creation of a push for more collaborative relationships.		★	★	
(Turunen and Finne, 2014)	Regulatory changes that can ban or facilitate new product–service offerings.		★	★	
(Benedettini et al., 2015)	Broader social values, the customers’ satisfaction, relationship, loyalty and retention with the organisation, which can facilitate servitization.		★	★	
(Neely, 2008)	The level of economic development, which can impact servitization.		★	★	
(Story et al., 2017, Baines and Lightfoot, 2014, Lightfoot et al., 2011)	ICT that facilitates servitization by improving the delivery of new services.	★		★	
(Holmström and Partanen, 2014)	Technology-driven design of solutions which facilitates servitization by allowing for new offerings to be considered.	★		★	
(Bustinza et al., 2013)	The capability to collect data on the customers’ experience of goods/services to allow for a better insight into service-related consumer behaviour.	★		★	
(Opresnik and Taisch, 2015, Lee et al., 2014)	Visualisation and analysis techniques for the processing of big data to facilitate the establishment of new service propositions.	★		★	
(Wilkinson et al., 2009)	Supply chain integration on the development of new service offering.		★	★	
(Kamp and Parry, 2017, Story et al., 2017)	The open sharing of data and knowledge which can enable collaborative working between buyers and suppliers and the joint development of new service offerings.		★	★	
(Eloranta and Turunen, 2016)	Platform approaches to provide structure for managing network cooperation in the servitization process.		★		★
(Story et al., 2017)	Managing partner relationships in the network to support the service value co-creation within the network.		★	★	

Table 1. Servitization studies’ focus on relationships between *context* and *content*

2.4 About the transformation process

Servitization is often seen as a unidirectional and linear *shift* from products to product–service offerings and, yet, practice rarely plays out so objectively (Spring and Araujo, 2013). Indeed, on the basis of three in-depth cases studies, Martinez et al. (2017) conclude that the servitization process is neither logical nor structured, but is much more emergent and intuitive. Spring and Araujo (2013) stress the continuously emergent and exploratory nature of the shift to service, and conceptualise the restless firm – in conjunction with its restless network counterparts – which is

engaged in network reconfiguration rather than simply ‘moving downstream’. Similarly, Kowalkowski et al. (2012) suggest that the transition takes place through ‘agile incrementalism’ as opportunities are seized and improvements take place independent of a centralised servitization strategy. Wilkinson et al., (2009) recognise systemic characteristics and, rather than sequential steps, they suggest that transition takes place through the resolution of organisational problems along the way.

These differing views of transformation are reflected in the broader literature on organisational change, which is dominated by two approaches: (i) continuous change and (ii) punctuated equilibrium. The continuous change approach emphasizes a situation where organisations and their people continually monitor, sense, and respond to the external and internal environment in small steps as an ongoing process (Luecke, 2003). Burnes (2004) identifies continuous change as the ability to change continuously in a fundamental manner. The theory of continuous change suggests that change is not episodic but endemic to the way in which organisations operate, having the ability to engage in rapid and relentless continuous change (Langley et al., 2013). By contrast, punctuated equilibrium is characterised by long periods of relative peacefulness with small, incremental changes that are interrupted by brief periods of discontinuous and radical change (Tushman and Anderson, 1986). There are other frameworks that also explain this organisational change process. In particular, Scott and Bruce (1987) propose a model of business growth that somewhat reconciles the differences between linear growth and radical change. They identify five stages which are punctuated by four crisis points that precede the advance into the next stage of development. It is the anticipation of these crises, and the successful management of the change that they cause, that ensures the survival of the growing business.

Servitization research has yet to settle on which model or theory is most appropriate for explaining the transformation process. The relatively exploratory work by Martinez et al. (2017) argues that the change process is best explained by the theory of continuous change; though Lütjen et al. (2017), having interviewed senior managers across 14 firms in the energy sector, suggest that the innovation management perspective also explains the organisational change process. This leads us to conclude that further work is necessary in this area and leads to our final research question.

RQ 3: What is the nature of the organisational change process that a manufacturer follows when servitizing to compete through advanced services?

3. RESEARCH METHOD

This study set out to illuminate the transformation process that a product-centric manufacturer undertakes as it servitizes to compete through advanced services. Given the nature of the research questions, this paper has adopted a multiple case study approach that allows the examination of *replication* logic (Yin, 2003), a condition in which empirical analyses can be seen as a series of independent experiments that confirm or disconfirm conceptual insights as they emerge (Eisenhardt, 1989). This section describes the case selection as well as the data collection and analysis methods.

3.1 Case selection

A critical aspect of the study was securing the participation of manufacturers involved in servitization, and specifically involved with a transformation centred on competing through advanced services. However, identifying such a pool is fraught with challenges. The research team faced two issues in particular: (i) an ideal case company would have fully executed and experienced a transformation process, yet the anticipated extended time-line of such a process (i.e. several years) means that evidence of earlier stages of maturity are unlikely to be available within such organisations; and (ii) an ideal case company would report business performance indicators about advanced services, yet financial conventions for such reporting differ across businesses (Baines and Lightfoot, 2013). The solution for this study was to accept a less specific selection and, instead, allow manufacturers to be chosen as case candidates if they indicated some reliable evidence of a trajectory towards advanced services. For example, early experimentation with an outcome-based contract or developing a services-led offering were considered to be positive indicators. As a result, selected cases were at different levels of organisational readiness in the development and delivery of advanced services, and evidence of this was recorded and analysed for scrutiny (see Section 4.1).

Search, selection and engagement proceeded as follows. A range of techniques was used to establish a shortlist of companies, including: (i) monitoring attendees at field service networking events, (ii) participating in forums and networking on LinkedIn, (iii) reviewing articles in professional periodicals and magazines, and (iv) web searches for businesses that have associations with advanced service-type contracts. During the process, extra care was taken to: (i) focus on manufacturers (note that services business can also offer forms of advanced services), (ii) achieve a broad view of transformation by covering a range of servitization maturity levels,

and (iii) avoid selection of competing companies since this would inhibit willingness to participate.

Shortlisted companies were then invited to participate in this study. The participating companies had to agree to: (i) provide access to middle/senior management, (ii) take part in several rounds of interviews, workshops, meetings, etc., and (iii) grant the research team access to their facilities to observe day-to-day operations. Following this process, 14 company cases were identified and preliminarily engaged by August 2014. For all cases, negotiations concerning access and confidentiality were carried out, and, therefore, the names of the manufacturing organisations have been coded (Case A through to Case N). An overview of the selected cases is provided in Table 2.

