

**THE DARK SIDE OF SERVITIZATION: A CUSTOMER AND MANUFACTURER  
PERSPECTIVE.**

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## **Abstract**

Oil remains the lifeblood of many states and international organisations, with far reaching political and environmental consequences. Thus, the research contained within this thesis will be of interest to those practitioners within governments, oil companies, NGOs and environmental groups. This thesis will also be of interest to members of the academic community wishing to understand the theory and practice of servitization within this industry.

The central question of this thesis explores why the oil industry is not as servitized as one would expect. The answer to this question provides several new additions to theory and practice which provide some explanation of the oil industry's prolonged servitization attempts. This research finds that a darker form of mimetic isomorphism facilitates distrustful adversarial relationships, exacerbated by external economic factors and a lack of management strategy.

The journal paper format was selected when creating this thesis, creating three separate papers. Each individual paper employs a mixed method approach allowing triangulation of the findings, first within each paper and then between all three papers. This approach combines the strengths, whilst minimising the weaknesses, of each individual method. The research provides insight into a 'dark side of servitization' from both the customer and manufacturer perspectives and challenges current theory by arguing that the benefits derived from the progression from base to advanced levels of servitization are complex and may be detrimental at base *and* intermediate levels. Finally, this research adds to the theory of servitization paradox within the oil industry, arguing that advancements in servitization are abandoned to return to intermediate levels to take the short-term advantages that high levels of distrust can provide.



**Declaration**

I Scott Wagstaff, declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other University or other Institute of Learning.

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## **Acknowledgement**

I wish to thank my research Professors Jamie Burton and Judy Zolkiewski for their unwavering support and guidance through my entire DBA journey. While they continuously gave me the benefit of their experience and expertise, it always came with genuine encouragement and friendship.

There are also two individuals whom without their support, patience and understanding, this DBA journey would not have been possible. These, of course, are my wife, Tracey Wagstaff and son, Liam Wagstaff. Both Tracey and Liam's support were a constant I came to depend upon and often took for granted. Despite the many hours I spent studying alone, Tracey was always supportive, spending countless hours proofreading my papers and taking care of our family in my absence. Similarly, Liam has sacrificed many weekends and evenings with his father, all without complaint. Tracey and Liam's time, understanding, support and sacrifice were freely given, but remain a debt I can never repay, other than my most sincere gratitude.

## **Dedication**

I dedicate this thesis to my late father-in-law, Bill Hanlon, a retired School Principal and father of three from the town of Grand Falls-Windsor in the province of Newfoundland Canada. I met Bill only a short time after his daughter Tracey, but he accepted me as a member of his family immediately. His kind and altruistic attitude to people and life have provided an example to live up to ever since. Bill was a learned scholar and on one memorable evening over a game of cards, he inspired me to further my academic learning, and supported me at every step of this endeavour. Bill spent much of his retirement at his cabin on New Bay Lake listening to traditional Newfoundland music, playing cards and occasionally indulging in a glass of rum and coke, pastimes I am fortunate to have shared with him whenever I got the opportunity.

## **My Research Journey and Perspective**

My career in the oil industry started in 1996 with Shell in Aberdeen (UK), gaining practical work experience as part of the 'thick sandwich' engineering degree curriculum. Since graduating in 1998 I have enjoyed an international career in eleven locations: Montrose (UK), Aberdeen (UK), Newfoundland (Canada), Melun (France), Baku (Azerbaijan), Stavanger (Norway), Houston (USA), Reading (UK), Doha (Qatar), Dubai (UAE) and Abu Dhabi (UAE). In these locations I have worked for a range of Service Companies (SC) who manufacture equipment and provide services to the oil industry and Operating Companies (OC) who are the SC's customers, both private and state owned. I have held several positions blending; technical and project engineering, teaching and recently managerial skills. This comprehensive experience has given me a first person and 'hands on' perspective of the international oil industry and the complex network of relationships between each actor and organization.

During my early career, I focused on developing the technical engineering skills I was using on a day-to-day basis to design specialised oil wells and equipment. In 2004, I completed the professional and experience component of the Institution of Mechanical Engineers (IMechE) development program and earned both the titles of Member of the Institution of Mechanical Engineers (MIMechE) and Chartered Engineer (CEng) status with the Engineering Council UK. I then completed additional training, allowing me to become an official mentor for junior engineers guiding and approving their progression through the prescribed mentoring program of the IMechE, and in 2014 I was elected to Fellow (FIMechE) of the Institution of Mechanical Engineers. In 2004, I also completed the requirements, and was subsequently awarded chartered status in Europe (Eur Ing) with the European Federation of National Engineering Associations (FEANI). In 2014, I became a member of the Chartered Management Institute (MCMI), and plan to complete the remaining requirements to become a chartered member (CMgr MCMI) once I have completed my DBA.

My first venture into management was in 2007, when I moved to Azerbaijan to take over the position of Field Manager for Schlumberger. Prior to this promotion my career comprised applying the technical engineering knowledge gained from my engineering degree and the experience accumulated during my nine-year career. In this new Field Manager position, I was placed in charge of three departments and over fifty staff. The experience of management was something in which I had little training or practice and this experience was somewhat turbulent. Fortunately, after I had moved from this position, I realised I had been working extremely hard and under a great deal of stress and there had to be a better way. Simply stated, I needed to develop my skills in management and business.

My management education started with completing the Project Manager Professional (PMP) qualification in 2009, which I then attempted to put into practice in later management positions. Whilst the knowledge gained in the PMP was useful for technically managing projects and ensuring that I delivered them on time and within budget, it was of limited use in managing people or business practices. To remedy this situation, I started my Master of Science in International Management (Oil and Gas) at the University of Liverpool (UK) in 2012. I selected this course for its applicability to my career in the oil industry, at the time I was an international oil and gas manager, and I could study in my then home of Houston (USA) and whilst travelling, because of the distance-learning nature of the course. I also wanted to study at an established UK 'red brick' university and Liverpool was awarded both AACSB and EQUIS accreditation during my study period and recently achieved the 'triple crown' status by obtaining AMBA accreditation. I immediately implemented the knowledge I was gaining on this course and when I graduated in 2015, I was finally working as an international manager at a performance and stress level I was comfortable with.

The transition from a technical career to a management career was challenging, as discussed above. However, equally challenging was the transition from a business solution-based focus to an academic thinking

process, research processes and writing style. Business focuses on finding solutions to problems and dashing on to the next problem. In contrast, the academic process asks the researcher to study subjects in great detail, applying critical thinking to understand the antecedents, effects and workable solutions. The academic process then requires that these subjects are thoroughly researched and then documented using an academic writing style that is then peer reviewed before eventual publication. I have found, however, that these two styles are not mutually exclusive and critical thinking, and application of research has supported the resolution of business challenges based on literature and supported by knowledge rather than personal experience and expediency.

After completing my Master of Science degree in 2015, I took a year off from academic study and research. However, after a year I came to the realisation that I missed the challenge of researching, learning and self-improvement and searched for a new outlet for this need. It was at this point that I remembered a comment from a professor on my MSc degree who challenged a fellow group member to get their doctorate and not only learn, but contribute to the subject of management. I started looking at courses that day and quickly had a short-list of perspective universities, listed on university ranking, 'triple crown' status and, again, a preference for established 'red brick' UK universities. The DBA has allowed me to expand my knowledge and perspective, feeding my need for self-improvement, and has allowed me to contribute, at least in some small way, to the subject of management in academia.

The oil industry is becoming increasingly volatile with the fluctuations in oil price and rig count becoming more pronounced and frequent (Jones, 2020). It is my future aspiration that my DBA will provide a mechanism to develop my career in a new direction, away from the oil industry and pursue a career that combines academic teaching and research and consulting within similar industries.

## **1 Introduction**

This thesis investigates the relationship between manufacturers and customers in the oil industry. Historically, manufacturers from many industries have supplied products to their customers with little service support. However, as these relationships have evolved over time the level of service support has changed. Many manufacturers have progressively changed their business practices to add services to their products and take advantage of the additional revenue streams and competitive advantage these services bring. This transformation of the manufacturer from a product only to a product and service supplier forms the basis of the subject now known as servitization. Hence, the generally held definition of servitization is a “a transition or transformation which is largely characterised as a linear and gradual move along a product continuum from less to more sophisticated services” (Baines *et al.*, 2020, p. 2).

This thesis aims to apply academic theory to the real-life business problem of servitization implementation within the oil industry. This thesis also aims to contribute to the body of knowledge in this field of study. Both of these aims align with the practical focus of the DBA degree. The chosen area of research is servitization within the oil industry. Specifically, to determine if the oil industry is overlooking the potential benefits of servitization. This research was undertaken to investigate the apparent problematic development of servitization within the oil industry and to understand if this was a common occurrence inside this industry.

The following sections will outline the context under which this research was undertaken, along with the theoretical context of servitization within the oil industry. Next the research aims shall be presented and the methodology and range of methods which were used to achieve these aims will be discussed. The final section will present the thesis structure.

## **1.1 Research Context**

With 25 years of experience in the oil industry and working for many companies in many locations, the author has come to realise that although the oil industry embraces many new technologies, it can remain resistant to new management developments, such as servitization. This thesis outlines the journey the author took to understand why servitization remains an untapped strategy sacrificing the financial, environmental and socio-political benefits that could be brought about by its application.

The oil industry was selected as the common focus of investigation, as it has unsuccessfully attempted to progress to an advanced level of servitization for many years. Thus, this industry provides an ideal opportunity to examine the factors which influence the successful and failed attempts of servitization and the servitization paradox. Furthermore, the oil industry is one in which servitization remains relatively under-researched (Bandinelli and Gamberi, 2011) and operates in complex customer and manufacturer relationships and thus provides a good context to explore these fields of research. The organizations within the oil industry can be classified as Operating Companies (OC) or Service Companies (SC). The OC manage the oil reservoir and the extraction of the oil or gas. Examples of OCs are: Shell, Total, ExxonMobil or national oil companies owned and run by the state such as: Saudi Aramco, Petroleos de Venezuela or China National Petroleum Corporation. The OC are the customers of the SC who provide equipment and technical expertise to the OC and include such companies as: Schlumberger, Baker Hughes, Halliburton and Siemens.

Yergin (1991, p. 773) states that oil “remains the motive force of industrial society and the lifeblood of the civilization that it helped create. It is still the basis for the world's biggest business, one that embodies the extremes of risk and reward, as well as the interplay and conflict between entrepreneurship and corporate enterprise, and between private business and the nation-state”. This statement is over thirty years old, but remains accurate and relevant (Lorusso and Pieroni, 2018; Raszewski, 2018). Oil is increasingly politicised because of



the unpopular environmental impact of pipelines (Williams and Kumar, 2021) and difficult extraction methods such as fracking (Gearhart, Adegbola and Huemmer, 2019) and tar sands (Finkel, 2018).

### **1.2 Social Responsibility**

The extraction, transportation and combustion of oil and its derivatives can have a significant impact on health (Ramirez *et al.*, 2017) and the environment either directly or indirectly through such processes as global warming (Dickens, 2004). In addition to these challenges, the efficiency of oil recovery from a reservoir is surprisingly low, Bentley (2002) and Zitha *et al.* (2008) report that only 20% to 34% of the oil in a reservoir can be extracted and the remaining 66% to 80% remains permanently inaccessible. However, this percentage can be increased if the stakeholders can cooperate to use advanced processes and technology (McCormack, Thomas and Mackie, 2014; Åm and Heiberg, 2014) to a potential 35% to 45% (Bentley, 2002; Zitha *et al.*, 2008).

Hence, it can be argued that the enhanced cooperation through servitization could encourage the efficient production of existing oil reserves, reducing the need to develop new oilfields and avoid the political, financial and environmental effects (Kumar and Markeset, 2007). Simply stated, reducing the need to create and develop new oil reserves will reduce the net environmental impact that the oil industry has from drilling operations and use of chemicals, as well as reducing the risk of environmental damage from accidental spills or releases of oil, gas or chemicals used in its development and refinement. Therefore, one could argue that servitization is a path to a more socially responsible industry.

### **1.3 Theoretical Context**

The following sections provide a review of the literature and current theory relating to the problematic nature of the development and application of servitization within organisations. This review should be read in conjunction with the literature reviews in the three individual papers which comprise this

thesis which provide a more bespoke literature overview specific to the needs of the paper in question.

This thesis intends to determine if the general observation that servitization is poorly executed (Valtakoski, 2017) is also true for the oil industry. A precursory examination of industry literature would appear to show that the oil industry has some degree of servitization (*Who We Are*, 2020; *Mission, Vision, Values*, 2020). However, there is little research available to show if these claims represent the actual or intended degree of servitization. There is a lack of literature which shows if a strategy exists for the application of servitization or if the process simply evolves and devolves to fulfil an immediate need. This thesis concurs with the extant literature [see (Ruiz-Alba *et al.*, 2019)] affirming the conclusion that a defined strategy is required, which is supported by long-term management commitment and provision of the resources needed to implement it. This research also intends to look at the outside influences that can affect servitization application, such as those from the network and larger economic environment.

### **1.3.1 Servitization**

Since the term servitization was coined by Vandermerwe and Rada (1988) it has received increasing research attention and interest from industry. Whilst the principal of adding services to products is not new and can be traced back to the 1960s, and arguably further, when organizations such as Bristol Siddeley, now Rolls-Royce, provided services alongside their products, such as “Power By The Hour” (Jovanovic, Engwall and Jerbrant, 2016). The term servitization and its application appears to be little known in the oil industry (Bandinelli and Gamberi, 2011). This absence of knowledge may explain the general lack of a definitive servitization strategy (Kumar and Markeset, 2007; Bandinelli and Gamberi, 2011), and the oil industry instead relies upon the organic growth of a service culture driven by tacit knowledge that they should promote customer services within their organizations (Ruiz-Alba *et al.*, 2019). Farr and Brazil (2009) offer some insight when they observe that many tiers of leadership within organizations, like the oil industry, are populated with

engineers who have little formal education in business. However, Bandinelli and Gamberi (2011) find that the oil and gas organizations they studied, like similar industries, are attempting to move towards servitization, albeit by other names and in an uncoordinated manner (Ruiz-Alba *et al.*, 2019).

Industry literature recognises that the oil industry is seeking to become more servitized in order to “improve revenue, generate better margins and [develop] sustainable growth” (Worldsen, 2017; ‘Servitization in Oil & Gas and Why You Should Care’, 2018). This literature also recognises that the drive towards more advanced servitization can provide a mechanism to achieve these goals by maximising productivity and lower operating costs (Dinges *et al.*, 2015; ‘Servitization in Oil & Gas and Why You Should Care’, 2018). Servitizing oil industry organizations recognise that there is a need to share responsibility for the design and execution of projects which includes basing revenue, and loss, upon use and performance (‘Servitization in Oil & Gas and Why You Should Care’, 2018). These organisations also recognise that competencies should be integrated between customer and manufacturer (Dinges *et al.*, 2015) to maximise performance. When we compare these expressed servitization goals with the servitization matrix produced by Baines and Lightfoot (2013, p. 66)(2013, p.66), see Table 1, we can see that these goals correspond with their definition of an advanced service. Therefore, we can reasonably conclude that the oil industry sees the successful implementation of servitization as the development of advanced services in order to achieve their business improvement goals.

An important consideration in the servitization journey is a measurement of its successful or unsuccessful application. Drucker is often attributed with the quote that ‘you can’t manage what you can’t measure’ (Deming, 2011; Ryan, 2014), although the validity and origin of this statement is questionable it is, nonetheless, held to be an axiom in business. Therefore, it becomes important for organisations to measure servitization levels to gauge their degree of success or failure and return on investment. However, there is an absence of a single definitive measure of servitization for organizations to use to gauge

their level of servitization against their peers, business partners or competition within the networks in which they operate (Kohtamäki *et al.*, 2018). In the absence of a single recognised servitization measurement scale, several scholars have attempted to devise servitization assessment tools. However, many of these are specific to a particular industry or aspect of servitization. Such examples are Fang, Palmatier and Steenkamp (2008) who use service revenue or Homburg, Hoyer and Fassnacht (2002) who use the number of services to determine servitization level. These two techniques represent a group of methods which use a single element to measure servitization. However, a meta-analysis performed by Liu, Zhang and Gao (2020) concludes that multi-dimensional and non-financial servitization measurement tools are preferable when assessing servitization levels in large organizations. Many methods use multiple criteria to measure servitization, for example, Adrodegari and Sacconi (2020) use 85 measurement categories, and Kohtamäki *et al.* (2018) use 10 categories. A popular measure of servitization used by Baines and Lightfoot (2013) uses a simple multi-dimensional matrix to provide servitization levels of base, intermediate or advanced, see Table 1.

Type	Defined by	Organizational stretch	Examples of services offered
Base services	An outcome focused on product provision	Based on the execution of production competence (i.e. we know how to build it)	Product/equipment provision, spare part provision, warranty
Intermediate services	An outcome focused on maintenance of product condition	Based on exploitation of production competences to also maintain the condition of products (i.e. because we know how to build it, we know how to repair it)	Scheduled maintenance, technical help desk, repair, overhaul, delivery to site, installation, operator training, operator certification, condition monitoring, in-field service
Advanced services	An outcome focused on capability delivered through performance of the product	Based on translation of production competences to also manage the product's performance (i.e. because we know how to build it, we know how to keep it operational)	Customer support agreement, risk and reward sharing contract, revenue-through-use contract, rental agreement

Table 1: Categorisation of product services, adapted from Baines and Lightfoot (2013, p. 66)

With a measurement tool an organisation can track its progression from base to more advanced levels of servitization, with the natural expectation that the benefits of servitization would match this development. This expectation is not unreasonable and is echoed in much of the available servitization literature (Oliva and Kallenberg, 2003; Lütjen, Tietze and Schultz, 2017). This literature assumes a direct relationship between servitization benefits and servitization level (Mont, 2004; Tukker, 2004; Martinez *et al.*, 2010; Gaiardelli *et al.*, 2014). However, there is a growing volume of research which is revealing that the journey to servitization may not be linear in many instances (Andrews *et al.*, 2018).