Case Identifier	Industry/ Business Focus	Size (Turnover/No. of Staff)	Evidence of Advanced Services Trajectory (Reason for Engagement in Study)
Case A	Passenger and commercial vehicle and aircraft tyre manufacturer	~ £12bn / ~ 70,000	Chief Innovation Officer approached research team to enquire about transformation expertise and to identify industry leaders.
Case B	Gas turbine engine manufacturer	~ £8bn / ~ 50,000	Frequently cited in publications as exemplar of advanced services.
Case C	Rail transportation manufacturer	~ £7bn / ~ 32,000	Cited in trade press as most innovative and successful advanced service provider in rail industry.
Case D	Heavy equipment manufacturer	~ £30bn / ~ 95,000	Frequently cited as exemplar of advanced services in business and management publications.
Case E	Manufacturer and provider of document solutions and services	~ £10bn / ~ 36,000	Widely cited in trade press as most pioneering and successful advanced service provider of printing machinery.
Case F	Truck and trailer manufacturer	~ £550m / ~ 34,000	CEO engaged research team to audit advanced service operations with customers.
Case G	Packaging equipment manufacturer	~ £600m / ~ 3,500	Service Director engaged in discussion around advanced services at tradeshow, discussed industry trends, and how the company sought to innovate their offerings.
Case H	Manufacturer of air filtration equipment	~ £3bn / ~ 1,900	Director of IoT engaged in discussion around advanced services at tradeshow, discussed need to capture value through advanced services.
Case I	Heavy equipment manufacturer	~ £5bn / ~ 18,000	Service Director engaged in discussion around advanced services at tradeshow, discussed aspiration to compete through advanced services.
Case J	Manufacturer of precision motion control systems	~ £2bn / ~ 10,700	Director of IT approached research team to deliver keynote on advanced services at their annual service conference.
Case K	Power generation, renewable energy and transmission manufacturer	~ £26bn / ~ 74,000	Engaged in discussion with business development team following presentation by research team at field service conference.
Case L	Aerospace and defence equipment manufacturer	~ £16bn / ~ 85,000	The research team was introduced to new Business Development Manager with interest in advanced services via university liaison officer.
Case M	Lifting and material-handling manufacturer	~ £700m / ~ 3,800	Service Director engaged in discussion around advanced services following his presentation at field service event.
Case N	Manufacturer of transport temperature control systems	~ £2bn / ~ 10,000	Widely cited as the leading company in developing and delivering advanced services where controlled temperature is vital.

Table 2. Overview of the selected case companies

3.2 Data collection

Data collection occurred in the period 2014–2018 and was supported by a data collection protocol based around the research questions. Accordingly, data was collected principally through semi-structured interviews (both face to face and by telephone) from a range of personnel levels. Interviews directly reflected the research questions, and were designed to guide the conversation flow towards a characterisation of servitization initiatives over time, focusing on process, as well as the contextual forces affecting progress towards increased servitization maturity. At least two researchers were present at each interview, and responses were captured by both audio recording and written notes. Each interview lasted from one to two hours. Overall, the study conducted 62 rounds of interviews, with at least three key stakeholders from each case company, resulting in more than 100 hours of recorded material. Written transcripts were prepared soon after each interview. Triangulation (Jick, 1979) was carried out to verify responses and included supplementary data, such as observation notes, organisational charts, process maps, operating protocols, and crosschecked responses from interviewees.

In addition, data collection included informal follow-ups through meetings and workshops and several rounds of on-site observations. After each of these activities, the involved researchers produced a written description of the gathered data (e.g. an account of the salient aspects discussed in a meeting). Finally, we examined archival data (mainly business plans, annual reports and internal company materials), extracting relevant information – as per the themes associated with the research questions – and transcribing/summarizing it into text, while keeping a reference to the raw data source. All of these written notes (from interviews and additional data sources) made up the *case-study database* (Yin, 2003) that was used for subsequent data analysis.

3.3 Data analysis process

We followed the principles of qualitative data analysis (Miles and Huberman, 1994) to describe, interpret and categorise the data. The key mechanisms for generating meaning from the data were noting patterns, seeing plausibility, clustering, making contrasts/comparisons, and subsuming particulars into the general (Miles and Huberman, 1994). We first performed within-case analysis, starting by organising the data around each of the research questions. We coded the data against the research questions, while simultaneously allowing for new codes and relationships to emerge inductively from the data. In order to ensure reliability and construct validity, the data was coded by two independent researchers and different interpretations of the data (e.g. classification of codes

into broader conceptual categories) were discussed vis-à-vis raw data to arrive at a consensual coding. We then performed cross-case analysis by summarising the data from each case and building displays to reveal cross-case patterns and make comparisons. Validity was further enhanced by identifying commonalities across cases, as well as by comparing cases with different levels of progression in servitization over time (Yin, 2003). Finally, we presented our findings (stages and their timing, and key contextual factors affecting progression and reconstructed pathways) to informants in each case to assess plausibility (Yin, 2003).

Analysing the findings to answer the research questions led to the formation of propositions that explain the transformation process. The next section provides additional details on the data analysis and reports the findings for each of the research questions.

4. ANALYSIS AND FORMATION OF THE TRANSFORMATION MODEL

4.1 Principal stages in the transformation process (RQ1)

From the onset, it was apparent that multiple stages of transformation maturity do exist. Case A, for instance, was concluding their activities centred on the ways in which further value could be created for current and prospective customers, and also searching for industrial exemplars that the company could study in detail. As their Chief Innovation Officer noted: *'We started by exploring the ideas around servitization by investigating the practices of manufacturers in our or other industries, what could we learn from them, and how should we go about it.'* Similarly, Cases B and C were also quite developed in their transformation journey and were focusing on their organisational strategy to optimise the delivery of advanced services, and exploit their services-led offering portfolios. In contrast, Case I was much less mature and struggling to conceptualise what an advanced service might look like for their industrial products. Indeed, they were questioning whether they might be most successful if they simply sought to sell data captured about their products directly back to their customers without any complementary services. Other cases, such as J, L and M, operated between these extremes: experimenting with offerings around advanced services, having a strong ambition to grow their portfolios, and exploring the potential of such services to their future competitive advantages.

We analysed the data with the goal of representing this progression through the transformation process at an appropriate level of abstraction, seeking to identify meaningful, distinctive stages. The data was coded to identify the significant actions or events associated with the servitization process over time in each case (as per the interviewees' accounts and other sources of data). The codes were then used to build a timeline for each case. To illustrate, Figure 2 shows the timeline

for Case A. We then iteratively analysed the servitization events within and across cases against the lenses of the different change models discussed in Section 2.4, grouping actions/events according to their conceptual similarity.

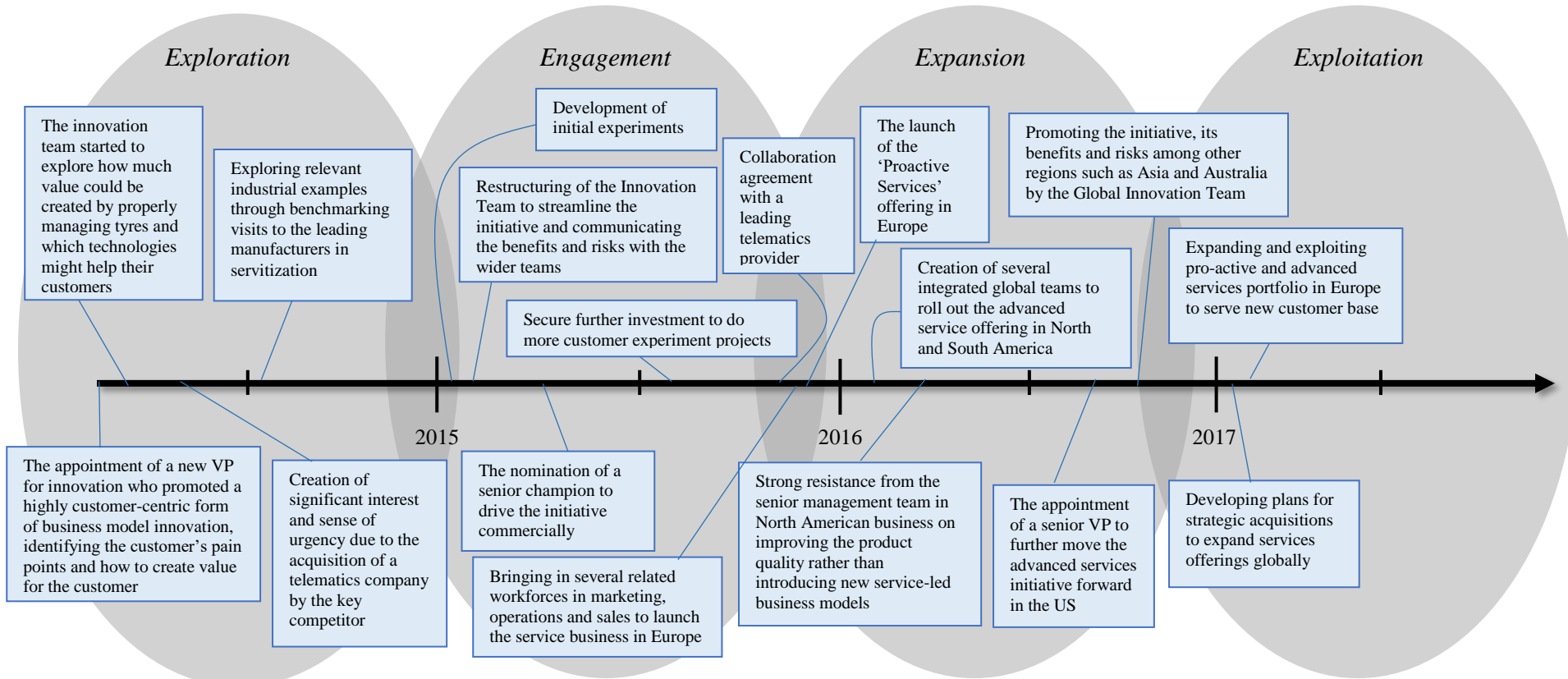


Figure 2. Timeline of the servitization process events and actions for Case A

Four conceptual categories of events in the transformation process became apparent. We found that, in each case, the events associated with each category clustered around a well-delimited time period, thus constituting different stages of maturity. In addition, each stage exhibited similar features across firms. These stages were well aligned with the four stages described in the model of organisational change proposed by Scott and Bruce (1987). The terminology and definitions of the stages were revised to better represent the servitization and advanced services context: *Exploration*, *Engagement*, *Expansion*, and *Exploitation*. By looking at the nature of the events grouped under a given stage we produced an abstract description for each stage. Table 3 summarises the features of each stage and provides illustrations from the case studies in the form of managerial concerns that were salient in each stage (from interview data).

	<i>Exploration</i>	<i>Engagement</i>	<i>Expansion</i>	<i>Exploitation</i>
Definition	Searching and finding out about the concept and the implications of competing through advanced services, until they are confident that the opportunity exists.	Seeking to evaluate and demonstrate advanced services, until the potential is accepted within the organisation.	Increasing the scale and speed at which advanced services are innovated and implemented, until significant value is demonstrated within the organisation.	Seeking to optimise innovation and delivery of an advanced services portfolio, unless business is adversely disrupted.
Illustrations from the case studies (managerial concerns)	<p>Is this right for us? (CEO, Case F)</p> <p>How much money could we make? (Service Director, Case E)</p> <p>Who does this well? (Business Development Manager, Case L)</p> <p>What are the key customer requirements? (CIO, Case A)</p> <p>What is the overall organisational mind-set on services? (Service Director, Case J)</p> <p>What are our differential</p>	<p>How do I get the board to invest? (Technical Director, Case G)</p> <p>How do we educate our customers? (CEO, Case F)</p> <p>Why can't we just sell our monitoring technology? (Service Director, Case I)</p> <p>What is the right business model? (CIO, Case A)</p> <p>What should be considered as KPIs in experimentation projects? (Service Director, Case G)</p>	<p>How do we overcome our production legacy? (Service Solutions Director, Case M)</p> <p>How do we build our market share? (Service Director, Case J)</p> <p>Who are our competitors now? (Service Director, Case E)</p> <p>How could this become an organisation-wide initiative? (CIO, Case A)</p> <p>What acquisitions should we make? (CIO, Case A)</p>	<p>How do we integrate production with service? (Senior Engineering Manager, Case B)</p> <p>How do we extend our services business? (CFO, Case F)</p> <p>What next, both in terms of the service portfolio and organisation direction? (Service Director, Case C)</p> <p>How do we improve efficiency of service delivery? (IT Director, Case H)</p>

	advantages? (Solutions Manager, Case L)			
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Table 3. Characterisation of the four stages of servitization maturity

Table 4 shows for each case the predominant incidence over time of traits associated with the four stages. It reveals that all firms seem to follow the same sequence, though not all companies had managed to progress through each stage at the time of the research. In addition, there is no evidence that firms skipped stages. Overall, the data supports the existence of the four stages in servitization journeys.