It has been argued that an attempt to implement servitization without an agreed strategy supported by all tiers of management may result in a minimal, if any, improvement (Brax, 2005; Benedettini, Neely and Swink, 2015; Lütjen, Tietze and Schultz, 2017). Ulaga and Loveland (2014) state that almost half of the organizations attempting servitization realise minimal gains and a quarter make a loss. Strähle, Füllemann and Bendig (2012) have shown that these

minimal gains are often in the range of only 10% to 25% of the potential gain of servitization. These failures highlight the risk that organizations take, especially larger ones, when transitioning to servitization (Neely, 2008). Because of these failures, some organizations' servitization efforts stall or can revert to a pre-servitization mode, in a process referred to as deservitization (Gebauer and Kowalkowski, 2012; Kowalkowski *et al.*, 2015). Hence, the inability to realise the full potential of servitization or, in more severe cases, deservitization are collectively known as the 'servitization paradox' (Gebauer, Fleisch and Friedli, 2005; Kastalli and Van Looy, 2013). Recent studies have shown that the servitization paradox may result from a poor application of the servitization process because of a lack of understanding of the level of commitment involved in this difficult (Iriarte *et al.*, 2018) and prolonged (Baines *et al.*, 2020) endeavour. Research also shows that the absence of a well-defined strategy may slow or completely derail the application of servitization (Kumar and Markeset, 2007; Bandinelli and Gamberi, 2011), and is not a failing of servitization itself.

It has been identified that the application strategy of servitization is fundamental to its success (Zhang and Banerji, 2017). Specifically, that scholars and organizations wishing to develop servitization should not undertake a dichotomous 'either-or' position on products or services during the servitization transition (Kohtamäki, Einola and Rabetino, 2020), as described in classic organization theory (Jay, 2013). Instead, these parties should use the lens of paradox theory to apply a paradoxical 'both-and' philosophy to products and services during the servitization process (Baines *et al.*, 2020; Kohtamäki, Einola and Rabetino, 2020).

Many organization attempt to implement servitization, and whilst some are successful many fail in this endeavour (Baines and Lightfoot, 2013). During servitization a paradox can occur when a manufacturer adds services to their portfolio but returns a negative outcome. This servitization paradox is described by Gebauer, Fleisch and Friedl (2005, p. 14) as the "investment in extending the service business [which] leads to increased service offerings and

higher costs, but does not generate the expected correspondingly higher returns”. This explanation shall be used as the definition of the servitization paradox throughout this document.

### **1.3.2 Tensions, Territoriality and Servitization**

Failure to employ a servitization strategy may have many consequences, and this section focuses on one such consequence, tensions and territoriality, which impact the servitization journey. The potential issues if the servitization strategy fails to anticipate or have suitable resources in place for the effects of tensions and territoriality which may occur during the servitization journey will be discussed below. During the servitization process there are significant changes to the entire organization which impact not only the organization but also the individuals who work for that organization (Palo, Åkesson and Löfberg, 2019). Burton et al. (2016) identify that these changes may lead to resources and responsibilities being reallocated throughout the organization from one department or individual to another, or may disappear entirely. Such a significant change, and resistance to this change in the working environment or responsibility has been identified as a cause of unreported tension within the workplace (van Dijk and van Dick, 2009). Such tensions drive different parties apart as their goals and objectives change, leading to potential problems with motivation and further resistance to the changes (Tura, Keränen and Patala, 2018). As the organization transitions from manufacturing to providing services, the skills of its employees will also need to change from a product-centric to include a service-centric focus (Baines and Lightfoot, 2013). It is, therefore, reasonable to assert that some of those affected will fear redundancies or a difficult, and often stressful, mandatory re-training programme (Beale and Nethercott, 1988; Terry and Callan, 1997). Furthermore, this tension can be treated as a threat to the individual or group who responds by becoming territorial to defend themselves or their position (Brown and Zhu, 2016). Territorial behaviour has been shown to have a negative impact on the efficiency of an organization and can generate further tension within individuals or groups generating a downward spiral of tension

and territoriality (Brown and Zhu, 2016), this is represented below in Figure 1. Such a relationship has been tested experimentally using physical stress and discomfort and has confirmed this downward spiral of tension and territoriality (Vischer, 2007; Ashkanasy, Ayoko and Jehn, 2014).

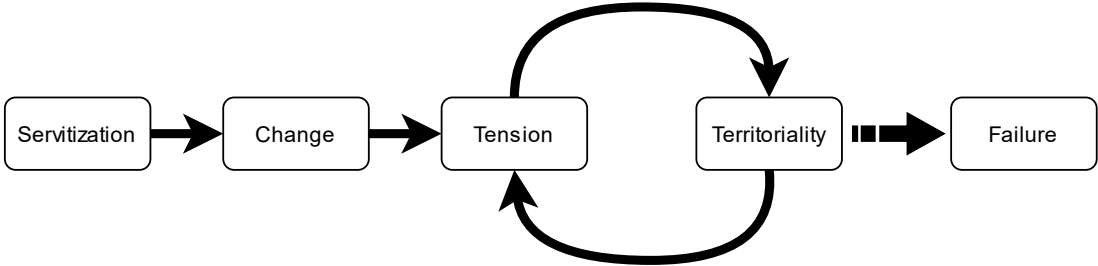


Figure 1: The Relationship Between Tension, Territoriality and Servitization

Vendrell-Herrero *et al.* (2014) observe that whilst there is much literature on the subject of territoriality, little exists on the subject of territoriality resulting from the application of servitization. However, there is literature that supports the position that tensions and territoriality can erode intra-organizational and extra-organizational value co-creation (Blackhurst, Wu and Craighead, 2008; Lenka *et al.*, 2018b). Therefore, any organization wishing to become servitized should acknowledge and expect the difficulties that may arise from tension and territoriality and have strategies in place to mitigate them (Burton *et al.*, 2016).

**1.3.3 Game Theory and Servitization**

Tensions and territoriality describe one aspect of the internal and external effects of a poorly implemented, or absent servitization strategy. However, external or intercompany factors can also influence the success or failure of the servitization process. Intercompany cooperation is a key element of servitization (Baines and Lightfoot, 2013). However, the precise form of cooperation or non-cooperation is often difficult to determine. To enable such an understanding a tool which can differentiate between intent and reality in terms of cooperation is useful.

Game theory is such a tool which can be used to determine the optimum outcome from an interaction or a ‘game’ between two or more ‘players’ based



on the strategy and counter strategy each player uses (Lima *et al.*, 2018). The best position is sometimes counterintuitive, as it is the balance point between best outcome and least risk (Tadelis, 2013) known as the Nash Equilibrium (Nash, 1951). This is especially true in a non-cooperative game, such as a legal proceeding where the strategies and counterstrategies of each player are unknown. As an example, the best outcome for least risk may be for an innocent party to plead guilty to a lesser crime than risk a greater punishment if found guilty of the original charge. Similarly, in this example, the prosecutor may accept a guilty plea for the lesser crime rather than risk the accused party being found innocent of the original charge. Therefore, we can see in this simple example that the Nash Equilibrium is for the accused party to plead guilty to a lesser crime and the prosecutor to accept this plea, even though this is not the best possible outcome for either party.

Unlike the legal example above, which uses a competitive game theory strategy, in a cooperative strategy the parties are free to communicate and form alliances to produce a mutually advantageous and fair outcome (Peleg and Sudhölter, 2007). In order to understand what a fair outcome is, Lloyd Shapley created an equation in the 1950's called the Shapley value (Shapley, 1953) which is still used (Algaba, Fragnelli and Sánchez-Soriano, 2019). The Shapley value determines a fair distribution of rewards or costs in a cooperative game (Winter, 2002) based upon the contributions of each player (Calleja and Llerena, 2020). Using this relationship, we can state that if the rewards from a game are equivalent to the Shapley value, within reason, then the players were playing with a cooperative strategy (Algaba, Fragnelli and Sánchez-Soriano, 2019). Similarly, if the values of the game differ from the Shapley value, then the players were not playing a fair cooperative strategy. Hence, using the Shapley value to interpret the rewards of a game can distinguish between a cooperative or non-cooperative game strategy (Algaba, Fragnelli and Sánchez-Soriano, 2019).

#### 1.3.4 Trust, Distrust and Servitization

Cooperation requires an element of trust and we have seen that cooperation is a critical element of servitization. Therefore, the next logical step is to understand the interaction between trust and cooperation and how these can influence servitization. Literature argues that trust must exist between the manufacturer and customer (Baines and Lightfoot, 2013; Kohtamäki *et al.*, 2018; Annarelli, Battistella and Nonino, 2019; Palo, Åkesson and Löfberg, 2019). However, the servitization literature lacks a precise definition of trust and discussions on trust in business relationships provokes a great deal of debate in servitization and related literature, such as B2B (e.g., Morgan and Hunt, 1994; Iyer *et al.*, 2006). To further complicate matters, this literature does not distinguish between trust and distrust (Blois, 1999; MacDuffie, 2011). Given that trust, and distrust, reduce complexity in business interactions by allowing each actor to take action based on these expectations (Lewicki, McAllister and Bies, 1998; Scheer, 2012), they are both important factors of business relationships. Therefore, the relationship between trust, distrust and servitization in the context of intercompany relationships warrants further investigation.

Traditional thinking has considered trust and distrust to be two extremes of the same unidimensional continuum (Deutsch, 1958; Rotter, 1967; Lewicki, McAllister and Bies, 1998). However, this has been challenged by the view that trust and distrust are distinct elements that can coexist simultaneously (Lewicki, McAllister and Bies, 1998). Suffice to say that low trust is not the same as high distrust (Lewicki, McAllister and Bies, 1998; Guo, Lumineau and Lewicki, 2017) as the definition of trust used throughout this thesis is ‘the expectation of beneficial conduct’ and the definition of distrust is ‘the expectation of injurious conduct’ (Luhmann, 1979; Lewicki, McAllister and Bies, 1998).

Distrust assumes a negative connotation, however, this is not necessarily the case as it can prove to be beneficial in some business relationships (Cook, Hardin and Levi, 2009). When one business distrusts another it must be

cautious, sceptical, vigilant and resist naivety and misplaced trust, all of which protect the business and, therefore, have a positive outcome (Lewicki, McAllister and Bies, 1998; Vlaar, Van den Bosch and Volberda, 2007; Lee and Lee, 2018), this is summarised in Figure 11 on page 138 of paper 3.

#### **1.4 Research Aims**

The overarching aim of this thesis is to build upon and contribute to theory about why the servitization paradox persists in the oil industry. This thesis comprises three papers and each addresses a distinct, but related, aspect of the oil industry servitization paradox.

**The first** aspect of the servitization paradox we explore is the effect of tensions and territoriality caused by changes due to the implementation of servitization. In order to investigate this, we must first confirm if the servitization process manifests itself as tensions and territoriality within the OC, SC or both. The next avenue of investigation is the management perception of the difficulties of servitization in relation to tensions and territoriality, is this a unified or fragmented strategy? Finally, we look at the availability of management tools and resources in place within these organisations to implement servitization and deal with the challenges that may arise. Specifically, are these tools and resources available and adequate for the task?

**The second** aspect of the servitization paradox we explore is the type of interorganisational cooperation that exists within the oil industry and the effect this has on the progression, or regression, of organisations from a base to an advanced servitization level. The first step in resolving this question is to explore how cooperation within an intercompany relationship affects the transition to advanced services. In order to determine the effect of this cooperation we must discover what form of cooperation or non-cooperation is commonly used by these organisations and how this aligns with servitization levels. Finally, we shall explore if changes in cooperation type can influence servitization or vice versa.

**The third**, and final, aspect of the servitization paradox we explore is the influence of trust and distrust in interorganisational relationships, and how this can influence the development of advanced servitization. We must first explore the type of trust and distrust used within the oil industry to determine if there is a dominant blend of trust and/or distrust. We can then explore this blend of trust and distrust to determine its degree of influence on servitization. We then explore if trust and distrust can offer an insight into the mechanism of the servitization paradox.

### **1.5 Methodology**

A research methodology is crafted from the needs and desired outcome of the research combined with the ontology and epistemology of the researcher. The resulting research methodology will then be key to the selection and implementation of the research methods and the overall success of the research as a whole. In addition to the methodology guiding the research process a clear statement of research paradigm will allow the reader to understand the reasoning behind the selection of research and analysis methods.

The subjects of ontology and epistemology are extensive and have been debated by philosophers for many years, so only a short summary is possible here. Ontology is concerned with the nature of reality, and can be divided into two main schools of thought. The first of these, objectivism, states that reality exists without the influence of individuals and occurs beyond their reach or influence. The second school of thought, constructivism, states that individuals have an influence in social reality and these realities are continuously socially constructed (Grix, 2002). An objectivist ontology is common to the natural sciences and is fundamental to the scientific method, for example, two atoms of hydrogen will react with one atom of oxygen to produce a water molecule. This reaction will occur irrespective of the influence of individuals or any social influence. Nevertheless, when we look outside the natural sciences the influence of individuals and society become important (Bryman, 2012). As an example, an objectivist ontology would hold that the

USSR existed before the end of the cold war. However, the influence of individuals changed this reality when the Berlin wall fell and, eventually, the USSR no longer existed. It then follows that one could posit that the USSR, or any state, never existed at all other than as a socially accepted construct, which is subject to change.

Epistemology is the study of knowledge and which form of knowledge is acceptable for a specific discipline. Epistemology can be split into many philosophies, one example being positivism, which relies on objective observation from the senses to provide facts, first by devising the hypotheses and then testing them. Once these facts have been gathered and the hypothesis proved or disproved a law can be created (Carson *et al.*, 2001; Bryman, 2012). In contrast to positivism, interpretivism argues that individuals and societies differ from the natural sciences and a subjective interpretation of information must be used. During research using interpretivism, the researcher is free to interpret observations, within reason, based upon the social group and the environment (Carson *et al.*, 2001; Bryman, 2012).

The many research outcomes contained within this thesis are derived from the experience of many individuals, who each hold a personal view of reality. The author also acknowledges that interpretation of the data will, therefore, form an intrinsic component of the research outcomes. The format of this thesis consists of three papers, in order to maximise the value derived from these three papers the analysis from each should be combined and interpreted as a whole, therefore a research method which favours a mixed method would be most suitable (Robson and McCartan, 2016; Creswell and Creswell, 2018).

There are many paradigms available, some with subtle differences and others with significant differences and implications on the resulting research method selection. Combining the different requirements and different permutations of epistemology and ontology a research paradigm of pragmatism was selected. Weaver (2018, p. 2) defines pragmatism as a “worldview that focuses on “what works” rather than what might be considered absolutely and objectively “true”

or “real.” ... [and] is not committed to any single system of philosophy and reality. Reality is actively created as individuals act in the world, and it is thus ever changing, based on human experience, and oriented toward solving practical problems. Truth is what works at the time and not based on dualism between reality independent of the mind (as with postpositivism and critical paradigms) and within the mind (as with constructivist and deconstructivist paradigms) .... Thus, pragmatism has gained considerable support as a stance for mixed-methods research”. From an ontological perspective pragmatism accepts that an external reality exists, but this reality is constantly negotiated, debated or interpreted through active research. From an epistemological perspective a pragmatic methodology states that knowledge should be examined using the best methods to solve the problem, and not restricted by the dogma of other paradigms. Pragmatism uses both deductive and inductive logic to interpret both qualitative and quantitative research methods and is, therefore, well suited for mixed methods research. In addition to these general qualities, pragmatism is especially useful in researching detailed social conflicts and real-world psychological, social, and educational phenomena and is especially relevant for finding objective basis for the criticism of institutions and practices (Weaver, 2018).

Positivism was discounted relatively easily as this relied upon quantitative research and an objective epistemology (Carson *et al.*, 2001; Bryman, 2012) which is incompatible with the needs outlined above. A post-positivism paradigm was also considered, as it acknowledges that measurement will always be imperfect and probable rather than absolute and total. However post-modernism relies heavily upon deductive reasoning and quantitative research methods and was therefore deemed unsuitable as a research paradigm (Bryman, 2012). A constructivism paradigm was considered; however, this restricted research options to qualitative methods and the use of inductive logic.

Bryman (2012, p. 17) and Bhaskar (2011, p. 2) define critical realism (CR) as a “manifesto [which recognises] the reality of the natural order and the events

and discourses of the social world and holds that ‘we will only be able to understand—and so change—the social world if we identify the structures at work that generate those events and discourses . . . These structures are not spontaneously apparent in the observable pattern of events; they can only be identified through the practical and theoretical work of the social sciences’.

CR and pragmatism are similar in some respects, both advocating for mixed methods research (Easton, 2010; Bryman, 2012). However, there are differences in these research approaches. Pragmatism promotes an unrestricted use and integration of qualitative and quantitative methods which complement each other as an exploratory tool. However, CR uses mixed methods as a confirmatory tool, first applying qualitative methods and only using quantitative methods if further explanation is required (Edwards, O’Mahoney and Vincent, 2014). Furthermore, CR seeks to determine causality for the phenomenon being researched, whereas pragmatism is more flexible focusing on the results rather than the processes used to find them (Johnson and Duberley, 2011). Given the three different, but related, research papers in this thesis, pragmatism was selected over CR due to this flexibility and freedom to apply the methods which produced the best data rather than applying qualitative and quantitative methods sequentially.

## **1.6 Methods**

The three papers used within this thesis used a range of methods to explore the subject of servitization and the servitization paradox. The methods were selected to be compatible with each other and deliver the findings required to address the research questions in each paper. In addition to this, the methods were also selected to compliment the selected research paradigm. Given the complex nature of servitization research (Baines and Shi, 2015) a mixed methods strategy was selected. The ability of a mixed method approach to attack the research question with multiple methods (Robson and McCartan, 2016) is therefore well suited to the complexities of servitization research. In contrast to a mixed method research method, a purely quantitative approach is reductionist and can show patterns but not causality or meaning. However,

a purely qualitative approach can be too context specific and open to interpretation. Greene, Caracelli and Graham (1989) propose the following advantages in taking a mixed methods approach:

1. Corroboration: convergence, or correspondence of results from different methods using triangulation
2. Complementary: elaboration, enhancement, illustration or clarification of results from another method and/or theory base
3. Initiation: discovery of paradox, new perspectives, recasting of questions
4. Development: sequential to inform next stage
5. Expansion: adding breadth and range of inquiry

Creswell and Creswell (2018) warn of the challenges of mixed method research for the researcher. These challenges include the need for a thorough understanding of all of the qualitative and quantitative methods that will be used and how to combine the data which can converge on a finding, or findings. They also warn of the time-consuming nature of multiple studies, compared to a single study. In order to avoid these pitfalls, the research has undergone multiple reviews and adherence to a detailed project schedule.