Incidents of stages over time	
Case A	<p>Timeline for Case A: Exploration (0-2), Engagement (2-3), Expansion (3-4), Exploitation (4-6)</p>
Case B	<p>Timeline for Case B: Exploration (0-1), Engagement (1-2), Expansion (2-8), Exploitation (8-10)</p>
Case C	<p>Timeline for Case C: Exploration (0-2), Engagement (2-3), Expansion (3-5), Exploitation (5-6)</p>
Case D	<p>Timeline for Case D: Exploration (0-1), Engagement (1-2), Expansion (2-6), Exploitation (6-7)</p>
Case E	<p>Timeline for Case E: Exploration (0-2), Engagement (2-4), Expansion (4-5), Exploitation (5-6)</p>
Case F	<p>Timeline for Case F: Exploration (0-1), Engagement (1-3), Expansion (3-6), Exploitation (6-7)</p>
Case G	<p>Timeline for Case G: Exploration (0-2), Engagement (2-10)</p>
Case H	<p>Timeline for Case H: Exploration (0-1), Engagement (1-2), Expansion (2-10)</p>
Case I	<p>Timeline for Case I: Exploration (0-2), Engagement (2-10)</p>
Case J	<p>Timeline for Case J: Exploration (0-3), Engagement (3-4), Expansion (4-10)</p>
Case K	<p>Timeline for Case K: Exploration (0-1), Engagement (1-3), Expansion (3-4), Exploitation (4-6)</p>
Case L	<p>Timeline for Case L: Exploration (0-1), Engagement (1-10)</p>
Case M	<p>Timeline for Case M: Exploration (0-2), Engagement (2-10)</p>
Case N	<p>Timeline for Case N: Exploration (0-1), Engagement (1-3), Expansion (3-6), Exploitation (6-7)</p>

* Note: Time units are in years. 0 signals the start of the journey for the relevant case

Table 4. Cross-case mapping of maturity stages over time

This conceptualisation of the transformation process as four stages provides a viable structure for differentiating the progress of the case companies. In the first phase of Exploration, all the case companies were looking to understand their market and explore how advanced services could play a key part in their growth. For instance, the CEO of Case F explained: *‘We started to explore what are the pain points of our customers – we found that it wasn’t the price of the truck at all; it was the cost of fuel as well as uptime ... we started to realise we can do a lot to address those pains.’* Similarly, the Business Development Manager of Case K said, *‘We started to be aware of the requirements and needs of our customers through a reverse engineer initiative, it feels like “by the way you’ll need one of those, and one of those, and one of those. And you stick them together like this”.’*

In the second stage, Engagement, the focus shifted towards securing internal backing, both financially and organisationally. The CIO in Case A stated:

We started to build alignment with the people inside the organisation for the advanced services initiatives. There was a sponsor for a group of three people who were business leaders ... so partly it was keeping them in the loop, bringing them up to date with what the global team was doing and building relationships with them.

Similarly, the Business Development Manager of Case E said:

After understanding the basics of the market and our offering, we had to think about an internal coalition to take the advanced services initiative forward ... The team was one-hundred-percent dedicated to advanced services initiatives ... in hindsight I look back and I don’t think it would have succeeded had it not been a dedicated group. There was never a pressure to support the core business; the pressure was to go and prove the new venture to be successful.

In the *Expansion* stage, the focus and efforts moved to scaling a portfolio of advanced service offerings, creating a larger market segment and enhancing cultural change initiatives. The CIO of Case A noted:

After the success of several rounds of experimentations with the selected customers (for nearly 18 months), we launched our first advanced services offering. It was initially called [xxx], but later changed to Proactive Services. The offering focused on taking care of the entire tyre-related operation for the road haulage companies through the sensor-enabled monitoring of tyre pressure and alerts, based on a monthly service fee model. A dedicated team from innovation, marketing and sales came together to work closely in identifying new relevant customers across the continent.

The General Manager of Case N also explained:

There's nothing like having a successful project to start to open people's minds ... it became real for people at that point; they could see this project, this customer, these outcomes ... here's the financial performance of that transaction, how it fits into the P&L of the business.

At the time of data collection, only eight of the case companies had reached the *Exploitation* stage of transformation, where their efforts started to focus more on institutionalising servitization across different business units and on designing their products with the mind-set required for the delivery of advanced services. On this concern, a Senior Engineering Manager from Case B stated: *'Today, our engines are designed and manufactured in a way that enables us to provide and deliver advanced services more effectively towards our customers.'* Similarly, a Senior Business Development Manager from Case N highlighted: *'Rather than having an organisation for building the products and an organisation for supporting the products – which we have currently – we now realise that we will need to manage a product through-life and have an organisational structure to reflect this.'*

Therefore, in response to the first research question, we offer:

Proposition 1: In a manufacturer's transformation to servitize and compete through advanced services, the organisation will experience four stages of process maturity as the organisation's commitment and capabilities progress.

Proposition 1.1 The manufacturer will firstly focus on Exploration, searching and finding out about the concept and the implications of competing through advanced services, until it is confident that the opportunity exists.

Proposition 1.2 The manufacturer will secondly focus on Engagement, seeking to evaluate and demonstrate advanced services, until the potential is accepted within the organisation.

Proposition 1.3 The manufacturer will thirdly focus on Expansion, increasing the scale and speed at which advanced services are innovated and implemented, until significant value is demonstrated within the organisation.

Proposition 1.4 The manufacturer will fourthly focus on Exploitation, seeking to optimise innovation and delivery of an advanced services portfolio, unless business is adversely disrupted.

4.2 Principal contextual factors that affect progression through the transformation process (RQ2)

We analysed the data based on first-order and second-order coding (Strauss and Corbin, 1998, Miles and Huberman, 1994). We started by coding the data (mainly interview data) for incidents or phenomena that constituted an evidence (or manifestation) of a contextual factor shaping the transformation process, assigning a first-order code to each. Then we grouped these factors into aggregate second-order conceptual factors. Establishing a second-order factor required the existence of at least two conceptually related first-order incidents associated with different data sources (e.g., two different respondents). For example, appetite from customer base to *experiment* new innovations, and commitments from key customers to *engage* in experimentation projects were grouped under customer pull. Since the literature is scarce on contextual factors pertaining to the servitization process (see Section 2.3), this was primarily an inductive process. The process as a whole was iterative, involving the revision of the definitions of the second-order factors to arrive at a comprehensive and consistent set of factors. The analysis resulted in five categories of factors: *customer pull*, *technology push*, *value network positioning*, *organisational readiness* and *organisational commitment*. Table 5 shows the result of the cross-case data analysis.

Factor	Presence of factors across cases														Examples from cases
	Case A	Case B	Case C	Case D	Case E	Case F	Case G	Case H	Case I	Case J	Case K	Case L	Case M	Case N	
Customer pull		✓	✓		✓			✓		✓		✓	✓	✓	<ul style="list-style-type: none"> • Strong appetite from customer base to experiment with new innovation • Initial request from key customers to purchase uptime rather than the asset • Customer engagements in experimentation projects • Level of maturity within the market about valuing outcome rather than the asset
Technology push	✓	✓		✓	✓	✓		✓	✓	✓	✓			✓	<ul style="list-style-type: none"> • The existence of the relevant technology to unlock the development of services-led offerings • Maturity of the <i>remote monitoring</i> sensors in the market • The realisation that new technologies could enable the company to do more • The threat from digital technology start-ups in analysing data from the use of the asset
Value network positioning		✓	✓	✓		✓	✓	✓	✓		✓	✓		✓	<ul style="list-style-type: none"> • Understanding of ‘who the customers actually are’ • Awareness of the fact that the partner company within the value network may change as the service proposition develops • Restructuring the relationship with dealers to get control and direct access to customers • Realisation of the existence of technology providers within the ecosystem, who could provide better, cheaper, and more effective tools to enable the company’s product to be smarter and provide a wide range of offerings to their customers
Organisational readiness	✓		✓		✓	✓	✓	✓		✓	✓	✓			<ul style="list-style-type: none"> • Empathetic that advanced services journey could only start if you have a realisable product • Experience of successful organisational transformation/acceptance of change • Understanding the importance of internal buy-in to move towards servitization • Organisational and strategic alignment across different business units • Having the right service vision and mission for the entire organisation
Organisational commitment	✓	✓		✓	✓	✓	✓		✓	✓		✓		✓	<ul style="list-style-type: none"> • Education of the senior management regarding the benefits of moving towards advanced services • Identifying new opportunities among existing customers to support the transformation progress • Engagement from the leadership in the development of advanced services offering early on • Development of a shared service to manage the data across different segments • Ability to learn from experimentation projects in the customer base

Table 5. Cross-case analysis of contextual factors

The results show that each factor was active across several cases (ranging from 8 to 10 cases, out of 14), thus receiving significant replication. They also show that, in general, several factors are active in each individual case (at least three), suggesting that progress benefits from a conjunction of different forces. The exception is Case M, which as yet has only been subject to customer pull. Overall most factors appear to influence each stage of the process to a greater or lesser extent, and indeed may lead to particular pathways through each stage.

Customer pull refers to the external context factors about the market environment that affect the progression. As an illustration, the Service Director of Case C stated, *'We had to move towards output- or outcome-based contracts, because it was a direct request from two of our largest customers ... this did play in our favour later, as we didn't need to involve in engaging or persuading the customers for such offerings.'*

Technology push refers to the external context factors about digital technologies that affect the progression. A good example took place in Case F. This firm became aware of technology that could record how its products (commercial trucks) were being used (e.g., driven by operators) and could transmit this data back to the operating company (logistics provider). Such data improved the *operators'* visibility of drivers' actions, which subsequently led to a moderation of drivers' behaviour through the use of incentives and training. By bundling this with other services, Case F was then able to develop an advanced services contract based around payment for cargo moved rather than based on asset ownership. In this regard, the CFO of Case F stated:

The technology change brought about a new realisation that we could do more. It was no longer enough for us to say this is the product, this is the component, these are the features and the benefits, and we had to start proving the performance. We then had to move towards taking care of the total cost of operation rather than cost of the asset.

Value network positioning refers to the external context factors about the value network structure that affect the progression. We found diverse examples in the cases. In Cases F and N, the distributors were observed to restrict access to customers, field service facilities and improvements in performance to such an extent that they were acquired. Case I failed to progress beyond the *Engagement* stage because the distributor inhibited customer interaction, which the management of Case I failed to navigate. Somewhat similar situations occurred around the access to remote sensing technologies, as illustrated by Case F, which for some time wrestled with the decision to acquire a technology vendor in order to increase access to and control of information about truck fleets. All these cases provide evidence supporting the

significant influence of positioning in the value network that delivers dependable access to both customers and suppliers.

Organisational readiness refers to the internal context factors about the organisation that affect whether or not the process starts. Particularly evident in the cases was the effect of the basic reliability and performance of the manufacturer's existing products. For example, Cases A, F, and G all indicated that their product platforms were entirely reliable, so that their interest in advanced services stemmed, in part, from product reliability and performance that were no longer differentiators. The CEO of Case F stated: *'Unless you manufacture a reliable asset, you will have no place in the advanced services space ... we build a reliable truck, so we can provide a platform of services.'* In contrast, Case I was unable to reach an acceptable pace in its transformation journey because its products were not sufficiently reliable to form a platform for advanced services. The Service Director of the company said:

We cannot start adding services to a range of our engines yet, because we're still testing those engines and improving their efficiency. Unless we are convinced about the reliability of our product, I'm not convinced about getting any customer on board with advanced services.

Organisational commitment refers to the common internal factors that act across all stages and focuses on the key capabilities that enable or inhibit the progression. Organisational commitment has been widely acknowledged as a key success factor for any change efforts (Kotter and Cohen, 2002, Burnes, 2004). Case H, for instance, progressed relatively quickly through the *Exploration* and *Engagement* stages because it had the support of the management board. In contrast, Case G failed to move through the *Engagement* stage because it lacked internal support. The Chief Innovation Officer of Case A said of this issue:

One of the principal factors which has been influencing our transformation journey is the commitment from the people – not only the leadership and senior people but also those who are actively involved in the effort. Getting organisational buy-in is a real challenge; I had to go around lighting lots of little bush fires.

In Case A, organisational commitment to advanced services was enhanced when a principal competitor acquired a network of service providers in South America, which caused anxiety amongst the senior management of the case company. The reaction was to significantly increase investment in its own advanced services programme.

Analysis of the principal factors affecting progression through the transformation process provides a response to the second research question as follows:

Proposition 2: In the transformation of a manufacturer to servitize and compete through advanced services, progress through the transformation process will be principally affected by (i) the extent of customer pull, (ii) the strength of technology push, (iii) the structure of the value network positioning, (iv) organisational readiness, and (v) organisational commitment.

4.3 Nature of the organisational change process (RQ3)

After having established the existence of stages and identified the contextual factors that significantly influenced progression, we addressed the nature of the transformation process. Specifically, we sought to determine whether the progression would be relatively linear or, instead, there would be reiterations and regression. Would there be consistency of decisions and actions within the stages? To find this out, we drew on the previously analysed patterns, as well as the detailed analysis of the dynamics of change within the cases, based on the rich qualitative data from the interviews.