Triangulation is used within each paper of this thesis to combine complimentary qualitative and quantitative mixed methods, and is also used in the last section of the thesis to triangulate findings between each of the separate papers. Using triangulation in this way allows each paper and this thesis to benefit from the relative strengths and reducing the individual weaknesses of each method (Brewer and Hunter, 1989). Using triangulation, the observations within and between all papers can be verified using multiple methods and increase the consistency scope and depth of the findings, the product being greater than the sum of the parts (Flick, 2009). A summary of the methods used in all three papers is presented below in Table 2.



	Qualitative				Quantitative	
	Interviews	Ethnography	Case Study	Delphi	Surveys	Testing
Paper 1						
Paper 2						
Paper 3						

Table 2: Summary of Research Methods Used

### 1.6.1 Semi-structured Interviews

The following section discusses the use of semi-structured interviews which were used in two of the three papers. Semi-structured interviews represent a critical qualitative research tool, having the ability to probe in-depth topics and reveal hidden information in the form of body language and intonation (Ritchie *et al.*, 2014). Semi-structured interviews also provide the interviewer with the flexibility to change themes or pursue new or previously unanticipated areas of interest which may inspire new ideas and research directions. Finally, the semi-structured interview requires active participation and can provide richer context to the questions in a way that is difficult to achieve using other methods (Paz-Soldan *et al.*, 2014).

By their nature semi-structured interviews are carried out one to one and, hence, can be difficult and time consuming. Additionally, with the advent of COVID-19 and the restrictions on personal contact there has been a greater reliance on video conferencing technology to enable these interviews. For nationalities who speak a different language from the interviewer there is the possibility of a language barrier during interviews, where information could be lost or misinterpreted (Marshall and While, 1994). Additionally, non-verbal communication between different cultures, such as avoiding direct eye contact (Nguyen, 2015) for example, could be similarly misinterpreted. During these interviews it is normal for the interview to be recorded, or detailed notes taken. The recording of semi-structured interviews and ‘being on the record’ can restrict the open dialogue, especially in locations where those who voice negative opinions of the government, including state owned oil companies, may face strict legal consequences. Such misunderstandings, fear of repercussions, or lack of knowledge on some or all of the topics can kill the interview. The semi-structured interview also requires the interviewer to be

practiced in active listening and attention to detail, in order to capture and act upon information during the interview (Wilson, 2014).

Logistically, managing the data from semi-structured interviews can take a long time, both in gathering the data and then transcribing the recorded interviews and observations into text for future analysis. Fortunately, the analysis of this data, once transcribed, can be aided by the use of software, in the case of this thesis NVivo by QSR. NVivo and similar applications can assist with thematic classification of interview data, and other data, allowing complex searches to be performed to identify patterns in the data. However, learning such new and complicated software can be a steep learning curve for those who are not familiar with it, or regular users of computers. In addition to this the software can be prohibitively expensive for the individual user.

Semi-structured interviews were held during the research phase of Papers 1 and 2. The question guides can be found in Appendix 3 and Appendix 4 of this document. The participants in the interviews were selected using a non-probability purposive/convenience sampling method, which is well suited for qualitative research (Miles, Huberman and Saldaña, 2020). Using this method increased the probability of participation as the interviewees were within the professional contact circle of the researcher. In addition to this the selected methods also ensured that the participants would have a suitable level of knowledge of the oil industry and the working practices of those organisations within that industry.

Invitations containing a short description of the type and purpose of the research were sent to prospective interviewees via the author's LinkedIn professional contact list. Interviews were carried out in order of response date and availability of the interviewee. This 'first-come-first-served' selection method introduced a form of random selection and eliminated potential bias in the selection method. Sufficient interviews were carried to ensure that both thematic saturation and equal representation from OC and SC occurred. Other non-probability sampling techniques, such as snowball sampling were not

used as potential participant numbers were not difficult to locate.

Additionally, random sampling methods were discounted as the participants may not have the required knowledge of the international oil industry.

Two separate sample groups were used, one group for paper 1 and a different group for paper 2. The groups were composed of a diverse range of oil industry professionals from OC and SC organizations from multiple locations. These locations included: Europe, North and South America, the Middle East, Asia and Australasia. A summary of the groups is presented below in Table 3. Median values were used to represent central tendency rather than the mean which can present a skewed representation based upon the recommendation of Murphy et al. (1998) and Hartwig et al. (2020).

	n	Age Range	Median Age	Oil Experience Range	Median Oil Experience Range
Paper 1	12	28-50	42.5	5-30	16.5
Paper 2	13	25-51	48.0	12-39	23.0
Combined	25	25-51	45.0	5-39	19.0

Table 3: Servitization Level Interviews Demographics, Paper 1, 2 and 3

The analysis of the interviews used in all the papers of this thesis used a systematic combining method (Dubois and Gadde, 2002). This method allows the researcher to refine and improve the thematic analysis as the research unfolds between theory and the real world (King and Brooks, 2018). The systematic combining method shares many similarities with the work of Gioia *et al.* (2013) who also suggest that the research direction should be flexible in order to progress the research in new directions. When using a systematic combining method the data drives the research direction but also ensures that the research remains true to the original scope and parameters of the research objectives (King and Horrocks, 2010). This flexibility allows the researcher to pursue avenues of investigation that may not have been expected at the start of the research process and allows the researcher to seek greater depth on subjects that are more complex than originally predicted.

Paper 1 used 12 experienced (see Table 3) oil industry employees. The thematic analysis resulted in 25 themes based upon the first round of the Delphi

method, see section 1.5.3, a summary is provided below in Table 4. Paper 2 included interviews from 13 experienced (see Table 3) oil industry employees. The thematic analysis initially had 5 themes and 15 sub-themes which were identified in order to determine the servitization level and the influence of servitization on cooperation or non-cooperation. These first and second order themes increased to 7 themes and 28 sub-themes due to the abductive discursive process. Detail of these themes and the coding structure is presented in Table II on page 105 of paper 2.

Theme	Description
1	OC generally disagree with the statement on cyclic nature of servitization, but strong support in SC
2	All groups agreed that they think their level of servitization is intermediate. However, OC Middle Management do not agree with this assessment and think it is below average.
3	OC think their servitization level compared with peers is at or slightly below average, but low agreement. SC General agreement that servitization level is slightly above average.
4	90.91% agree that servitization is variable within their organisation either by department (63.64%) or location (27.27%).
5	Uniform high agreement (median 8.65) that servitization is necessary for good business.
6	All Agreed that change was frequent, especially senior management.
7	OC and SC agree that there is resistance to change, but SC junior management are more neutral.
8	All parties in agreement that SC regard change as a good thing and that OC are more cautious.
9	All parties in strong agreement that cost was greatest challenge to servitization.
10	OC agree that servitization may cause tension. SC middle management also agree, but junior and senior management are neutral.
11	All in agreement that territorial behaviours result, with exception of senior management who are neutral.
12	All agree that territoriality can negatively impact business.
13	All agree that no controls are in place to deal with tensions and territoriality.
14	All agreed that SC would be disadvantaged with exception of some senior managers.
15	All agree that there is a lack of management commitment and infrastructure to implement servitization.
16	OC disagree that servitization as a quick fix, but most SC think that this is likely.
17	All agree that senior management is committed to the implementation of servitization.
18	OC disagree that there is poor implementation and support for servitization, but SC are neutral.
19	There is agreement that there is no clear strategy for servitization within the organisations.
20	All agree that there are insufficient resources for the implementation of servitization.
21	All agree that servitization would lead to improved relationships, performance, learning environment and job satisfaction.
22	All agree that servitization could lead to increased work load for SC = deterioration in work-life balance.
23	All agree that servitization would increase profit and differentiate them from competition and peers.
24	All agree that servitization could overwhelm SC, with the exception of SC senior managers who were neutral.
25	All agree that servitization is good for the industry by reducing impact on environment and global resources.

Table 4: Paper 1 thematic structure analysis

### 1.6.2 Ethnography

The following section discusses the ethnography that was carried out in paper 3. First, we shall describe the type of ethnography used in this research and the relative strengths and weaknesses.

O'Reilly (2009b, p. 3) defines ethnography as “iterative-inductive research ... involving direct and sustained contact with human agents”. Furthermore, O'Reilly states that and ethnography is a “human experience” which draws upon a number of methods, each observing and recording the daily lives of the subjects in their natural environment. Ethnography also acknowledges the role of the researcher as an integral component of the research. Doing ethnographic research requires field research and maintaining notes and records of observations. Ethnographic research often requires immersion into the group, this can have positive and negative consequences (Neyland, 2008). The first criticism that arises from this immersion is that the study becomes subjective (O'Reilly, 2009a). However, this effect can be mitigated, to a degree, by the use of recording devices or reference to written information, for example recorded conversations or email communications (Bryman, 2012).

A specific form of ethnography was used in this research, this is described as an ‘insider ethnography’. This type of ethnography is applicable when the researcher is an “overt full member of the group” (Bryman, 2012, p. 434). The aim of any ethnography is for the researcher to become an insider so they can observe the group from an insider's perspective (O'Reilly, 2009a). Therefore, when the researcher is already an insider, the time taken to achieve cultural immersion is avoided (Thomas, 2013), reducing the duration of the ethnography to a matter of months or even weeks (Boyle, 1994; Muecke, 1994; Weinstein and Ventres, 2000; Bryman, 2012) instead of months or years (Bryman, 2012). Ethnographies of this duration are known as micro, mini or focused ethnographies and are especially suited to hybrid or mixed research methods (Wolcott, 1990) and are ideal for examining a specific theme within a defined group (Bryman, 2012).

An insider ethnography allows the researcher to take advantage of emic subtleties of an observation which may go unnoticed by the outside observer (Easterby-Smith, Thorpe and Jackson, 2012). O'Reilly (2009a) also argues that inside ethnographers blend seamlessly into the environment and are better positioned to understand the subtleties of complex situations and grasp the

nuances and technical terminology of the group. Furthermore, the members of the group are more likely to be forthcoming with a familiar colleague who appears less threatening than an external observer whose motives they are unsure of. O'Reilly (2009a) also states that the inside ethnographer is unlikely to misinterpret and misrepresent the complex interactions that occur and see the detail and nuance beneath the surface of otherwise benign interactions.

The ethnography in paper 3 consisted of direct observation, a reflective journal, informal conversations and collection of publicly available company literature (Brewer, 2004; Gordon, 2011) conducted over four months within a national oil company in the Middle East. Once the data has been collected and the recorded data transcribed analysis took place using NVivo software, using the same thematic analysis process as previously described, producing the following set of 11 themes:

Theme	Description
1	Appreciation from Customer to Manufacturer
2	Blame culture
3	Use of contracts to favour customer position
4	Cooperation between customer and manufacturer
5	Distrust shown by customer
6	Inter-company customer frustration
7	Inter-company retaliation
8	Coercive behaviour
9	Assumption of fault on the part of the manufacturer
10	Manufacturer accepting blame despite evidence to the contrary
11	Unethical behaviour

Table 5: Thematic analysis derived from ethnography

### 1.6.3 Delphi Method

The following section shall discuss the Delphi method which was used in paper 1. The discussion shall provide a brief introduction to the method, including its advantages and disadvantages, followed by an explanation of the process used for the data analysis.

The Delphi methods epistemological position can incorporate qualitative and quantitative approaches (Keeney, Hasson and McKenna, 2011), which makes it a useful tool for pragmatic mixed method research. The Delphi method was developed to determine a consensus amongst a panel of experts and was

created by the RAND corporation for use in military decisions in 1953 (Kezar and Maxey, 2016). The Delphi method works by a process of iterative refinement, once the panel have answered the question, the answer is fed back to the group for further comment and this process is repeated until a consensus is reached, or until it is agreed that consensus cannot be reached (Murphy *et al.*, 1998). Typically, the Delphi method results in two or three rounds to reach consensus (Sumsion, 1998; Thangaratinam and Redman, 2005). A simplified process diagram for the Delphi method is shown below in Figure 2:

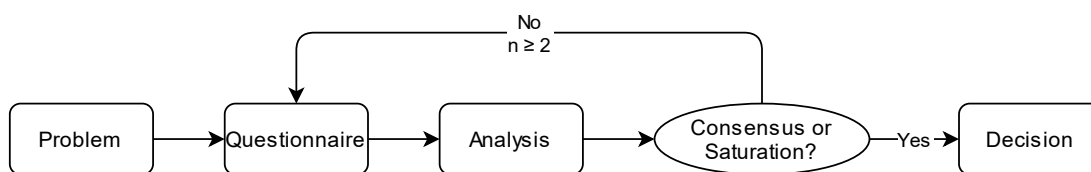


Figure 2: Simplified Process Diagram for the Delphi Method

Servitization is a relatively new subject. Its first use only dates as far back as 1988 (Vandermerwe and Rada, 1988) and as such proves to be a “challenging topic to study; nuances can be easily misunderstood and often require careful explanation. Conventional survey techniques (where respondents complete questionnaires remotely and in isolation) fail to give sufficient insight into practice, and yet in-depth case studies are so resource intensive that they rarely deliver reliable generic results” (Baines and Shi, 2015, p. 1174).

The Delphi method is an exploratory method (Kennedy, 2004) and has been used, and is well suited for, the study of servitization (Baines and Shi, 2015). While superficially simple, the Delphi method is uniquely suited to “problems that do not lend themselves to precise analytical techniques but rather could benefit from the subjective judgments of individuals on a collective basis (Adler and Ziglio, 1996) and to focus their collective human intelligence on the problem at hand (Linstone and Turoff, 1975). Also, the Delphi is used to investigate what does not yet exist (Czinkota and Ronkainen, 1997; Skulmoski and Hartman, 2002)” (Skulmoski, Hartman and Krahn, 2007, p. 2) or where



there is incomplete knowledge (Ferri *et al.*, 2005), or the aim is to understand complex interactions which other methods may struggle with (Hallowell and Gambatese, 2010).

Despite the advantages outlined above, Keeney, Hasson and McKenna (2011, p. 20) note that “the Delphi has been subject to considerable criticisms, which relate to five main areas:

1. Lack of universal guidelines
2. Size of expert panel
3. Implications of lack on anonymity
4. Expert ‘opinion’
5. Level of consensus”

Many of the weaknesses of the Delphi method appear to stem from a general unfamiliarity with the technique. Many scholars from a quantitative background confuse Delphi method with quantitative surveys (Mullen, 2003) criticising it for a small un-representative sample size. This misconception is explained by Brady (2015, p. 2) who states that “the Delphi method is not concerned with having a generalizable sample but instead seeks input from a purposive sample of individuals with specific expertise on a topic”.

Furthermore, Hasson, Keeney and McKenna (2000) state that participants in a Delphi study are selected for their knowledge of the problem being researched and are not intended to be a statistically representative sample of the whole. Hence, representative sampling techniques are not appropriate (Beretta, 1996) and it is the quality of the expert panel and not the size that is critical to the success of the Delphi method (Keeney, Hasson and McKenna, 2011). This is confirmed by Rowe and Wright (1999) and Makkonen *et al.* (2012), who point out that the Delphi method cannot be paralleled with statistical or model-based procedures.

Paper 1 used the Delphi method to examine the effect of tensions and territoriality within the oil industry. A panel of 12 experts selected for their expertise was used in the Delphi method panel for this research. As mentioned

above, the panels used for the Delphi method are selected experts and are not intended to be a statistically representative sample of the population (Okoli and Pawlowski, 2004), and are smaller than one would expect to find in a statistical sample. However, there remains much discussion on the ideal panel size, but the consensus is that between 8 and 15 members should be sufficient to produce robust results for most Delphi applications (Mullen, 2003; Okoli and Pawlowski, 2004; Worrell, Di Gangi and Bush, 2013; Diamond *et al.*, 2014).

In the first round of the Delphi method each panel member participated in a semi-structured interview. The complete details of how the interviews were carried out and the data collected and analysed are given in section 1.5.1. The second round comprised of a summary of the themes see Table 4, which were sent to the panel members who were asked to respond on a scale of 0-10 on how much they agreed with each statement, where 0 represents strongly disagree, and 10 represents strongly agree. In accordance with the method outlined by Keeney, Hasson and McKenna (2011) the median was calculated for each of the questions, in the first instance for agreement within management level, irrespective of organization type, and then agreement within organization type, irrespective of management level, and finally a combined value. In general, a median value of 7 or more, somewhat agree, was deemed to show agreement with the statement. In addition to this, the coefficient of variation was calculated and values of 25% or less were deemed to show consensus (Tian, 2005), i.e. that the range of responses around the mean value was low indicating that most group members were in close agreement with the mean value.

The third and final round of the research sought to provide clarification only on those questions where agreement was absent, or the range of responses was too wide to show a consensus. These questions were sent individually to each research participant who responded, usually via email, with a short explanation of their view in relation to each question. These were then compiled and examined, along with data from previous rounds. In all cases,

the third round was successful in creating a consensus in all remaining questions, and no further rounds were required.

#### **1.6.4 Surveys**

Surveys are one of the primary instruments for gathering data in research and are inherently quantitative in nature (Bryman, 2012). Creswell and Creswell (2018) describe survey research as a method of gathering the opinions of a representative sample of the population in the form of surveys or structured interviews. These data can then be gathered in cross-sectional or longitudinal studies and analysed to make generalised observations of the population from the representative sample.

With the advent of technology, especially the internet, self-administered surveys are becoming increasingly common. These surveys require the respondent to complete the survey and then the system either reports the data to the researcher or, increasingly less common, the responses are mailed to the researcher. Surveys can be complex or very simple and can generate stand-alone data or be used as a confirmatory tool (Bryman, 2012).

One of the advantages of these surveys using the internet is that the administration of the survey is quick. With the click of a mouse, thousands of surveys or invitations can be delivered. Self-administration also removes the influencing effect of the researcher, also known as the Hawthorne effect. The survey is also consistent, unlike an interview where questions can be phrased differently or interviewers can change. Finally, the survey can be taken at the convenience of the respondent.

Surveys also have limitations, foremost amongst these is the absence of the researcher to answer questions or clarify any issues. The data is limited to the set of questions provided, removing the ability of the researcher to probe, or pursue a new finding. The assumption in surveys is that they are completed by the target, but there is no way of confirming this. The final problem with surveys is one of overload, mailboxes become full of surveys, leading to low response rates, or the respondent becomes bored or distracted with a high

volume of questions and abandons the survey mid-way (Evans and Mathur, 2005; Ball, 2019).