Table 4 showed that all the firms seemed to follow the same sequence of four stages and there is no evidence that stages are skipped. Moreover, the individual case timelines (see Figure 2 for an example) showed that the events/actions associated with each stage were clustered around well-delimited time periods. Although in some cases there was some time overlap of events belonging to different stages, this overlap was short and confined to the transition period between stages. We also did not find evidence of actions/events belonging to the previous stage beyond the short transition period. Thus, at an aggregated level, the process appears to be structured and predominantly unidirectional.

However, the qualitative analysis of the dynamics of change also revealed that, within stages, there were sub-processes which were organic, unstructured and iterative. By looking at the transition periods, we also found evidence of *tipping points* between stages. These are triggered when the case for support is sufficiently strong, whether in terms of personal conviction or organisational permission, so that consent is achieved to move on to the following transformation stage. Companies would switch from *Exploration* to *Engagement* only when senior management became confident that a viable business opportunity existed; from *Engagement* to *Expansion* only when the potential of advanced services was accepted within the organisation; from *Expansion* to *Exploitation* only when significant value was demonstrated within the organisation. As illustrated by Cases G, I, L and M which did not move beyond the *Engagement* stage, not all companies had a sufficiently strong case to

overcome the tipping points. Within the stages, multiple reiterations of decisions and actions took place until such tipping conditions prevail – that the transformation process ‘tips’ and moves on to the following stage. In the case studies, once the process had moved on to a new stage, it did not return to the preceding stage unless some form of relatively catastrophic change took place within the business. Case J illustrated this: the Service Director and Technical Director both described (independently) how they were experimenting with advanced service offerings (*Engagement* stage), but the circumstance of a senior board member’s bereavement resulted in the loss of a major supporter. Subsequent staff changes ultimately resulted in the team being disbanded, the service strategy abandoned, and both the Service Director and Technical Director leaving the organisation.

The unstructured nature of the sub-processes was strongly influenced by the confluence of different contextual factors (see Table 5), which affected the detailed activities carried out by the firms. Case B, for example, was initially pulled by its customers into delivering advanced services. The strength of this pull was such that it affected the activities with which it engaged – for instance, it was not necessary to scan and analyse the market sector to identify relevant customers. Rather, the challenges centred more on developing the organisational conviction to take this opportunity, along with putting in place technologies to enable delivery of its advanced services. The situation for Case F, as another example, was different. By his nature, the company CEO was inquisitive about technology and how it might be exploited. He was introduced to one of the leading telematics providers, and the two companies collaborated closely to experiment on ways in which technology systems might enable Case F to develop and deliver advanced services. Case F experimented with, for example, having its own rental fleet to develop a proposition that could then be taken to market. Unlike Case B, it was necessary for Case F to scan, identify and engage customers. However, where Case B had to formally engage in joint ventures and acquisitions to enhance its technological capabilities and create its engine health management systems, Case F had implicitly moved through many of these decisions. Case A’s initial driver was one of the senior personnel in the innovation team that were exploring ways to inspire growth, and came to recognise that business model innovation around advanced services could provide a possible route. Case A’s interest was influenced by the growing attention to services by its key competitors. Consequently, it had to engage in a range of activities, from developing and experimenting with customer value propositions through to deciding on relationships with technology suppliers. However, Case A

came to the process with a relatively higher level of organisational engagement and a more structured methodology for innovating the propositions.

This analysis of the nature of the organisational change process leads to the proposal:

Proposition 3: In the transformation of a manufacturer to servitize and compete through advanced services, the progression from one macro-stage to the next appears as structured and predominantly unidirectional, but within these are sub-processes which are characteristically organic, unstructured and iterative, and so the whole process can be characterised as a business growth model with multiple tipping points.

5. DISCUSSION AND DEVELOPMENT OF THE MODEL

This study has focused on the servitization of manufacturing firms and the organisational transformation such firms undergo in order to offer complex and sophisticated services at scale. We have revealed insights into (i) the rationalisation of this process into stages or steps, (ii) the contextual factors (*what the situation was*) which interplay on this process, and (iii) the change process (*how change occurred*) and the theory which describes this. We now discuss the formation of a theoretical model and contrast this research with other contemporary studies in the field.

5.1 Formation of the servitization progression model

Our findings and experiences from executing this study provide the basis for a theoretical model which explains how manufacturers progress through transformation processes when they servitize to compete through advanced services. Drawing together the propositions above enables the formation of such a model, and we refer to this as *the servitization progression model* (see Figure 3).

The servitization progression model explains how the servitization journey unfolds through four distinctive stages of organisational maturity, in accordance with five sets of internal and external forces. At a macro-level, progression from stage to stage appears linear and unidirectional; yet, within each stage, activities to progress servitization are organic, intuitive and repetitive. Progress from one macro-level stage to the next is punctuated by *tipping points*, which are only overcome once the activities of the preceding stage demonstrate sufficient value that the organisation consents to progression to the following stage. So significant are these

tipping points that progression is not guaranteed, and under certain conditions the servitization journey may stall or even fail entirely. Overall, this process can be characterised as a business growth model.

The rate of progression is determined by five sets of forces. While organisational readiness seems to be present only in the first two stages, the other forces are present across the four stages. It is helpful to reflect how these forces typically interplay on the process. For instance, transformation only effectively begins if there is sufficient organisational readiness (i.e. reliable products, robust processes, etc.). Then the progression is significantly affected by the prevailing organisational commitment (i.e. management buy-in, resource availability, awareness of competitors, etc.). Working around these internal forces are the external forces of customer pull (i.e. customers requesting services, strong relationships, etc.), technology push (i.e. the availability of and access to digital technologies, etc.), and the value network positioning (i.e. relationships with distributors, dealers and vendors). These five forces interplay and collectively determine progress.

The servitization progression model explains the experience of practitioners within manufacturing firms typically in the following way. At inception, the process is triggered when one or more practitioners within the host organisation become aware of the general concepts of servitization and advanced services, and in accordance with the extent of their organisational commitment, they begin with *Exploration* and reflecting upon the concept. Then, if there is sufficient organisational readiness (and no immediate blocks apparent from other forces), they seek managerial consent to move on to the stage of *Engagement*. In *Engagement*, they search for evidence of customer demand (customer pull), and/or test the potential of technologies (technology push), and if suitable conditions prevail, they move to pilot and experiment with new advanced service offerings. If the outcomes of these are positive, these help to demonstrate the value of servitization to the organisation and progression takes place. However, this is inhibited if, for instance, the host organisation struggles to engage customers because they work through dealerships and distributors (value network). If the outcome of *Exploration* is positive, the organisation moves to *Expansion*. Pilots are translated into commercial offerings and there is a general increase in the scale and speed at which advanced services are innovated and implemented. Then, if expansion is successful, attention switches to *Exploitation*. In *Exploitation*, the organisation continues to develop new offerings and scale these, but also invests in initiatives to improve the reliability and efficiency of the delivery of services at scale.

Finally, it is important to stress the scope of this study (see Section 2) as this bounds the validity of the model we propose. Primarily, this study has focused on manufacturing firms undergoing servitization (we have purposely excluded deservitization) and to *describe* the transformation process these firms *have* followed. This study has not considered the content (*what was changed or what should be changed*) of servitization, where servitization has been taken to be indicated through the sophistication of services offered (see Baines et al., 2009; 2017).

5.2 Comparisons with contemporary servitization research

The first finding from this study is that at an aggregated level the process of organisational change through servitization can be explained as four macro-stages: *Exploration*, *Engagement*, *Expansion* and *Exploitation*. This is largely consistent with the work of Lütjen et al. (2017) who identify the three steps of (i) service initiation, (ii) service anchoring and (iii) service extension, and these align with the *Exploration*, *Engagement* and *Expansion* stages. In the study described here, *Exploitation* is teased out as an additional stage, and this is attributed to our particular focus on servitization towards advanced services, and observing that some cases (e.g., Case B) have largely absorbed business improvement activities typical of this stage. There are more striking differences to the work of Martinez et al. (2017), who identify seven steps, along with limited commonality and considerable iterations. This difference is explainable by the different level of aggregation adopted in the study, and which is consistent with that suggested by Scott and Bruce (1987). In this way, our first finding emphasises the value of a higher level of aggregation (as per Lütjen et al. (2017)) for rationalising the servitization process as a manageable concept.

The second finding is that progression both between and within these macro-stages is significantly influenced by contextual factors. These can be grouped into five categories relating to customer pull, technology push, value network positioning, organisational readiness, and organisational commitment. It has been known for some time that contextual factors are central to shaping organisational transformation and progress towards servitization (Finne et al., 2013, Cusumano et al., 2015). Indeed, various works have looked at the barriers to servitization, particularly in terms of *content* (*what have manufacturers sought to change?*) (i.e., Baines and Shi, 2015). However, by establishing a holistic set of factors and categorising these as key influencers in the *process* of servitization, this paper provides the foundation to

delve deeper into the factors in each category and their influence on detailed decisions within the process.

The third finding is that, while progression from one macro-stage to the next appears as structured and predominantly unidirectional, within these are sub-processes which are characteristically organic, unstructured and iterative. This reconciles the notions that: (i) servitization is a unidirectional and linear *shift* from products to product–service offerings (Turunen and Finne, 2014), and that (ii) the servitization process is neither logical nor structured (Martinez et al., 2017). In their work Martinez et al., describe how they observed that ‘the chronological order of steps differs from journey to journey’. Likewise, Kowalkowski et al. (2017b:15) suggest evolutionary stages and ‘tentative steps of trial and error’. Yet, the more general literature on organisational change and innovation demonstrates that process stages, iterations and key decision points can be approximately organised and ordered (see Section 2.3). Our study builds on this understanding and demonstrates that both sets of characteristics can be exhibited, depending on the level of aggregation at which the process is viewed (i.e. at a macro-level the process stages appear as a progression; yet the processes within these stages are unstructured and iterative). This is aligned with the business growth model developed by Scott and Bruce (1987) that comprises of multiple crises or tipping points, and helps to explain how the process of organisational change unfolds as a manufacturer undertakes the servitization journey.