To avoid the pitfalls described above, the surveys used in this thesis were relatively simple and were limited to a single or small number of questions. For example, the survey used in paper 1 asked a single question which was used as a confirmatory instrument in round 2 of the Delphi method. Similarly, the survey used in paper 2 was attached to the Game theory experiment and used to confirm the interview responses on the level of servitization within organisations. Finally, paper 3 used 2 separate surveys, each requiring a single numerical response to a single question. A summary of the surveys used in this thesis is presented below in Table 6.

Paper	N	n	RR	Comments
1	12	12	100%	Round 2 of Delphi method, 0-10 scale on each of 24 themes
2	48	48	100%	Part of Game theory experiment, 1 question on servitization level, 0-10 scale
3a	321	218	67.9%	1 question, identification of trust/distrust business relationship
3b	2155	834	38.7%	1 question on servitization level, 0-10 scale

Table 6: Summary of surveys

The participants in papers 1 and 2 were part of the Delphi method or Game theory experiment. However, the participants in paper 3 were selected using a non-probability purposive/convenience sampling method from the author's LinkedIn professional contact list. As mentioned previously, using this method increased the probability of participation of the participants. In addition to this the selected methods also ensured that the participants would have a suitable level of knowledge of the oil industry and the working practices of those organisations within that industry.

### 1.6.5 Experiment

A game theory experiment was selected to investigate the expressed strategy used by employees within the oil industry. Game theory, unlike other methods, focuses on strategy, and therefore has the virtue of discovering the actual conscious or subconscious strategy used and not the expressed strategy of the player (Peleg and Sudhölter, 2007; Tadelis, 2013). Game theory is also a

modern, but well-established method for determining strategy and strategic outcomes of scenarios like the one presented to the members of the research group and can therefore be relied upon to provide robust findings (Chatterjee and Samuelson, 2014; Peleckis, 2015).

To perform the experiment, a representative sample of 48 experienced oilfield employees were selected. They were directed to complete an experiment to determine if they elected to use a cooperative or adversarial strategy in the experiment as if they were dealing with their regular day-to-day business partners. The experiment consisted of a modified version of the established prisoners' dilemma (Dixit and Nalebuff, 2010), to reflect a realistic oilfield scenario where the Service Company (SC) provided a new tool generating a saving for the Operating Company (OC). The experiment used an inverted version of the prisoners' dilemma where the aim of the experiment was not to determine the outcome which was already known, instead to use the outcome to determine the type of game strategy being employed by each actor, specifically competitive or non-competitive. One version (High reward) of the test examined a saving of \$1,025,000 and the other version (Low reward) a lesser saving of \$350,000. The difference in values between the two tests determined if value was a factor in the strategy of either party, the experiments were otherwise identical. Both versions of this experiment are provided in Appendix 4.

During the experiment, the participants were asked to allocate a percentage share of the saving to the SC responsible for creating the saving. Each participant was asked to allocate the saving value based on what they thought was fair. The same participant was then asked to reconsider the realistic saving value based upon their experience and expectation if the event occurred in their current organization. Both these values were recorded and analysed using a range of criteria and a chi-square statistical analysis.

## 1.7 Structure of Thesis

This thesis uses the 'Journal Format' and comprises three papers. The structure of the thesis is illustrated below in Figure 3.

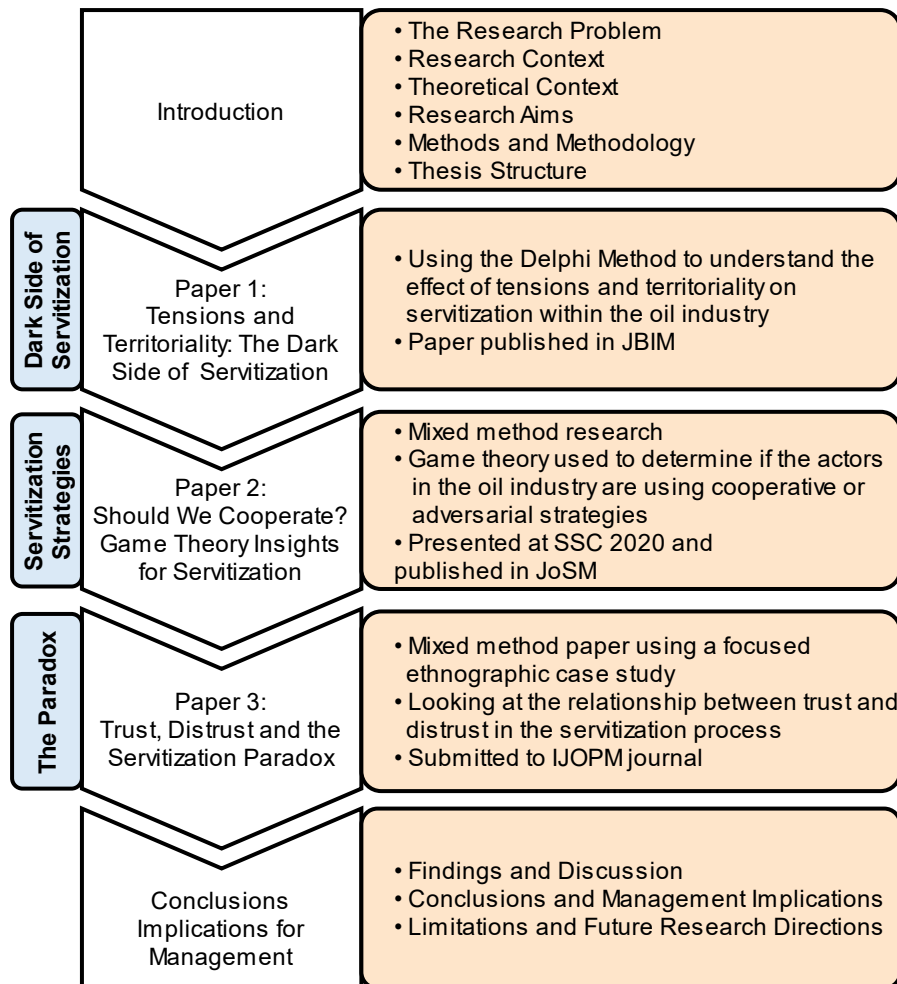


Figure 3: Thesis Structure

The first part of this thesis contains an introduction to the research. The next part contains a general literature review, followed by a general methodological section to frame the research undertaken in this thesis. Following these parts are three papers: paper 1, paper 2 and paper 3. The last part of this thesis contains the discussion, which includes conclusions and management implications.

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## 2 Paper 1: Tensions and Territoriality: The Dark Side of Servitization

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Wagstaff, S., Burton, J. and Zolkiewski, J. (2021) 'Tensions and territoriality: the dark side of servitization', *Journal of Business & Industrial Marketing*, 36(10), pp. 1755–1766. doi:10.1108/JBIM-01-2020-0067.

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The paper was created from two earlier conference papers:

Wagstaff, S., Burton, J. and Zolkiewski, J. (2019a) 'A Delphi Study to Explore Tensions and Territoriality Within Servitizing Oil and Gas Organizations', in *DBA Conference. 2019 DBA Conference*, Manchester, UK, pp. 1–21.

Wagstaff, S., Burton, J. and Zolkiewski, J. (2019b) 'A Delphi Study to Explore Tensions and Territoriality Within Servitizing Oil and Gas Organizations', in *IMP-2019 Conference*. Paris, France, pp. 1–18. Available at: <https://www.impgroup.org/uploads/papers/11129.pdf> (Accessed: 16 February 2021).



# Tensions and Territoriality: The Dark Side of Servitization

## **2.1 Abstract**

**Purpose** – This paper focusses on the darker side of the dynamics of servitization by exploring the tensions and territoriality that emerge between manufacturers and customers during the servitization process in the oil industry.

**Design/methodology/approach** – The Delphi method is used to explore the perspectives of three management tiers in oil organizations and the manufacturers who work with them. The views of these managers were synthesized over three iterations: semi-structured interviews, a questionnaire and resolution/explanation, where consensus was not obtained.

**Findings** – The findings of the study highlight perceptions of change, resulting tensions and territoriality and the impact of management commitment, resources and strategy. They reveal significant differences between customers and their suppliers and different management levels and highlight territorial behaviour and the negative impact this has on buyer supplier relationships during the implementation of servitization.

**Research limitations/implications** – Further research is required to explore why there is a variation in understanding and commitment at different managerial levels and the causes of tensions and territoriality.

**Practical implications** – Servitization is not a “quick fix” and management support is essential. A fundamental element of this planning is to anticipate and plan for tensions and territoriality caused by the disruption servitization creates.

**Originality/value** – The research provides empirical evidence of tensions and territoriality relating to servitization that potentially can damage supplier–

buyer relationships and suggest that there is a darker side to servitization. It also shows that differences in strategic intent across organizations and between different managerial layers impedes to servitization efforts.

**Keywords:** Servitization, Buyer–seller relationships, Delphi method, Tension, Territoriality, Oil gas industry

## **2.2 Introduction**

Servitization attracts considerable attention from a multidisciplinary base (Baines *et al.*, 2017; Raddats *et al.*, 2019). Generally, servitization is regarded as the process a manufacturing organization undergoes to increase their competitive advantage by developing the services they offer to their customers (Baines *et al.*, 2009; Kowalkowski *et al.*, 2017) and is generally accepted as having positive outcomes for all parties involved. However, there is a stream of research that argues that servitization tends to be poorly executed and the potential gains are seldom fully realised (Brax, 2005; Valtakoski, 2017) with territorial tensions being evident (Burton *et al.*, 2016). Servitization often necessitates change (Visnjic, Wiengarten and Neely, 2016; Bigdeli *et al.*, 2017); it has been suggested that change theory can add important insight to servitization theory (Kim and Toya, 2019) and increase understanding of the process (Bigdeli *et al.*, 2017). Additionally, current literature tends to focus almost exclusively on the perspective of the manufacturer to drive servitization and neglects customer contributions to the process (Pereira, Kreye and Carvalho, 2019). Hence, the objective of this paper is to investigate how manufacturers and customers deal with change and related tensions and territoriality in a servitization context.

The oil industry provides a rich research context because, despite the recognition that oil and gas companies such as Shell and BP have vast service expertise (Neely, 2008), it has received limited attention in servitization or PSS research [an exception being Bandinelli and Gamberi (2011)]. The Delphi Method has been adopted to explore servitization, change and territoriality in this industry as it is particularly well suited to investigating servitization in

complex business relationships such as those in the oil industry (Baines and Shi, 2015). Our findings provide insight into the darker side of the dynamics of servitization from the perspectives of both customers and manufacturers and demonstrate that it is not perceived in the same way by both parties or seen as mutually beneficial. We also look at servitization from three management perspectives; first-line managers who supervise only employees, middle managers who supervise first-line managers and top managers who supervise middle managers (Jones and George, 2016). Additionally, we show differences in the attitudes to the process between customers and manufacturers and confirm that it is a non-linear process.

From this we identify the following contributions. Firstly, we provide empirical evidence of the tensions and territoriality that emerge as a result of the changes that manifest from servitization, with territoriality being evident through defensive behaviour and restricted knowledge sharing that ultimately damage buyer–supplier relationships. Secondly, we extend the findings of Crowley et al. (2018) by showing that differences in strategic intent across organizations as well as between different managerial layers provide an impediment to servitization that manifests in tensions and territorial behaviour.

## **2.3 Literature Review**

### **2.3.1 Servitization**

Servitization was initially recognized by Vandermerwe and Rada (1988) and has grown in popularity as a subject of interest since then. Unlike other approaches such as outsourcing, servitization encourages the manufacturer and customer to combine their efforts over the life of a project to ensure that the best solution is reached for both parties (Baines and Lightfoot, 2013). Servitization is a growing trend within organizations (Ruiz-Alba *et al.*, 2019) and as an area of academic research. However, there remains little literature on servitization within the oil industry, and it is therefore unknown if it is a widespread phenomenon.

Servitization offers the manufacturer an opportunity to increase revenue and profitability (Kumar and Markeset, 2007; Bandinelli and Gamberi, 2011), and if carried out successfully these goals can be realised (Anderson and Narus, 1995; Wise and Baumgartner, 1999). Strähle, Füllemann and Bendig (2012) state that income from additional services can increase revenues by 20% to 35% and for some specialised manufacturers this can account for more than 50% of revenues with an annual growth rate of 5%. However, it has been argued by Wang et al. (2018) that the positive effects of servitization are more pronounced in traditional manufacturers than other types of organizations. It is also widely accepted that servitization increases competitive advantage because of the difficulty other providers face while attempting to replicate the combined offering of products and services (Gebauer, Friedli and Fleisch, 2006).

### **2.3.2 Organizational Change**

The servitization process necessitates significant organizational (Barnett *et al.*, 2013; Kowalkowski and Kindström, 2013; Visnjic and Looy, 2013; Kowalkowski *et al.*, 2017; Raddats *et al.*, 2019) individual (Bratman, 1999; Searle, 1999) or combined change (Cañibano, Encinar and Muñoz, 2006). This change is needed to transition the business and organization from a manufacture centric to manufacture and service organization (Bigdeli *et al.*, 2017), requiring a significant change in their business model and day-to-day business practices (Crowley, Burton and Zolkiewski, 2018). Servitization also changes the organization's core offering, and they "need to consider the implications for their resources and their staff's competences in relation to the specific skills that they bring in delivering the value propositions" (Smith, Maull and Ng, 2014, p. 260).

There is much literature on the subject of organizational change; however, there is little about change and servitization (Martinez *et al.*, 2010) or how organizational change because of servitization occurs. Lenka et al. (2018a, p. 328) state that existing literature recognises there is significant resistance to change on the individual level, but "a deeper understanding of the role that

individuals play during servitization” is required. Baines et al. (2017) describe the effects of change because of servitization as an underdeveloped topic and highlight the need for further research. The psychological impact of organizational change, such as that seen during servitization (Baines *et al.*, 2017), is an often overlooked consideration (Burke and Litwin, 1992). However, the success of the servitization strategy is contingent upon the organization’s change strategy (Bigdeli *et al.*, 2015). The changes required during the change to a servitized organization have been expanded upon by Bigdeli et al. (2017, p. 15) to:

*[. . .] include (internal) organizational structure, corporate culture, power and leadership, political characteristics, strategic directions, level of trust and stage of the board development; and (external) political, economic, social, technological, regulations, environmental and industry.*

Change is often a problematic process that can lead to anxiety and stress in individuals and teams (Rowland and Higgs, 2012). The dissatisfaction with the status quo must, therefore, be greater than the negatives caused by the change process if the change is to be long-lasting and successful (Schein, 2010). Therefore, one can deduce that the success of servitization implementation is highly contingent upon the successful management of the change process (Bigdeli *et al.*, 2015).

Change theory can be used to explain how individuals or groups react to change caused by servitization in predictable ways; the most notable contribution to change theory is Lewin’s theory of change (Lewin, 1942). Lewin’s field theory states that an individual’s behaviour is influenced by the group environment or field. He then goes on to state that these influences are dynamic and can change with time and may stem from “internal characteristics of the organization’s structure, strategy, management and personnel, or external characteristics” (Batras, Duff and Smith, 2014, p. 233).

Lewin (1947) states that for change to succeed the following model should be used:

- Unfreezing: create dissatisfaction with the status quo.
- Moving: implement the change, which may include reassigning roles, responsibilities and relationships, training and up-skilling, promoting supporters and removing resisters.
- Refreezing: new organizational structures, policies and practices to lock in the new changes.

In addition to the work of Lewin (1947), Steckler and Goodman (1989) explain that the time it takes to implement a change process is often underestimated and underfunded, which can lead to problems of staff retention and loss of corporate memory (Pettigrew, Ferlie and McKee, 1992). Furthermore, Kowalkowski et al. (2017) state that leadership skills beyond simple organizational change are required with servitization because of the need to create a service centric culture.

The change required for servitization is not a linear top down process, but impacts all levels of management in different ways (Palo, Åkesson and Löfberg, 2019). Internal communication within an organization and between management tiers is a major concern resulting in inefficiency and misdirection (Welch and Jackson, 2007). Therefore, it is this aspect of change caused by misinformation and inefficiency during the servitization process that is explored as a possible catalyst for tension (Johnson *et al.*, 2016). Hence, it can be seen that the change required for servitization can be an extremely disruptive process and could lead to tension and territoriality, as discussed below.

### **2.3.3 Tensions and territoriality within servitization organizations**

Many scholars have identified that often the act of servitization requires fundamental changes at both an individual level, and perhaps, more importantly, a collective level (Palo, Åkesson and Löfberg, 2019) within an

entire organization (Ulaga and Reinartz, 2011; Alghisi and Saccani, 2015; Spring *et al.*, 2017). The consequence of these changes is expounded upon by Burton *et al.* (2016) who discuss the implications of these changes, specifically, that resources and responsibilities will inevitably move to and from one individual or department to another or disappear altogether. Several supporting arguments are provided in general literature to support this position, such as the work of van Dijk and van Dick (2009) who describe how resistance to change can cause an often unseen and unreported tension throughout an organization. Real or perceived tensions relate to a contradiction in motivation, objectives and goals which drive parties apart (Tura, Keränen and Patala, 2018) or create internal resistance. Similarly, Baines and Lightfoot (2013) show that the skill sets and employees required in a service organization are different from those in a traditional manufacturing un-servitized organization. It is, therefore, reasonable to assert that some of those affected will fear redundancies or a difficult, and often stressful, mandatory retraining programme.

Combining these sources allows a reasonable conclusion to be drawn which states that a loss of authority and resources, increase or change in workload and responsibility, fear of redundancy and mandatory re-training because of changes caused by servitization will result in tension within an organization (Baines and Lightfoot, 2013; Song and Sakao, 2016). Furthermore, it can be argued that this tension between actors can, and should be, expected in both individuals and groups (Burton *et al.*, 2016). Zolkiewski, Burton and Stratoudaki (2008) describe how these tensions may manifest themselves as a group or individual taking steps to defend their current position which they perceive is under threat, or loss of ownership (Brown and Zhu, 2016). However, these defensive behaviours often have a negative impact and act to increase the undercurrent of tension within individuals and the organization as a whole, resulting in an increasingly destructive feedback loop of threat and territoriality (Brown and Zhu, 2016). This concept has been experimentally

simulated and confirmed by creating tensions from physical stress or discomfort (Vischer, 2007; Ashkanasy, Ayoko and Jehn, 2014).

While there is literature on the general subject of territoriality, there is little on the subject of territoriality specifically related to servitization or the servitization development processes (Vendrell-Herrero *et al.*, 2014). Despite this, there are two competing definitions of territoriality in servitization. The first and largest group discusses servitization in the context of geographical or socio-political territoriality (Ruggie, 1993; Romain and Julie, 2016; Lafuente, Vaillant and Vendrell-Herrero, 2017; Vendrell-Herrero and Wilson, 2017). The second approach discusses territoriality with respect to the personnel involved, whereby an individual or group seeks to defend their personal or organizational position from a perceived threat or tension, e.g. Crowley *et al.* (Crowley, Burton and Zolkiewski, 2018). However, it can be seen that tension and territoriality often have a detrimental effect on the implementation of servitization and erode value within the organization as a whole (Blackhurst, Wu and Craighead, 2008; Song and Sakao, 2016; Lenka *et al.*, 2018b). Burton *et al.* (2016) suggest that organizations need to acknowledge that tension and territoriality will occur and take measures to mitigate the negative impact this can have. Song and Sakao (2016) further note that many organizations attempt to use existing process controls, such as design reviews and change memos, to manage these issues which tend to overlook the human aspect of the problem and, therefore, have limited, if any, success.

The limited research on servitization (Bandinelli and Gamberi, 2011) and the absence of material on tensions and territoriality in the oil industry highlights a research gap in this specific domain and provides justification for this research. In line with the overall research objective of the paper and to explore change and related tensions and territoriality in a servitization context, following questions have been used to guide the research:



- Q1. Does the servitization process create significant change within an organization which can then manifest itself as tension and territorial behaviour in customers and suppliers?
- Q2. Do management at differing levels have different perceptions on the impact of servitization induced tensions and territoriality?
- Q3. Are adequate tools and processes to manage servitization induced tensions and territoriality in place?

#### **2.4 Delphi Method**

The complexity and specificity of the domain (the oil industry) and the challenges relating to the study of servitization (Baines and Shi, 2015) required an exploratory research methodology to be used. Baines and Shi (2015) further recommend the Delphi Method as a solution because traditional survey instruments fail to give enough insight into practice. The Delphi method was also selected because it is well suited to situations where there is incomplete knowledge (Ferri *et al.*, 2005) and the subject is difficult to analyse using traditional analytical techniques (Hallowell and Gambatese, 2010). A single industry, oil and gas, was selected to reduce the number of variables in the study, removing a potential source of error in the findings. It is important to note that the Delphi Method does not seek to create a statistical sample or to be representative of a larger population; instead, it is a group decision method for a specific question or group of questions (Okoli and Pawlowski, 2004). The Delphi Method also allows research subjects to contribute individual responses which are not swayed by the larger group pressures or be subject to group conflicts. The method also allows the researcher to compile early results and build upon them during the research process (Loo, 2002). Finally, the method overcomes logistical issues of assembling a group of experts in the same place at the same time on two or more occasions (Ogbeifun, Mbohwa and Pretorius, 2017).

The Delphi Method was developed by the RAND Corporation in 1953 (Kezar and Maxey, 2016) and was initially created to find a single consensus amongst a selected panel of experts by discussing and refining the results from previous

rounds. However, later literature has seen that a bimodal or polymodal consensus may indicate important pockets of opinion enabling greater insight (Tetzlaff, Moher and Chan, 2012) and such a “distribution should be viewed with special interest” (Scheibe *et al.*, 2011, p. 271). Therefore, the aim of the Delphi method today is to identify “the degree of consensus or dissensus, specifying the range of different positions and revealing the rationales which lie behind the judgements” Critcher and Gladstone (1998, p. 432).

There is much discussion about the number of panel members required for a Delphi study (Keeney, Hasson and McKenna, 2011) because of, amongst other things, the many different contexts where the technique can be used. Scholars such as Mitchell (1991) and Johnson (1976) state that the error rapidly drops when the number of members is increased to between 8 and 10, but there is no significant reduction in error once the number of panel members increases past 13 to 15. This suggests that a panel size ranging from 8 to 15 should provide robust results for most Delphi Method studies (Mullen, 2003; Okoli and Pawlowski, 2004; Worrell, Di Gangi and Bush, 2013; Diamond *et al.*, 2014).

Concerns are often voiced over bias in the selection of a panel, one potential source of bias is the link between experts and the researcher; this can be especially evident in specialised subjects where the pool of experts is small. The method was designed to create a single point of convergence but “the possibility of polarization or clustering of the results around two or more points” (Ludwig, 1994, p. 57) has been noted. Such a possibility could be insightful when exploring the dynamics of a manufacturer and customer relationship. Another potential issue is the definition of expert or which experts to select (Thangaratnam and Redman, 2005), Mitchell (1991) suggests that one solution to avoid expert selection bias is to use all identified experts, whilst this may work for small pools of experts, this would become impractical and not beneficial when the pool exceeds 15 or so experts, as discussed previously in this section.

### 2.4.1 Number of Rounds

One of the distinguishing features of the Delphi method is the successive feedback reviews held with the research subjects to converge upon a consensus (Murphy *et al.*, 1998). The minimum number of rounds could, therefore, be two (Thangaratinam and Redman, 2005), but the optimum number of rounds is a topic of debate. As the number of rounds increases the degree of improvement in convergence will experience diminishing returns and the process of excessive rounds leads to fatigue and attrition of the research subjects and researcher (Walker and Selfe, 1996). In most studies the preferred number of rounds is limited to two or three (Sumsion, 1998; Thangaratinam and Redman, 2005) but can be as high as four or five (Turoff, 1970; Rudy, 1996) or until a consensus is reached (Mullen, 2003).

### 2.4.2 Application of the Delphi Method

Table 7 below identifies the respondents used.

Management Tier (Jones and George, 2016)	Organization Type	Individual Identifier
Top Managers	Customer	TMC1
	Manufacturer	TMM1
		TMM2
		TMM3
Middle Managers	Customer	MMC1
	Manufacturer	MMC2
		MMM1
		MMM2
First-line Managers	Customer	FLC1
	Manufacturer	FLC2
		FLM1
		FLM2

Table 7: Delphi Study Group

The research subjects were experienced individuals from eight different organizations in the oil industry, most of whom had extensive international experience, and many had worked for several companies. The range of ages spanned between 28 and 50 years with the median age being 42.5. The range of oil industry experience ranged between 5 and 30 years with a median experience level of 16.5 years. The research subjects came from diverse cultural backgrounds: Europe, North and South America, the Middle East, Asia and

Australasia. Panel members were selected based upon equal representation of their management level or tier (Jones and George, 2016) and equal representation from OC and SC, where possible members were also selected based upon their current and historical global industry experience.

The process used was as follows: Round 1, each member was individually interviewed using a semi-structured interview and then individually provided with the feedback of the entire group. Comments on the feedback were sought, and these comments were again fed back to each member of the entire group for further comment. Once complete the comments and interview findings were analysed. Round 2 used a computer-based questionnaire, and Round 3 involved asking respondents' opinions about points that had not achieved consensus.

The semi-structured interviews were transcribed and coded and the findings summarised into 24 nodes. Each node was then reformatted into a questionnaire statement, summarising each node, and all of the subjects were asked to comment to what degree they agreed with that statement. Results were recorded on a scale of 0–10, where 0 represents strongly disagree, and 10 represents strongly agree. In accordance with the method outlined by Keeney, Hasson and McKenna (2011) the median was calculated for each of the questions, in the first instance for agreement within management level, irrespective of organization type, and then agreement within organization type, irrespective of management level, and finally a combined value. In general, a median value of 7 or more, somewhat agree, was deemed to show agreement with the statement. In addition to this, the coefficient of variation was calculated and values of 25% or less were deemed to show consensus (Tian, 2005), i.e. that the range of responses around the mean value was low indicating that most group members were in close agreement with the mean value.

The third and final round of the research sought to provide clarification only on those questions where agreement was absent, or the range of responses was

too wide to show a consensus. These questions were sent individually to each research subject who responded, usually via email, with a short explanation of their view in relation to each question. These were then reviewed, along with data from previous rounds. In all cases, the third round was successful in creating a consensus in all remaining questions, and no further rounds were required. The collated results from all rounds are presented below.

## **2.5 Findings**

### **2.5.1 Servitization Strategy**

The move towards servitization was accepted as good for business by all those interviewed and it was felt that it could create a mutually beneficial environment; this supports existing servitization theory (Baines and Lightfoot, 2013). However, there was frustration expressed by several respondents over delays in completing the process and the unwillingness of management to commit to the process fully, this observation supports current servitization theory (Weeks and Benade, 2015; Lenka *et al.*, 2018b). One fear which was expressed by SCs and confirmed by OCs was that the relationship would become skewed in favour of the OC. Specifically, OCs would expect increased support from the SCs but would be unwilling to compensate the SC adequately for those services. This finding is contrary to the accepted assumption that trust will be mutual and balanced in servitized relationships (Kohtamäki *et al.*, 2018).

### **2.5.2 Perceptions of Change**

The findings showed a difference in attitude to the change required for servitization between OCs and SCs, such a difference has not been discussed in the extant literature. Almost all SCs expressed a large desire for change, whereas OCs were more cautious in their attitude towards change.

Despite the differing attitudes towards change, all parties agreed that servitization requires a significant change within an organization (Baines *et al.*, 2017; Lexutt, 2020). However, servitization is just one change amongst many within all of the organizations researched. All parties described how frequent

change could result in a cynical attitude, where staff are confused and are not motivated to try and make the most recent change, in a long line of changes, successful. Most middle managers were especially vocal on this subject and described the symptoms of Repetitive Change Syndrome where “employee burnout [is] often expressed as cynicism” (Abrahamson, 2004, p. 94) examples of repetitive change syndrome can be seen in the comment below:

*Our industry’s morphing itself every 12 months, isn’t it? For the last six or seven years. I think they’ve got to put the brakes on. You know, it’s more than strategy. You implement the strategy. The fruits of the strategy don’t manifest themselves for 12, 18 months. You should be giving your strategy 18, 24 months before you then go and change that action (TMM2).*

Such a frequency of change can be extremely disruptive if not managed (Johnson *et al.*, 2016), and it is common that this can lead to resistance for those most affected by it (Jones, 2013; Lenka *et al.*, 2018a; Oberle, 2020). Both OCs and SCs report resistance to the change caused by moving to a more servitized organization (Annarelli, Battistella and Nonino, 2019). One senior manager described how this resistance could cause loss of profit, which can, in turn, create more resistance:

*I think that’s where we can see some resistance from the operators and the service providers, that they can’t make the things profitable or workable. So that’s why they’re resisting change (TMM1).*

### **2.5.3 Tension and Territoriality as a Result of Change**

When asked about the impact of change caused by servitization there was general agreement that it caused tension, confirming current literature (Burton *et al.*, 2016). It was reported by all that it was common, to a greater or lesser degree, for territorial behaviours to emerge. A middle manager offered an explanation as to why individuals react to tensions with territorial

behaviour. His explanation identified that those individuals were becoming protective of their positions against the threat, or perceived threat:

*Some of the people who are doing the general job, like sales, administration, accounting management or general management, they will definitely feel threatened because the companies are now trying to move them, eliminate the layers, to derive the perfect profit. So, we have seen this in different companies at the moment. So yeah, protective and defensive (TMM1).*

Most of the behaviours recounted were less extreme than those discussed above and consisted of the withholding knowledge and the reluctance to volunteer their knowledge or services. It was expressed that the motivation for this behaviour was to make it more difficult for the organization to discard them, in essence, the belief is that to give away knowledge was to reduce their value to the organization and make it easier for the company to make them redundant. For example:

*They're very wanting to acquire all the knowledge, but they won't share it because they think that they'll make themselves less valuable. They think knowledge is power, so they'll keep that knowledge to themselves (FLM2).*

Once tensions were established many reported that they had witnessed acts of territoriality as individuals or departments attempted to secure their positions. Some reported deliberate acts of sabotage against individuals or departments. Other more common displays of territoriality consisted of withholding of information or knowledge – on several occasions the phrase “knowledge is power” was used. This behaviour is described by Ardichvili et al. (2006, p. 98) stating that “power and status determine people’s motivation to share and the direction of knowledge flows”. The general strategy behind this is aimed at elevating their standing by sacrificing another to make oneself indispensable to the organization by withholding knowledge and information (Ashkanasy,

Ayoko and Jehn, 2014; Valtakoski, 2017). This can be categorized as territorial behaviour.

The impact of this territoriality is to weaken the organization (Benedettini, Neely and Swink, 2015), or as one manager phrased it, “I think our main challenge is not that people are concealing, but yes, you get protective. And especially if the change, now, is affecting the business in a negative way” (TMM3). Several of the respondents agreed that, not only, could territorial behaviours damage their organization, but they could also damage the relationship with business partners, supporting current literature on this subject (Dmitrijeva *et al.*, 2019).

Despite the recognised disruption that change to a more servitized organization creates and the acknowledged need for mechanisms to deal with these disruptions, all respondents reported that no such specific mechanisms had been introduced. This confirms the findings of Song and Sakao (2016) that reliance upon existing mechanisms, such as HR grievance procedures or computer based cultural awareness training are insufficient and a “barrier that needs to be overcome” (Raja, Green and Leiringer, 2010, p. 262). It was also noted that organizations were unwilling to provide additional resources: “Okay, and the thing is, when we raised this issue to office they didn’t care about it” (FLC2).

#### **2.5.4 Management Commitment, Resources and Strategy**

Management commitment was discussed and there was agreement that there was not consistent commitment from all management tiers. Respondents agreed that senior management were committed:

*Our management, the senior most management of my company, they are pretty committed to our goals. But as it goes down the chart, it keeps getting worse. When it reaches the site, it’s poorly implemented” (FLC2).*



There were several observations that some managers were feigning commitment and some even admitted that they were guilty of this. There were two reasons given for this behaviour, which support current theory, the first was a refusal to change from existing practices or industry norms (Crowley, Burton and Zolkiewski, 2018), and the second was a reaction to the continuing number of changes they were expected to support (Abrahamson, 2004; Johnson, 2016; Johnson *et al.*, 2016).

Most respondents reported that there was no defined strategy or plan in their respective organizations for the implementation of servitization. A phrase that was repeatedly used was “organic” the term was further explored and confirmed to mean: to develop without guidance or a defined strategy. This finding is supported by literature such as Ruiz-Alba *et al.* (2019) who described similar observations in pharmaceutical organizations who were “flying blind” in their application of servitization, for example:

*I can't say that I've seen any specific message other than we'll work closely with our vendors to get the best value for [my company and] our shareholders. I don't really see a plan of execution, how we're going to integrate better with our service providers (MMC2).*

This lack of planning may account for the lack of resources, specifically skilled personnel and time to implement servitization: “They probably couldn't have right resources in place. Or not put them in place, is probably what's killed it” (TMM2). There was a high level agreement that servitization would be welcomed at an individual level, as there were tangible benefits for individuals, for example:

*So that is the true benefit and it's strengthens things along the whole value chain. And I think there's more openness, in terms of how we do things, but there's also responsibility to make sure that what you're committing to is to providing, occurs on time (MMM2).*

However, many of the manufacturers were cautious that the relationship would be skewed, leading to a greater workload.

All agreed that, at an organizational level, increasing servitization would increase profit and differentiate them from competition and peers, increase teamwork and communication, reduce time and mutually beneficial decisions (Baines and Lightfoot, 2013). Furthermore, all were in agreement that servitization was good for the industry by reducing its impact on the environment and global resources.

## **2.6 Discussion**

Using the Delphi method has provided the ability to explore both manufacturers' and customers' perceptions of servitization and to get a more holistic understanding of the servitization process, with the customer perspective being previously overlooked in current literature. Thus, extending the work that explores customer perceptions of servitization. The opportunity to seek clarification on conflicting subjects resolved several, initially, contradictory conclusions. There were several examples where there was a consensus from the SC which differed from the consensus of the OC as well as within management levels. The lack of consensus is an important finding of this research and is a valuable outcome of the Delphi method. Such a polymodal finding indicates that the servitization experience and interaction is different for SCs and OCs.

### **2.6.1 Servitization Strategy**

In most literature the assumption is that servitization is a linear process; an organization chooses to become servitized and steadily works towards that goal (Kreye and Lewis, 2015). However, during this research, it became evident that this is not the case within the oil industry. Despite believing that servitization should not be cyclic, all those interviewed believed that market forces resulted in cyclic application of servitization in the oil industry. This is the first observation of non-linear servitization in the oil industry but aligns with recent research in other fields (Andrews *et al.*, 2018). The research

supports the view that servitization has a value that is difficult to quantify especially by managers who have limited experience of it (Bertoni, Panarotto and Larsson, 2016). Therefore, in most cases, these managers were unwilling, and perhaps unable (Nudurupati *et al.*, 2011) to defend the budget required to maintain or increase the level of servitization during a recession focusing instead on short term efficiencies (Eriksson *et al.*, 2016), despite the knowledge that this could differentiate them from their competition and benefit their organization in such a recession (Tongur and Engwall, 2014; Jovanovic, Engwall and Jerbrant, 2016; Wang, Lai and Shou, 2018). However, when the economic environment is more favourable there tend to be fewer constraints on budgets and managers may be more confident in requesting and approving resources to improve servitization.

### **2.6.2 Change**

Almost without exception the method of change did not follow the established route of change theory proposed by scholars such as Lewin (1947), i.e. unfreeze, implement and then refreeze. Instead, the method adopted appeared to be an organic application based upon vague tacit knowledge that servitization, or servitization by another name, was a desirable goal. Failure to adopt change theory by these organizations may have been because of a lack of understanding of change theory or a lack of resources, most notably time. It is likely that this ignorance stems from the fact that most managers within the oil industry have an engineering background with little education in management theory or practice (Farr and Brazil, 2009).

One finding that was not expected was the differing attitudes to change; it was observed that SCs welcomed change in their organization and working practices. However, OCs were far more cautious of change; this difference contradicts much of the current understanding of such relationships which assume both parties need similar attitudes to work together (Rowland and Higgs, 2012). It is possible that this difference is because of the different consequences that change can create for each. The SC must constantly find ways to differentiate themselves from their competition (Tongur and Engwall,

2014). Changing organizational practices, such as servitization, is one way to make this differentiation, along with the more traditional route of creating better and less expensive products (Baines and Lightfoot, 2013). The OC may only see value in change if this change can be shown to have a high probability of producing a better product and is therefore worth the additional risk.