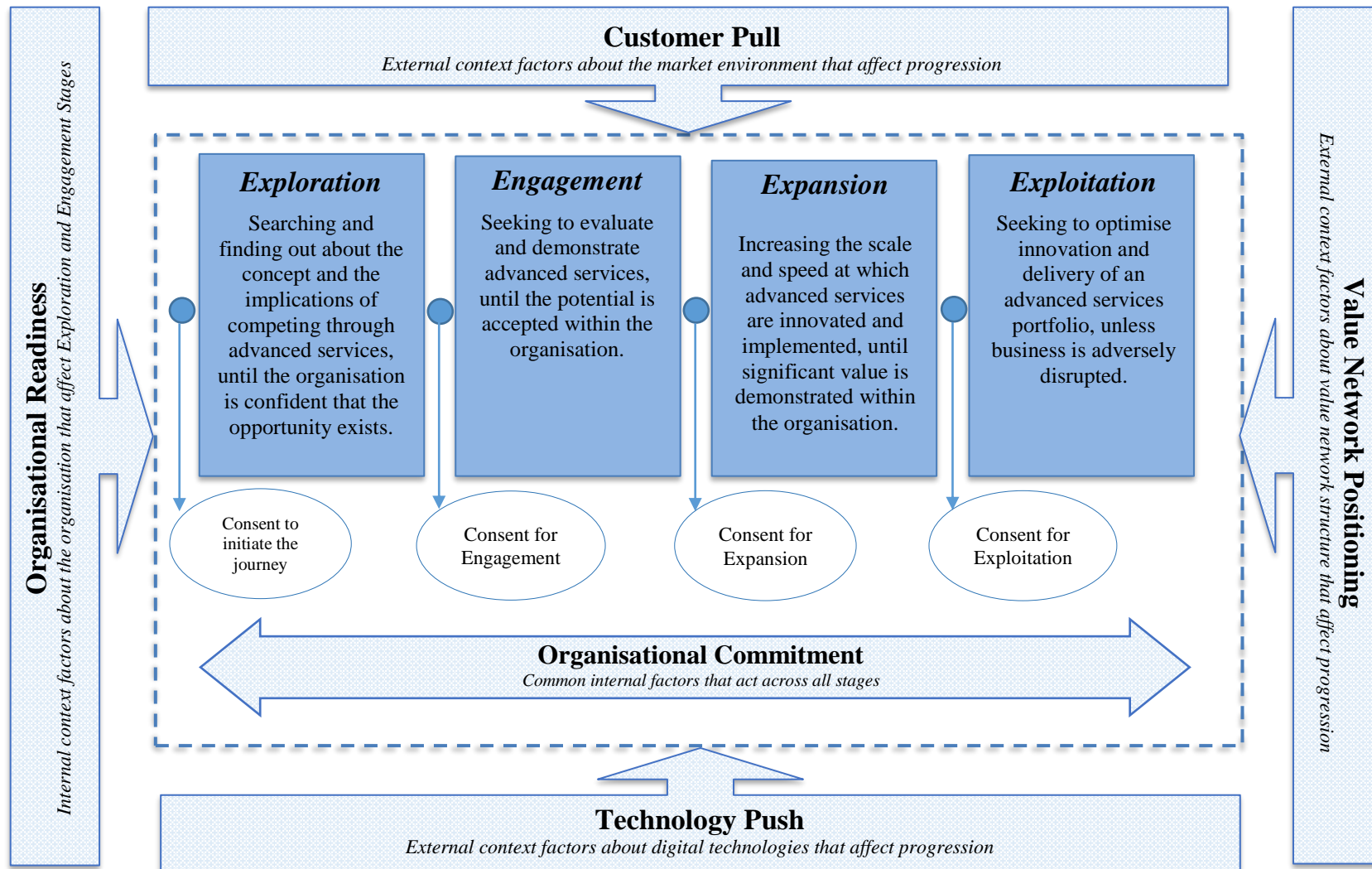


Figure 3. The servitization progression model

6. CONCLUSIONS

The principal contribution of this study is a series of propositions, represented collectively as *the servitization progression model*, which describes the transformation process that takes place as a product-centric manufacturer servitizes to compete through advanced services. This model shows that the transformation process comprises four principal stages of organisational maturity, through which the manufacturer proceeds according to the pressures of five principal forces. This contribution has both theoretical and practical implications.

6.1 Theoretical implications

A recent review by Raddats et al. (2019) emphasises that there are still some fundamental aspects of servitization that warrant further research. Primarily, this paper answers the call for further research on the process and stages of organisational transformation towards servitization (Martinez et al., 2017), along with addressing the limited attention given to contextual factors (Baines et al., 2017). It establishes that: (i) the process of organisational change through servitization can be explained as the four macro-stages of *Exploration*, *Engagement*, *Expansion* and *Exploitation*, (ii) progression both between and within these macro-stages is significantly influenced by contextual factors, which can be grouped into five categories relating to markets, technology, organisational readiness, organisational commitment and the value network of the host business, and (iii) progression from one macro-stage to the next appears as structured and predominantly unidirectional, punctuated by multiple tipping points; but within these stages are sub-processes that are characteristically organic, unstructured and iterative. The whole process can be characterised as a business growth model.

This study also (i) draws a distinction between the stages of the transformation process and the forces that could significantly influence progression, and (ii) focuses clinically on the *process* manufacturers *have* followed and avoiding intertwining a conversation about *content*. While our study largely builds on and develops insights into the transformation process, it also expands confidence because of the range and depth of organisations we have studied. Earlier studies of researchers such as Martinez et al. (2017) and Lütjen et al. (2017) have been crucial to forming new ideas around the structure of the transformation process, and our work provides

a timely complement while building confidence through the depth and breadth of organisations studied.

6.2 Practical implications

Servitization can involve a raft of challenges for those executives from a production-centric background, especially for those faced with the task of evaluating and potentially implementing this concept within their organisation. This study has shown that a servitization programme will typically unfold through four stages of organisational change (*exploration, engagement, expansion and exploitation*) in accordance with a range of contextual factors, in which the factors and stages will interplay, and this will result in an iterative process with critical points where progress can stall.

Executives should find it particularly helpful to understand the characteristics of each stage along with those factors that are key to success. Figure 2 and Table 5 are helpful to illustrate typical activities in each stage and the associated contextual factors. On the basis of such data, we surmise that in the early *exploration* stage of a programme, executive sponsorship is likely to have the most influence on progress (i.e. Case H rapidly progressed because a board director was an advocate of the programme). Following this, *engagement* will focus on demonstrating the opportunity of servitization and the piloting of innovative customer value propositions. Most helpful at this stage is the use of in-depth (and ideally independent) customer analysis using empathising techniques and structured experimentation with new service offerings at carefully chosen customer sites (i.e. Case A applied these techniques and rapidly progressed through this stage, while Case G developed an offering largely based on assumptions of customer need and still fails to gain traction). The subsequent *Expansion* stage will be characterised by increasing tensions between the support and growth of the new service offering(s) and the established (production-centric) business model, and this is likely to result in turbulence around people, their priorities and structures (i.e. Case A experienced such upheaval that the executive responsible for the initial focus on services was retired from the organisation but, after a short period of tension, he was eventually replaced by an equally strong advocate of services). In the relatively mature stage of *Exploitation*, the focus will be characterised by initiatives to improve delivery efficiency while continuing to innovate advanced services (i.e. Case B is entirely focused on these priorities).

The characteristics and priorities of an organisation at the earlier stage of maturity are very different to the later, and these distinctions are very important to recognise when executing popular management techniques such as benchmarking. The practitioner should also be mindful that the time taken to progress through these four stages can be significant and may take decades for a company embarking on a servitization programme to achieve the capabilities typical of the later stages of maturity.

6.3 Limitations and opportunities for future work

This research, similar to any other case study-based research, has certain limitations, which could provide opportunities for future work. These are summarised in the below three areas:

Development of a richer understanding of the process and content at each stage. During this study it was observed that particular techniques and specific decisions were commonly adopted. For instance, Cases A, H and K used a business model canvas (see Osterwalder et al., 2005) as an analytical tool during the *Engagement* stage, while Cases B, F and M put in place a dedicated business unit to support services during *Expansion*. Therefore, within the model established here, it would be valuable to understand the variety, popularity and sequencing of process and content within each stage. Also, it would be valuable to know the relationship between these and the forces impacting the progression – perhaps in the first instance by dealing with each stage separately and in-depth.

Investigate the linkages between context and process. A richer understanding of process and *context* would then allow an investigation into whether there are distinct selections and sequences of activities through the pathways. A likelihood exists that various pathways exist and organisations may switch pathways as people and contextual circumstances change.

Development of a prescriptive transformation roadmap. As mentioned, this descriptive study set out to lay the foundation for a more prescriptive process that practitioners can follow in order to servitize their businesses and compete through advanced services. Future research should explore links between different aspects of our progression model (e.g., the four macro-stages, the five forces and their interplay) and servitization journey outcome measures, such as the rate of progression along the journey or the efficiency and effectiveness with which advanced services are provided. Rationalising this knowledge into a management aid is a logical next step, and yet caution will be required as the multitude of variables could easily result in a process that is overly complex and unworkable. As a recommendation for future

work, an intermediate step would be to use this model, in the first instance, to audit existing servitization initiatives, and in doing so, to better understand how to apply this thinking in practice.

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