Resistance to change exists at both at a personal level and organizational level, and it is documented that much of this resistance to change resides with individuals. At the personal level the engineer accountable for the change decision carries the responsibility for failure, which could range from loss of credibility, termination of contract and potentially legal consequences, whereas remaining with existing methods poses no additional personal risk. At an organizational level even a minor failure can escalate and have enormous financial consequences, one recent example being the Deepwater Horizon incident where the total cost to BP was estimated to be between \$61.6bn and \$65bn (BBC News, 2016; Bousso, 2018).

One subject that both OCs and SCs agreed on was the volume of change within their organizations. Many were cynical about the constant stream of changes that were driven down by management, which is consistent with repetitive change syndrome (Abrahamson, 2004). It was clear that the change caused by the introduction and development of servitization had also seen cynicism at least at some levels within both types of organization. Furthermore, it was also identified that many had witnessed active resistance to change in general and change caused by servitization specifically.

### **2.6.3 Tensions and Territoriality**

The findings agree with current literature and confirm that servitization requires change and that change causes tension with individuals or departments (Burton *et al.*, 2016). There were several explanations given for the tension; the first was a loss of status as some saw some or all of their roles being taken by another person or department or that their position was less critical to the organization after servitization (Burton *et al.*, 2016). It then

follows that they believe their jobs are less secure because of their, perceived or real, diminished role within the organization. Territorial behaviour was reported as being common, and all respondents acknowledged that it was detrimental to their own organization and other business partners who felt the effects and reduced the value of their partnership, which is consistent with current literature on the subject (Vendrell-Herrero and Wilson, 2017).

#### **2.6.4 Management Commitment and Strategy**

When asked about commitment, all of those interviewed agreed that senior management was genuinely committed to servitization. However, this research extends current understanding by identifying that commitment to servitization at senior levels of management was high but that this commitment decreased as it was disseminated down the management hierarchy. It is possible that poor planning and resistance to change are linked, specifically, that they become so cynical of new changes they refuse to accept any change and continue to use existing methods until the “next change comes along”.

Respondents reported that there was a lack of a specific servitization plan or strategy other than a goal of closer working relationships with business partners, but when questioned further on the issue they confirmed that there was no plan in place to implement this goal. A phrase that was used in four interviews was “organic” which was defined as the development of servitization as an evolutionary process. This same observation was described by Ruiz-Alba et al. (2019) as “flying blind” to describe the lack of a managed plan or strategy during the implementation of servitization. Option “a” in Figure 4 below shows the outcome of such an organic and unmanaged implementation of servitization resulting in potential failure. The absence of management planning and poor implementation of servitization combined with resistance to the changes required for servitization contribute to tensions and territoriality within these organizations. However, the application of servitization with a planned execution and appreciation of change theory

(Lewin, 1947), shown in option “b” is more likely to avoid, or reduce, these tensions and territoriality and result in a positive outcome.

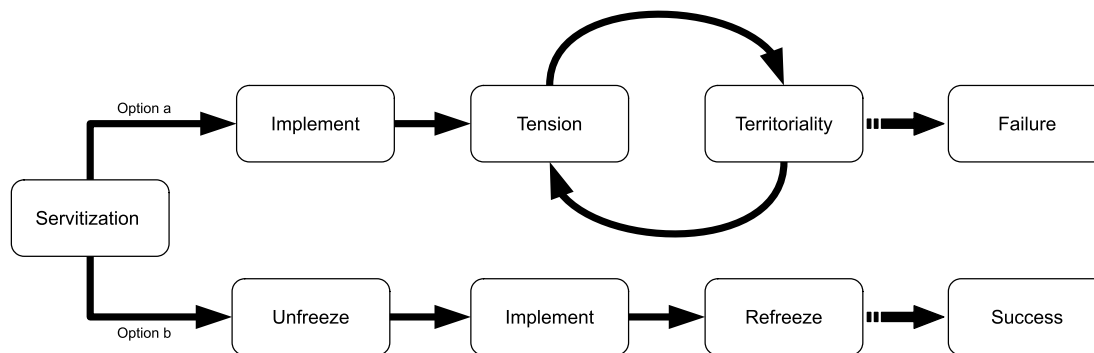


Figure 4: Servitization Framework

## 2.7 Conclusions and Implications for Management

Literature on servitization is predominantly focused on the manufacturers’ perspective, but in this research we have expanded on current theory by researching servitization from both customer and manufacturer perspectives and the interaction between the two. The first research question presented in this paper asks if the servitization process within the oil industry causes significant change which leads to tension and in turn territorial behaviours. We provide new empirical evidence, which adds to current literature, showing that this is the case. Specifically, that in the oil industry, servitization leads to tensions, which lead to territoriality. A practical application of these findings warns that defensive behaviour and restricted knowledge sharing brought about by territoriality has the potential to damage external buyer–supplier relationships and internal organizational interactions with individuals and departments.

In responding to the second research question we provide more empirical support for and extend the findings of Crowley, Burton and Zolkiewski (2018) by showing that differences in strategic intent across organizations as well as between different managerial layers provides an impediment to servitization that manifests in tensions and territorial behaviour. This research also supports the findings of Andrews et al. (2018) supporting their conclusion that the application of servitization is not a linear process. However, we expand on

this work by showing that this non-linear application may be because of the prevailing economic climate and the appetite of management to support servitization during challenging economic periods. The culmination of these findings suggests that management is either unwilling or unable to commit to servitization and maintain this commitment during the cyclic nature of the servitization process.

We confirm existing theory with regard to resistance to organizational change, but expand upon this theory by showing that this resistance to servitization is different in each management tier and may be due, at least in part to multiple change syndrome, especially in middle management. We also add to current theory by showing that risk tolerance associated with change also differs between manufacturers and customers, with customers being more risk averse than manufacturers. Therefore, for a successful implementation of servitization a commitment and focus is required from management so that employees may begin to believe that the need for the change is genuine and overcome the “yet another change” resistance that is prevalent and leads to cynicism (Abrahamson, 2004; Johnson, 2016; Johnson *et al.*, 2016).

The final research question concerned the provision of resources and support or mechanisms to deal with tension and territoriality. The findings suggest that for servitization to be successfully implemented specific servitization related support mechanisms need to be introduced to support the change process. The research supports existing theory by emphasizing that a lack of consistent support or a comprehensive servitization implementation strategy inhibits servitization (cf. Pettigrew, Ferlie and McKee, 1992). It also highlights the need for a structured servitization strategy with suitable safeguards and resources to prevent, or lessen the impact of, tensions and territoriality.

All parties agree that servitization is beneficial and should be developed within their organizations and the industry as a whole. However, it is clear that the mind-set of both SCs and OCs in the industry needs to change to make a success of servitization. This research extends current understanding by

showing that both parties believe the natural conclusion of servitization in the resulting environment would be skewed in favour of the OC, instead of a balanced and mutually beneficial outcome. It is, therefore, difficult to envisage how servitization can develop and become successful in the existing environment without the trust that both parties will act amicably. All of the changes above require commitment from all levels of management to overcome the difficulties discussed. To make this commitment, management must be educated on the benefits of servitization and the mechanisms to make it work, or tensions and territoriality coupled with cynicism and fear of a skewed application will prevent development and realisation of the compounded benefits of servitization.

## **2.8 Limitations and Future Research Directions**

The limitations of this study provide opportunities for future research into the implementation of servitization within the oil industry. While the managers interviewed supported the findings in the current literature that servitization in relation to oil was unique to that industry (Vendrell-Herrero and Wilson, 2017; Ruiz-Alba *et al.*, 2019), this only expresses an agreement of their collective opinion, future research into this area could confirm this. Similarly, it was the opinion of the group that servitization support was contingent upon oil price or the general health of the industry, this again warrants further study as to the mechanism of this link and its influence on the application of servitization. In order to assess accurately the current level of servitization and therefore monitor its progress, quantitative research which incorporated a standard measuring tool would be beneficial, similar to the one used by Neff *et al.* (2014) for heavy equipment manufacturing, or Lütjen, Tietze and Schultz (2017) who use a different system for measuring the servitization level of the German energy market.

The paper confirmed that there was agreement on many subjects, and that there were areas where SCs and OCs had differing opinions. Investigation into these phenomena would be warranted to understand if this was because of organizational culture, or the grouping of like minds, or some other factor.



One interesting subject of agreement was the assumption by SCs and OCs that the resulting servitized relationship would be strongly skewed, this may indicate that trust could be an issue, or some form of game theory (Nash, 1951) was being observed where both parties were gravitating to a lose-lose Nash Equilibrium (Scharlemann *et al.*, 2001), and would be an intriguing line of future research.

## 2.9 References

Abrahamson, E. (2004) 'Avoiding Repetitive Change Syndrome', *MIT Sloan Management Review*, 45(2), pp. 93–95.

Alghisi, A. and Sacconi, N. (2015) 'Internal and external alignment in the servitization journey – overcoming the challenges', *Production Planning & Control*, 26(14–15), pp. 1219–1232. doi: 10.1080/09537287.2015.1033496.

Anderson, J. C. and Narus, J. A. (1995) 'Capturing the Value of Supplementary Services', *Harvard Business Review*, 73(1), pp. 75–83.

Andrews, D., Dmitrijeva, J., Bigdeli, A. Z. and Baines, T. (2018) 'Snakes and Ladders in Servitization: Using a Game to Capture Inhibitors and Enablers of Transformation', *Research-Technology Management*, 61(6), pp. 37–47. doi: 10.1080/08956308.2018.1516930.

Annarelli, A., Battistella, C. and Nonino, F. (2019) *The Road to Servitization: How Product Service Systems Can Disrupt Companies' Business Models*. Cham: Springer International Publishing. doi: 10.1007/978-3-030-12251-5.

Ardichvili, A., Maurer, M., Li, W., Wentling, T. and Stuedemann, R. (2006) 'Cultural influences on knowledge sharing through online communities of practice', *Journal of Knowledge Management*, 10(1), pp. 94–107. doi: 10.1108/13673270610650139.

Ashkanasy, N. M., Ayoko, O. B. and Jehn, K. A. (2014) 'Understanding the physical environment of work and employee behavior: An affective events perspective', *Journal of Organizational Behavior*, 35(8), pp. 1169–1184. doi: 10.1002/job.1973.

Baines, T. and Lightfoot, H. (2013) *Made to Serve*. 1st edn. Chichester: John Wiley & Sons, Inc. doi: 10.1002/9781119207955.

Baines, T. S., Lightfoot, H. W., Benedettini, O. and Kay, J. M. (2009) 'The servitization of manufacturing', *Journal of Manufacturing Technology Management*, 20(5), pp. 547–567. doi: 10.1108/17410380910960984.

- Baines, T. and Shi, V. G. (2015) 'A Delphi study to explore the adoption of servitization in UK companies', *Production Planning & Control*, 26(14–15), pp. 1171–1187. doi: 10.1080/09537287.2015.1033490.
- Baines, T., Ziaee Bigdeli, A., Bustinza, O. F., Shi, V. G., Baldwin, J. and Ridgway, K. (2017) 'Servitization: revisiting the state-of-the-art and research priorities', *International Journal of Operations & Production Management*, 37(2), pp. 256–278. doi: 10.1108/IJOPM-06-2015-0312.
- Bandinelli, R. and Gamberi, V. (2011) 'Servitization in oil and gas sector: outcomes of a case study research', *Journal of Manufacturing Technology Management*, 23(1), pp. 87–102. doi: 10.1108/17410381211196302.
- Barnett, N. J., Parry, G., Saad, M., Newnes, L. B. and Goh, Y. M. (2013) 'Servitization: Is a Paradigm Shift in the Business Model and Service Enterprise Required?', *Strategic Change*, 22(3–4), pp. 145–156. doi: 10.1002/jsc.1929.
- Batras, D., Duff, C. and Smith, B. J. (2014) 'Organizational change theory: implications for health promotion practice', *Health Promotion International*, 31(1), pp. 231–241. doi: 10.1093/heapro/dau098.
- BBC News (2016) *BP says total Gulf spill bill \$61.6bn*, BBC News. Available at: <https://www.bbc.com/news/36798842> (Accessed: 5 March 2019).
- Benedettini, O., Neely, A. and Swink, M. (2015) 'Why do servitized firms fail? A risk-based explanation', *International Journal of Operations & Production Management*, 35(6), pp. 946–979. doi: 10.1108/IJOPM-02-2014-0052.
- Bertoni, M., Panarotto, M. and Larsson, T. C. (2016) 'Boundary objects for PSS Design', *Procedia CIRP*, 47, pp. 329–334. doi: 10.1016/j.procir.2016.03.226.
- Bigdeli, A., Baines, T., Bustinza, O. F. and Shi, V. (2017) 'Organisational change towards servitization: a theoretical framework', *Competitiveness Review*, 27(1), pp. 12–39. doi: 10.1108/CR-03-2015-0015.
- Bigdeli, A. Z., Baines, T. S., Bustinza Sánchez, Ó. F. and Shi, V. G. (2015) 'Holistic approach to evaluating servitization: A content, context, process framework', in *Operations management for sustainable competitiveness*. Neuchâtel: Université de Neuchâtel. Available at: <http://hdl.handle.net/10481/40948> (Accessed: 7 October 2018).
- Blackhurst, J., Wu, T. and Craighead, C. W. (2008) 'A systematic approach for supply chain conflict detection with a hierarchical Petri Net extension', *Omega*, 36(5), pp. 680–696. doi: 10.1016/j.omega.2006.02.001.
- Bouso, R. (2018) *BP Deepwater Horizon costs balloon to \$65 billion*, Reuters. Available at: <https://www.reuters.com/article/us-bp-deepwaterhorizon/bp-deepwater-horizon-costs-balloon-to-65-billion-idUSKBN1F50NL> (Accessed: 5 March 2019).

Bratman, M. E. (1999) *Faces of Intention: Selected Essays on Intention and Agency*. 1st edn. Cambridge University Press. doi: 10.1017/CBO9780511625190.

Brax, S. (2005) 'A manufacturer becoming service provider – challenges and a paradox', *Managing Service Quality: An International Journal*, 15(2), pp. 142–155. doi: 10.1108/09604520510585334.

Brown, G. and Zhu, H. (2016) 'My workspace, not yours: The impact of psychological ownership and territoriality in organizations', *Journal of Environmental Psychology*, 48, pp. 54–64. doi: 10.1016/j.jenvp.2016.08.001.

Burke, W. W. and Litwin, G. H. (1992) 'A Causal Model of Organizational Performance and Change', *Journal of Management*. SAGE Publications Inc, 18(3), pp. 523–545. doi: 10.1177/014920639201800306.

Burton, J., Story, V., Zolkiewski, J., Raddats, C., Baines, T. S. and Medway, D. (2016) 'Identifying Tensions in the Servitized Value Chain', *Research-Technology Management*, 59(5), pp. 38–47. doi: 10.1080/08956308.2016.1208042.

Cañibano, C., Encinar, M.-I. and Muñoz, F.-F. (2006) 'Evolving capabilities and innovative intentionality: Some reflections on the role of intention within innovation processes', *Innovation*, 8(4–5), pp. 310–321. doi: 10.5172/impp.2006.8.4.310.

Critcher, C. and Gladstone, B. (1998) 'Utilizing the Delphi Technique in Policy Discussion: A Case Study of a Privatized Utility in Britain', *Public Administration*, 76(3), pp. 431–449. doi: 10.1111/1467-9299.00110.

Crowley, E., Burton, J. and Zolkiewski, J. (2018) 'Servitization intent as a factor in the servitization process', *Journal of Business and Industrial Marketing*, 33(8), pp. 1125–1140. doi: 10.1108/JBIM-08-2016-0199.

Diamond, I. R., Grant, R. C., Feldman, B. M., Pencharz, P. B., Ling, S. C., Moore, A. M. and Wales, P. W. (2014) 'Defining consensus: A systematic review recommends methodologic criteria for reporting of Delphi studies', *Journal of Clinical Epidemiology*, 67(4), pp. 401–409. doi: 10.1016/j.jclinepi.2013.12.002.

van Dijk, R. and van Dick, R. (2009) 'Navigating Organizational Change: Change Leaders, Employee Resistance and Work-based Identities', *Journal of Change Management*, 9(2), pp. 143–163. doi: 10.1080/14697010902879087.

Dmitrijeva, J., Schroeder, A., Ziaee Bigdeli, A. and Baines, T. (2019) 'Context matters: how internal and external factors impact servitization', *Production Planning & Control*, pp. 1–21. doi: 10.1080/09537287.2019.1699195.

Eriksson, P. E., Patel, P. C., Sjödin, D. R., Frishammar, J. and Parida, V. (2016) 'Managing Interorganizational Innovation Projects: Mitigating the Negative

Effects of Equivocality Through Knowledge Search Strategies', *Long Range Planning*, 49(6), pp. 691–705. doi: 10.1016/j.lrp.2016.05.006.

Farr, J. V. and Brazil, D. M. (2009) 'Leadership Skills Development for Engineers', *Engineering Management Journal*, 21(1), pp. 3–8. doi: 10.1080/10429247.2009.11431792.

Ferri, C. P., Prince, M., Brayne, C., Brodaty, H., Fratiglioni, L., Ganguli, M., Hall, K., Hasegawa, K., Hendrie, H., Huang, Y., Jorm, A., Mathers, C., Menezes, P. R., Rimmer, E. and Sczuzefca, M. (2005) 'Global prevalence of dementia: a Delphi consensus study', *The Lancet*, 366(9503), pp. 2112–2117. doi: 10.1016/S0140-6736(05)67889-0.

Gebauer, H., Friedli, T. and Fleisch, E. (2006) 'Success factors for achieving high service revenues in manufacturing companies', *Benchmarking: An International Journal*, 13(3), pp. 374–386. doi: 10.1108/14635770610668848.

Hallowell, M. R. and Gambatese, J. A. (2010) 'Qualitative Research: Application of the Delphi Method to CEM Research', *Journal of Construction Engineering and Management*, 136(1), pp. 99–107. doi: 10.1061/(ASCE)CO.1943-7862.0000137.

Johnson, J. L. (1976) 'A ten-year Delphi forecast in the electronics industry', *Industrial Marketing Management*, 5(1), pp. 45–55. doi: 10.1016/0019-8501(76)90009-2.

Johnson, K. J. (2016) 'The dimensions and effects of excessive change', *Journal of Organizational Change Management*, 29(3), pp. 445–459. doi: 10.1108/JOCM-11-2014-0215.

Johnson, K. J., Bareil, C., Giraud, L. and Autissier, D. (2016) 'Excessive change and coping in the working population', *Journal of Managerial Psychology*, 31(3), pp. 739–755. doi: 10.1108/JMP-12-2014-0352.

Jones, G. R. (2013) *Organizational theory, design, and change*. 7th edn. Boston: Pearson.

Jones, G. R. and George, J. M. (2016) *Contemporary Management*. 9th edn. New York: McGraw-Hill.

Jovanovic, M., Engwall, M. and Jerbrant, A. (2016) 'Matching Service Offerings and Product Operations: A Key to Servitization Success', *Research-Technology Management*, 59(3), pp. 29–36. doi: 10.1080/08956308.2016.1161403.

Keeney, S., Hasson, F. and McKenna, H. (2011) *The Delphi Technique in Nursing and Health Research*. Oxford: Wiley-Blackwell. doi: 10.1002/9781444392029.

Kezar, A. and Maxey, D. (2016) 'The Delphi technique: an untapped approach of participatory research', *International Journal of Social Research Methodology*, 19(2), pp. 143–160. doi: 10.1080/13645579.2014.936737.

Kim, S. and Toya, K. (2019) 'Leadership style required for the transition to servitization in Japan', *Journal of Manufacturing Technology Management*, 30(2), pp. 335–352. doi: 10.1108/JMTM-02-2018-0034.

Kohtamäki, M., Baines, T., Rabetino, R. and Bigdeli, A. Z. (2018) *Practices and Tools for Servitization*. Cham: Springer International Publishing. doi: 10.1007/978-3-319-76517-4.

Kowalkowski, C., Gebauer, H., Kamp, B. and Parry, G. (2017) 'Servitization and deservitization: Overview, concepts, and definitions', *Industrial Marketing Management*, 60, pp. 4–10. doi: 10.1016/j.indmarman.2016.12.007.

Kowalkowski, C. and Kindström, D. (2013) 'Servitization in manufacturing firms: a business model perspective.', in *Spring Servitization Conference*.

Kreye, M. and Lewis, M. A. (2015) 'Servitization and service recovery: Can you be too close for comfort?', in *22nd EurOMA Conference*. Denmark: European Operations Management Association, p. 11.

Kumar, R. and Markeset, T. (2007) 'Development of performance-based service strategies for the oil and gas industry: a case study', *Journal of Business & Industrial Marketing*, 22(4), pp. 272–280. doi: 10.1108/08858620710754531.

Lafuente, E., Vaillant, Y. and Vendrell-Herrero, F. (2017) 'Territorial servitization: Exploring the virtuous circle connecting knowledge-intensive services and new manufacturing businesses', *International Journal of Production Economics*, 192, pp. 19–28. doi: 10.1016/j.ijpe.2016.12.006.

Lenka, S., Parida, V., Sjödin, D. R. and Wincent, J. (2018a) 'Exploring the microfoundations of servitization: How individual actions overcome organizational resistance', *Journal of Business Research*, 88, pp. 328–336. doi: 10.1016/j.jbusres.2017.11.021.

Lenka, S., Parida, V., Sjödin, D. R. and Wincent, J. (2018b) 'Towards a multi-level servitization framework', *International Journal of Operations & Production Management*, 38(3), pp. 810–827. doi: 10.1108/IJOPM-09-2016-0542.

Lewin, K. (1942) 'Field theory and learning.', in *The forty-first yearbook of the National Society for the Study of Education: Part II, The psychology of learning*. Chicago: University of Chicago Press, pp. 215–242. doi: 10.1037/11335-006.

Lewin, K. (1947) 'Frontiers in Group Dynamics', *Human Relations*, 1(2), pp. 143–153. doi: 10.1177/001872674700100201.

- Lexutt, E. (2020) 'Different roads to servitization success – A configurational analysis of financial and non-financial service performance', *Industrial Marketing Management*, 84(June), pp. 105–125. doi: 10.1016/j.indmarman.2019.06.004.
- Loo, R. (2002) 'The Delphi method: a powerful tool for strategic management', *Policing: An International Journal of Police Strategies & Management*, 25(4), pp. 762–769. doi: 10.1108/13639510210450677.
- Ludwig, B. G. (1994) *Internationalizing Extension: An exploration of the characteristics evident in a state university Extension system that achieves internationalization*. Unpublished doctoral dissertation. Ohio State University. Available at: [https://etd.ohiolink.edu/!etd.send\\_file?accession=osul487849377294225&disposition=inline](https://etd.ohiolink.edu/!etd.send_file?accession=osul487849377294225&disposition=inline).
- Lütjen, H., Tietze, F. and Schultz, C. (2017) 'Service transitions of product-centric firms: An explorative study of service transition stages and barriers in Germany's energy market', *International Journal of Production Economics*, 192, pp. 106–119. doi: 10.1016/j.ijpe.2017.03.021.
- Martinez, V., Bastl, M., Kingston, J. and Evans, S. (2010) 'Challenges in transforming manufacturing organisations into product-service providers', *Journal of Manufacturing Technology Management*, 21(4), pp. 449–469. doi: 10.1108/17410381011046571.
- Mitchell, V. W. (1991) 'The delphi technique: an exposition and application', *Technology Analysis & Strategic Management*, 3(4), pp. 333–358. doi: 10.1080/09537329108524065.
- Mullen, P. M. (2003) 'Delphi: myths and reality', *Journal of Health Organization and Management*, 17(1), pp. 37–52. doi: 10.1108/14777260310469319.
- Murphy, M. K., Black, N. A., Lamping, D. L., McKee, C. M., Sanderson, C. F., Askham, J. and Marteau, T. (1998) 'Consensus development methods, and their use in clinical guideline development.', *Health technology assessment*, 2(3), pp. 1–88. doi: 10.3310/hta2030.
- Nash, J. (1951) 'Non-Cooperative Games', *The Annals of Mathematics*, 54(2), p. 286. doi: 10.2307/1969529.
- Neely, A. (2008) 'Exploring the financial consequences of the servitization of manufacturing', *Operations Management Research*, 1(2), pp. 103–118. doi: 10.1007/s12063-009-0015-5.
- Neff, A. A., Hamel, F., Herz, T. P., Uebernickel, F., Brenner, W. and vom Brocke, J. (2014) 'Developing a maturity model for service systems in heavy

equipment manufacturing enterprises', *Information & Management*, 51(7), pp. 895–911. doi: 10.1016/j.im.2014.05.001.

Nudurupati, S. S., Bititci, U. S., Kumar, V. and Chan, F. T. S. (2011) 'State of the art literature review on performance measurement', *Computers & Industrial Engineering*, 60(2), pp. 279–290. doi: 10.1016/j.cie.2010.11.010.

Oberle, L. J. (2020) *Servitization of Industrial Enterprises through Acquisitions: A Success Story*. Wiesbaden: Springer Fachmedien Wiesbaden. doi: 10.1007/978-3-658-28870-9.

Ogbeifun, E., Mbohwa, C. and Pretorius, J.-H. C. (2017) 'Achieving consensus devoid of complicity: adopting the Delphi technique', *International Journal of Productivity and Performance Management*, 66(6), pp. 766–779. doi: 10.1108/IJPPM-08-2015-0112.

Okoli, C. and Pawlowski, S. D. (2004) 'The Delphi method as a research tool: An example, design considerations and applications', *Information and Management*, 42(1), pp. 15–29. doi: 10.1016/j.im.2003.11.002.

Palo, T., Åkesson, M. and Löfberg, N. (2019) 'Servitization as business model contestation: A practice approach', *Journal of Business Research*, 104, pp. 486–496. doi: 10.1016/j.jbusres.2018.10.037.

Pereira, V. R., Kreye, M. E. and Carvalho, M. M. de (2019) 'Customer-pulled and provider-pushed pathways for product-service system', *Journal of Manufacturing Technology Management*, 39(12), pp. 75–93. doi: 10.1108/JMTM-07-2018-0209.

Pettigrew, A., Ferlie, E. and McKee, L. (1992) 'Shaping strategic change - The case of the NHS in the 1980s', *Public Money & Management*, 12(3), pp. 27–31. doi: 10.1080/09540969209387719.

Raddats, C., Kowalkowski, C., Benedettini, O., Burton, J. and Gebauer, H. (2019) 'Servitization: A contemporary thematic review of four major research streams', *Industrial Marketing Management*, 83, pp. 207–223. doi: 10.1016/j.indmarman.2019.03.015.

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*, 20(3), pp. 258–276. doi: 10.1111/j.1748-8583.2009.00124.x.

Romain, A. and Julie, G. (2016) 'On the use of Intangible Assets Management in PSS Projects', *Procedia CIRP*, 47, pp. 472–477. doi: 10.1016/j.procir.2016.03.115.

Rowland, D. and Higgs, M. (2012) *Sustaining Change: Leadership That Works*. 1st edn. Chichester: Jossey-Bass. doi: 10.1002/9781119206330.

Rudy, S. F. (1996) 'A review of Delphi surveys conducted to establish research priorities by specialty nursing organizations from 1985 to 1995', *ORL-head and neck nursing: official journal of the Society of Otorhinolaryngology and Head-Neck Nurses*, 14(2), pp. 16–24.

Ruggie, J. G. (1993) 'Territoriality and beyond: problematizing modernity in international relations', *International Organization*, 47(1), pp. 139–174. doi: 10.1017/S0020818300004732.

Ruiz-Alba, J. L., Soares, A., Rodríguez-Molina, M. A. and Frías-Jamilena, D. M. (2019) 'Servitization strategies from customers' perspective: the moderating role of co-creation', *Journal of Business & Industrial Marketing*, 34(3), pp. 628–642. doi: 10.1108/JBIM-02-2017-0028.

Scharlemann, J. P. W., Eckel, C. C., Kacelnik, A. and Wilson, R. K. (2001) 'The value of a smile: Game theory with a human face', *Journal of Economic Psychology*, 22(5), pp. 617–640. doi: 10.1016/S0167-4870(01)00059-9.

Scheibe, M., Skutsch, M. M., Schofer, J., Turoff, M. and Linstone, H. (2011) 'Experiments in Delphi Methodology', *The Delphi Method: Techniques and Applications*, pp. 257–281.

Schein, E. H. (2010) *Organizational Culture and Leadership*. 4th edn. San Francisco: Jossey-Bass.

Searle, J. R. (1999) *Intentionality, an essay in the philosophy of mind*. Cambridge: Cambridge University Press. Available at: <http://site.ebrary.com/id/10897805> (Accessed: 30 December 2020).

Smith, L., Maull, R. and Ng, I. (2014) 'Servitization and operations management: a service dominant-logic approach', *International Journal of Operations & Production Management*, 34(2), pp. 242–269. doi: 10.1108/IJOPM-02-2011-0053.

Song, W. and Sakao, T. (2016) 'Service conflict identification and resolution for design of product–service offerings', *Computers & Industrial Engineering*, 98, pp. 91–101. doi: 10.1016/j.cie.2016.05.019.

Spring, M., Hughes, A., Mason, K. and McCaffrey, P. (2017) 'Creating the competitive edge: A new relationship between operations management and industrial policy', *Journal of Operations Management*, 49–51, pp. 6–19. doi: 10.1016/j.jom.2016.12.003.

Steckler, A. and Goodman, R. M. (1989) 'How to Institutionalize Health Promotion Programs', *American Journal of Health Promotion*, 3(4), pp. 34–43. doi: 10.4278/0890-1171-3.4.34.



- Strähle, O., Füllemann, M. and Bendig, O. (2012) *Service now! Time to wake up the sleeping giant*. Munich: Bain & Company, pp. 1–35. Available at: [www.bain.de](http://www.bain.de) (Accessed: 19 September 2019).
- Sumsion, T. (1998) 'The Delphi Technique: An Adaptive Research Tool', *British Journal of Occupational Therapy*, 61(4), pp. 153–156. doi: 10.1177/030802269806100403.
- Tetzlaff, J. M., Moher, D. and Chan, A.-W. (2012) 'Developing a guideline for clinical trial protocol content: Delphi consensus survey', *Trials*, 13(1), p. 176. doi: 10.1186/1745-6215-13-176.
- Thangaratinam, S. and Redman, C. W. (2005) 'The Delphi technique', *The Obstetrician & Gynaecologist*, 7(2), pp. 120–125. doi: 10.1576/toag.7.2.120.27071.
- Tian, L. (2005) 'Inferences on the common coefficient of variation', *Statistics in Medicine*, 24(14), pp. 2213–2220. doi: 10.1002/sim.2088.
- Tongur, S. and Engwall, M. (2014) 'The business model dilemma of technology shifts', *Technovation*, 34(9), pp. 525–535. doi: 10.1016/j.technovation.2014.02.006.
- Tura, N., Keränen, J. and Patala, S. (2018) 'The darker side of sustainability: Tensions from sustainable business practices in business networks', *Industrial Marketing Management*, (July 2016), pp. 1–11. doi: 10.1016/j.indmarman.2018.09.002.
- Turoff, M. (1970) 'The design of a policy Delphi', *Technological Forecasting and Social Change*, 2(2), pp. 149–171. doi: 10.1016/0040-1625(70)90161-7.
- Uлага, W. and Reinartz, W. J. (2011) 'Hybrid Offerings: How Manufacturing Firms Combine Goods and Services Successfully', *Journal of Marketing*, 75(6), pp. 5–23. doi: 10.1509/jmkg.75.6.5.
- Valtakoski, A. (2017) 'Explaining servitization failure and deservitization: A knowledge-based perspective', *Industrial Marketing Management*, 60, pp. 138–150. doi: 10.1016/j.indmarman.2016.04.009.
- Vandermerwe, S. and Rada, J. (1988) 'Servitization of business: Adding value by adding services', *European Management Journal*, 6(4), pp. 314–324. doi: 10.1016/0263-2373(88)90033-3.
- Vendrell-Herrero, F., Parry, G., Bustinza, O. F. and O'Regan, N. (2014) 'Servitization as a Driver for Organizational Change', *Strategic Change*, 23(5–6), pp. 279–285. doi: 10.1002/jsc.1976.

- Vendrell-Herrero, F. and Wilson, J. R. (2017) 'Servitization for territorial competitiveness: taxonomy and research agenda', *Competitiveness Review*, 27(1), pp. 2–11. doi: 10.1108/CR-02-2016-0005.
- Vischer, J. C. (2007) 'The Concept of Workplace Performance and its Value to Managers', *California Management Review*, 49(2), pp. 62–79. doi: 10.2307/41166383.
- Visnjic, I. and Looy, B. V. (2013) 'Successfully Implementing a Service Business Model in a Manufacturing Firm', *Cambridge ServiceAlliance*, p. 37.
- Visnjic, I., Wiengarten, F. and Neely, A. (2016) 'Only the Brave: Product Innovation, Service Business Model Innovation, and Their Impact on Performance', *Journal of Product Innovation Management*, 33(1), pp. 36–52. doi: 10.1111/jpim.12254.
- Walker, A. and Selfe, J. (1996) 'The Delphi method: a useful tool for the allied health researcher', *British Journal of Therapy and Rehabilitation*, 3(12), pp. 677–681. doi: 10.12968/bjtr.1996.3.12.14731.
- Wang, W., Lai, K.-H. and Shou, Y. (2018) 'The impact of servitization on firm performance: a meta-analysis', *International Journal of Operations & Production Management*, 38(7), pp. 1562–1588. doi: 10.1108/IJOPM-04-2017-0204.
- Weeks, R. and Benade, S. (2015) 'The development of a generic servitization systems framework', *Technology in Society*, 43, pp. 97–104. doi: 10.1016/j.techsoc.2015.09.003.
- Welch, M. and Jackson, P. R. (2007) 'Rethinking internal communication: a stakeholder approach', *Corporate Communications: An International Journal*, 12(2), pp. 177–198. doi: 10.1108/13563280710744847.
- Wise, R. and Baumgartner, P. (1999) 'Go Downstream: The New Profit Imperative in Manufacturing.', *Harvard Business Review*, 77(5), pp. 133–141. doi: 10.1080/00343404.2018.1524134.
- Worrell, J. L., Di Gangi, P. M. and Bush, A. A. (2013) 'Exploring the use of the Delphi method in accounting information systems research', *International Journal of Accounting Information Systems*, 14(3), pp. 193–208. doi: 10.1016/j.accinf.2012.03.003.
- Zolkiewski, J., Burton, J. and Stratoudaki, S. (2008) 'The delicate power balance in advertising agency-client relationships: partnership or battleground? The case of the Greek advertising market', *Journal of Customer Behaviour*, 7(4), pp. 315–332. doi: 10.1362/147539208X386851.

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### 3 Paper 2: Should We Cooperate? Game Theory Insights for Servitization

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Wagstaff, S., Burton, J. and Zolkiewski, J. (2020b) 'Servitization as a Game-Changer in the Oil Industry', in *Proceedings of the Spring Servitization Conference. Advanced Services for Sustainability and Growth (Spring Servitization Conference)*, Birmingham, UK: Aston University, pp. 29–37.

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# Should We Cooperate? Game Theory Insights for Servitization

## 3.1 Abstract

**Purpose:** An abundance of literature suggests that organisations adopting a cooperative approach achieve greater rewards than those that act in opposition or isolation. An emerging body of work also highlights the multiple actors involved in servitization. Despite this, in some contexts, the benefits of servitization are not apparent. This paper examines business relationships in the oil industry and how they affect levels of servitization.

**Design/Methodology/Approach:** A mixed method study employing qualitative and quantitative methods was used to fully explore the context. In the quantitative phase, 48 oil industry specialists responded to a scenario based on game theory. This aimed to determine if the relationships between their respective organisations are cooperative or adversarial. A second qualitative phase was conducted. This consisted of a series of semi-structured interviews that were used to explore the servitization level and influence of servitization on relationships and vice versa.

**Findings:** The statistical results suggest all parties used adversarial strategies despite the publicised intent to work cooperatively. The interviews suggested that increasing (decreasing) servitization could increase (decrease) cooperation and, in turn, value co-creation but revealed nuances to this effect. It also adds to our understanding of the darker side of servitization by illustrating the impact of mimetic isomorphism.

**Originality/Value:** The findings add to understanding of the complex dynamics around servitization by showing that it is only at advanced levels of servitization that cooperative behaviour is observed, and base and intermediate levels result in non-cooperative behaviour and thus illustrate the importance of adopting a multi-actor lens to explore servitization.

**KEYWORDS:** Servitization Dynamics, Game Theory, Oil Industry, Business Relationships, Mixed Methods

### **3.2 Introduction**

The extant literature tends to focus on success stories, e.g., IBM, Rolls Royce and Xerox (Ng *et al.*, 2012) and suggests a steady progression from supply of base services through intermediate, to provision of advanced services (Baines and Lightfoot, 2013). However, there is growing recognition that not all organizations follow a smooth transition journey, with reports of a service paradox (Gebauer, Fleisch and Friedli, 2005), service failure and deservitization (Kowalkowski *et al.*, 2017; Valtakoski, 2017). Researchers are beginning to explore why this is so. Factors such as tensions (Burton *et al.*, 2016), servitization intent (Crowley, Burton and Zolkiewski, 2018), the challenges of developing appropriate service strategies, (Raddats and Kowalkowski, 2014; Raddats *et al.*, 2018), and the paradoxical nature of servitization (Kohtamäki, Einola and Rabetino, 2020) illustrate the complexities of the challenges facing an organization that embarks on a servitization journey.

Hence, this research uses a relational lens to explore servitization that has not progressed to an advanced level and to understand what prevents servitization from being perceived as beneficial by both parties. Thus, we have identified a context where progression to advanced services has not been fully realized. Moving to a multi-actor perspective necessitates recognition of the complex network of relationships any organization is embedded in (Håkansson and Snehota, 2017). These networks and the individual relationships within them are often cooperative (Dyer and Nobeoka, 2000) and require trust and commitment (Morgan and Hunt, 1994). However, the impact of changes, such as introducing advanced services, on individual relationships remains under-explored. This motivated our research questions: 1) How does cooperation within a relationship affect the transition to advanced services? 2) What are the strategies adopted by both actors in a relationship when faced with the

introduction of more advanced levels of service? 3) how do changes in servitization level impact on cooperation?

This paper provides a novel perspective and contribution to servitization by exploring how game theory (Lima *et al.*, 2018) can enhance our understanding of an area where servitization appears to be stalled at the intermediate level: the oil industry. Game theory provides a robust method to analyse strategy in business relationships in comparison to analysing intended or stated strategies. In order to improve the robustness of our findings, a qualitative phase of research was then used to explore the potential for servitization to influence the adversarial or cooperative nature of business relationships. Drawing on this, our contribution is to show that it is **only** high levels of servitization (advanced services) that facilitate cooperative behaviour. This illustrates the paradoxical, non-linear and complex relationship between service provision and cooperative behaviour and the strategies that drive this in a servitization context.

The remainder of this paper is structured as follows, first we review relevant literature and develop our conceptual framework. We then describe the methods employed, present our findings, discuss the implications and propose future areas of investigation.

### **3.3 Literature Review**

#### **3.3.1 Servitization**

Traditionally, servitization is described as the process a manufacturing organisation undergoes to increase their competitive advantage by developing the services they offer to their customers (Baines *et al.*, 2009; Kamp and Parry, 2017). Servitization achieves this advantage by creating additional revenue streams that change the existing business focus from product-centricity to service-centricity and, in doing so, differentiates the manufacturer and customer from their peers within the network (Raddats, Burton and Ashman, 2015). This change of focus often requires transformation (Kowalkowski *et al.*, 2017) and more recently the processes that garner this change are being

explored (Baines *et al.*, 2020). Much extant research takes a focal manufacturer perspective (Raddats *et al.*, 2019) and fails to address the complex network/service ecosystem of manufacturers and customers involved in servitization (Ferreira *et al.*, 2013; Story *et al.*, 2017). Additionally, the provision of advanced services remains difficult and, if they are to become more than tools to enhance competitiveness, they must be exploited fully by both manufacturers and customers (Salonen, Saglam and Hacklin, 2017).

Ng *et al.*, (2012) argue that transformation from an entrenched goods-dominant logic to a service-dominant logic mindset is a significant challenge and critical to the success of servitization. However, recent literature argues that this dichotomous 'either-or' thinking should be replaced by a recognition of hybrid approaches (Burton *et al.*, 2017) and 'both-and' thinking (Kohtamäki, Einola and Rabetino, 2020). Goods and services are interdependent and, therefore, organisations cannot simply choose between a service-dominant logic and a goods-dominant logic mindset, instead, they should embrace a paradoxical 'both-and' approach.

Although servitization is gaining traction and many manufacturers are adding a variety of services to their portfolios (Baines *et al.*, 2020), this pattern is not uniform. Some companies are deservitizing (Kowalkowski *et al.*, 2017). Others appear not to fully embrace or implement service-focussed strategies (Raddats *et al.*, 2018) or possess the capabilities needed to effectively make the transition (Reim, Sjödin and Parida, 2019). Digital technologies, e.g., big data, cloud computing and the internet of things (IoT), can enable, drive and shape the application of servitization (Kohtamäki *et al.*, 2019; Tronvoll *et al.*, 2020). However, it is the strategy and not the technology which should drive the servitization process (Peillon and Dubruc, 2019) and the broad range of factors that influence this means that successful servitization is not always guaranteed (Lexutt, 2020). Barriers to success may be due to employees' general lack of understanding about their organisation's current level of servitization, which in turn is related to their level of education in the process of servitization, rather than a failing of servitization itself (Shi *et al.*, 2013; Salonen, Saglam and



Hacklin, 2017). It has also been suggested that the lack of a servitization strategy can lead to fragmentation of the organisation, which may result in a reduced return on the investment in servitization or, in extreme circumstances, complete deservitization (Gebauer and Kowalkowski, 2012; Kowalkowski *et al.*, 2015). This suggests more understanding of such strategic decision-making processes is needed.

### **3.3.2 Game Theory (Exploring Strategic Decision Making)**

Game theory is traditionally used to explore, guide and interpret the strategic decision-making of rational parties (Lima *et al.*, 2018). It is used as a tool to simultaneously find the optimum balance of maximum payoff and minimal risk for a given situation (Tadelis, 2013). There are two strategies in game theory: cooperative and non-cooperative. In a non-cooperative strategy, each party attempts to get the best payoff for themselves by employing a strategy which includes the unknown strategies and counterstrategies of the other parties. In contrast to this, in a cooperative strategy, the parties are free to make agreements and alliances to increase the likelihood of a fair outcome for each party (Peleg and Sudhölter, 2007).

A central tenet in cooperative game theory is the Shapley value (Shapley, 1953). It is used in cooperative game theory to calculate a fair distribution of rewards or costs based upon the contributions of each participant (Calleja and Llerena, 2020). The Shapley value was intended to model the interactions of participants who choose to cooperate, unlike participants in a non-cooperative scenario (Winter, 2002). Therefore, if the results of an interaction resemble the Shapley value prediction, it can be posited that the participants were playing a cooperative game strategy (Algaba, Fragnelli and Sánchez-Soriano, 2019). Hence, using the Shapley value can distinguish between a cooperative and non-cooperative strategy in an interaction between two or more participants (Algaba, Fragnelli and Sánchez-Soriano, 2019).

Due to the recent introduction of modern mathematical tools, game theory is now widely accessible to scholars and the general public (Ross, 2019) with the

majority of applications employed in financial strategies (Chatterjee and Samuelson, 2014). However, new managerial applications of game theory have grown considerably, especially in the interpretation of 'big data' for predictive analysis. Here, game theory uses past information to predict future events, reduce risk, and maximise returns (Hammoudi, 2018).

Despite this, the use of game theory in conjunction with servitization is limited (Zhong, 2014). One notable exception is a paper written by Gao (2019), which uses game theory to show the equilibrium positions of an organisation's servitization evolution. Gao (2019) concludes that for the successful adoption of servitization the net servitization revenue must be positive and is also contingent upon the servitization position of the manufacturer's counterpart. Additionally, although with a slightly different focus, an evolutionary game approach has been adopted to explore outsourcing as part of servitization; this research highlights the importance of collaborative approaches when it is difficult to provide high-quality services (Ma, Feng and Jiang, 2020). On the other hand, there are several papers written about the unrelated subject of gamification and servitization (Süße and Wilkens, 2014; Lee, Yoo and Kim, 2016; Hezarkhani, 2017). Gamification is a teaching and learning tool which reflects the growing popularity of games in everyday life (Shi *et al.*, 2013; Koivisto and Hamari, 2019; Welbers *et al.*, 2019), rather than game theory, which is a method to understand and guide strategic decisions (Lima *et al.*, 2018).

### **3.3.3 Research Gap and Conceptual Framework**

Business relationships and their dimensions, e.g., trust, commitment, cooperation, coordination are discussed extensively in the supply chain, business-to-business marketing and organizational behaviour literature (e.g. Dyer and Nobeoka, 2000; Håkansson and Snehota, 2017). However, this discussion is only now beginning to be introduced into the servitization context as focus moves away from the manufacturer as the focal actor and towards a multi-actor perspective (e.g. Story *et al.*, 2017) network (e.g. Huikkola *et al.*, 2020), and relational perspectives (e.g. Kamalaldin *et al.*,

2020). Digital servitization research focuses on the servitization ecosystem, which involves relationships that are focused on mutual value creation and shared goals (Lusch and Nambisan, 2015; Kohtamäki *et al.*, 2019; Sklyar *et al.*, 2019; Story *et al.*, 2020) and are essential to the servitization process and continued success of the servitized ecosystem (Opresnik and Taisch, 2015). Much of the extant literature views servitization as process undertaken by manufacturers in isolation (Raddats *et al.*, 2019). The literature which discusses the customer or intermediaries tends to regard servitization as an intra-company process (Raddats *et al.*, 2017) or from the perspective of the manufacturer or the customer and neglect the collaborative perspective of servitization (Finne and Holmström, 2013; Polova and Thomas, 2020). However, the benefits and rewards of collaboration are beginning to be acknowledged in the discussion around digital servitization (Tronvoll *et al.*, 2020).

Scholars agree that collaboration between actors is required for the application and development of advanced services and servitization (Story *et al.*, 2017; Polova and Thomas, 2020). This collaboration relies upon the shared interests and knowledge each party brings to the table (Burton *et al.*, 2016; Polova and Thomas, 2020) and aligning these attributes to the mutual benefit and value co-creation of all parties (Finne and Holmström, 2013; Raddats *et al.*, 2017). Research has shown that organisations that collaborate are more successful than those that do not (Raddats *et al.*, 2019). However, it is also noted that servitization collaboration is a difficult undertaking that requires the sharing of trust and commitment during the entire process (Polova and Thomas, 2020). Additionally, the review of the literature suggests more understanding of servitization strategies and the associated decision making is needed. Using the lens of game theory to examine the nature of the relationship between oil industry organisations provides a mechanism with which to view these interactions and involves a novel mechanism for this exploration.

Table 8 suggests that advanced levels of servitization produce more cooperative relationships where risk and reward are more likely to be shared

between the manufacturer and customer (Baines and Lightfoot, 2013). Simply stated, a manufacturer cannot work in isolation from their customer and cooperation is required for collaboration and servitization (Kohtamäki *et al.*, 2019). Similarly, when servitization levels are at a base level the provision of services is much reduced and the need for advanced levels of cooperation is not observed (Kremer *et al.*, 2016). As such, at the intermediate level the relationship is more complex with potential for some cooperative behaviour to emerge. Therefore, if the level of servitization can be determined, this will provide insight into the level of cooperation that exists in the given relationship, and vice versa.

Type	Defined by	Organizational stretch	Examples of services offered
Base services	An outcome focused on product provision	Based on the execution of production competence (i.e. we know how to build it)	Product/equipment provision, spare part provision, warranty
Intermediate services	An outcome focused on maintenance of product condition	Based on exploitation of production competences to also maintain the condition of products (i.e. because we know how to build it, we know how to repair it)	Scheduled maintenance, technical helpdesk, repair, overhaul, delivery to site, installation, operator training, operator certification, condition monitoring, in-field service
Advanced services	An outcome focused on capability delivered through performance of the product	Based on translation of production competences to also manage the product's performance (i.e. because we know how to build it, we know how to keep it operational)	Customer support agreement, risk and reward sharing contract, revenue-through-use contract, rental agreement

Table 8: Categorisation of product services, derived from Baines and Lightfoot (2013, p. 66)

However, it is difficult to know if this claim is a reality and carried out in practice at all levels within organisations. Game theory focuses on the employed strategy and not the intent (Peleckis, 2015; Elkind and Rothe, 2016). Therefore, by analysing the strategy used in the relationship between two actors, we can compare the intended and actual strategies used by either party. Thus, the following research questions were created:

1. How does cooperation within a relationship affect the transition to advanced services?
2. What are the strategies adopted by both actors in a relationship when faced with the introduction of more advanced levels of service?
3. How do changes in servitization level impact on cooperation?

### **3.4 Methodology**

The research questions provide an opportunity to employ a mix of quantitative and qualitative insight in order to understand the phenomena. A mixed methods approach that combines complimentary qualitative and quantitative methods is adopted; thereby benefiting from the relative strengths and reducing the individual weaknesses of each method (Brewer and Hunter, 1989). This is in-line with the definition proposed by Johnson et al., (Johnson, Onwuegbuzie and Turner, 2007, p. 123) whereby “a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration. Using a mixed method allows triangulation of the findings (Denzin, 1978) whereby observations can be verified using more than one method, thereby “increase[ing] their scope, depth and consistency” (Flick, 2009, p. 445). A sequential explanatory design was adopted (Creswell, 2010) as illustrated in Figure 5.

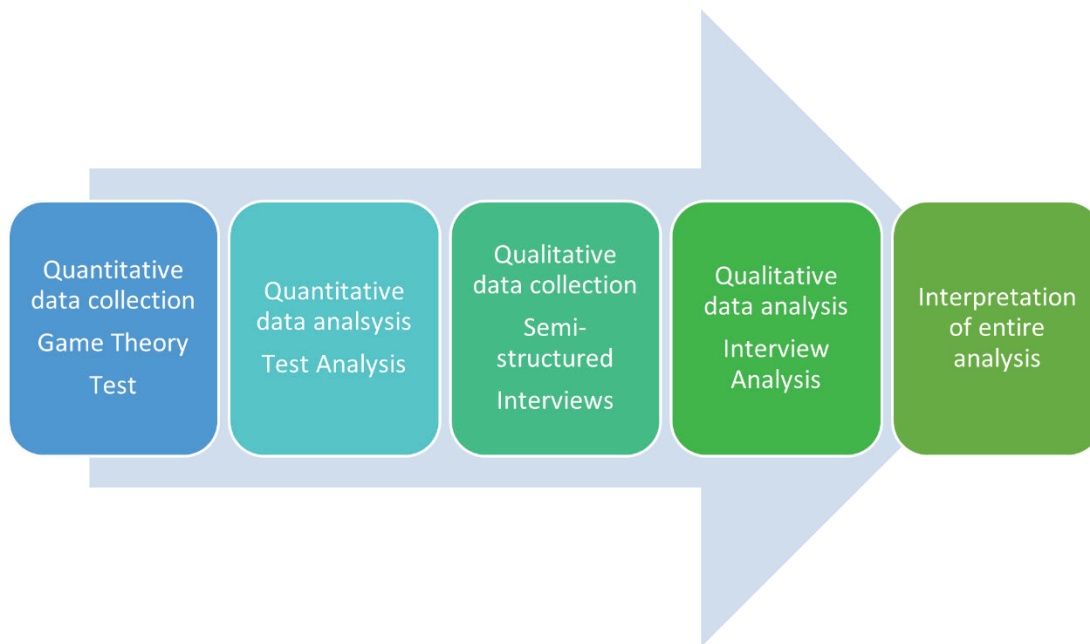


Figure 5: Sequential Explanatory Design, Adapted from Creswell et al., (2010, p. 59)

The different phases, their analysis and the research context chosen for the research are described in the sections below. The procedures outlined by Harrison et al., (2020) to ensure rigour in mixed methods research have been used to guide this process, e.g., reporting the different data collection and analysis procedures and illustrating how the different data strands contribute to the discussion and conclusions. The research uses the interorganisational relationships between Operators (OC) (the users of these services and equipment) and Service Companies (SC) (suppliers of equipment and technical services in the industry), as the unit of analysis. These relationships are explored from the perspectives of the employees working for these organisations.

### 3.4.1 Research Context

The research context necessary to explore these questions needed to be one in which high levels of servitization are not evident. Generally, studies considering the topic of servitization within the oil industry are sparse. However, the available literature highlights that most organisations lack a definitive servitization strategy (Kumar and Markeset, 2007; Bandinelli and

Gamberi, 2011). This suggests that the oil industry could provide a suitable research context. Oil is a volatile global commodity and an important export for many nations (Kesicki, 2010) making it a highly political product (Parra, 2004). Additionally, the extraction, transportation and combustion of oil and its derivatives can have detrimental effects on the natural environment. Currently, standard extraction practices mean that only 20%–34% of the oil in a reservoir can be recovered with the remaining oil being permanently lost (Bentley, 2002; Zitha *et al.*, 2008). However, with pre-planning, advanced procedures and new technologies this can, in some instances, be increased to 35%–45% (Bentley, 2002; Zitha *et al.*, 2008). Cooperation between all stakeholders is needed to realise the associated political, environmental and financial gains achieved by increasing the recovery factor (Alvarado and Manrique, 2010; Åm and Heiberg, 2014). Servitization would be a potential route to achieve this. Despite SC showcasing such promises in their promotional material, e.g. (*Mission, Vision, Values*, 2020; *Who We Are*, 2020), there is limited evidence of cooperation in practice. Additionally, the OC seem reluctant to either engage in cooperative practices or accept the benefits servitization can provide. Thus, our research attempts to determine the prevalence of advanced levels of servitization within this industry. This conflicting focus within the OC and SC relationship highlights an interesting research area and, thus, the purpose of this research is to explore the relationship between servitization and the strategies that are in play in this context. To this effect, game theory is used to examine these relationships **in practice** to determine if they are adversarial or cooperative in nature and to identify the actual strategies being used. Building on this, a semi-structured interview process was used to develop understanding and context of the cooperative/non-cooperative processes identified in the test (Korstjens and Moser, 2017).

### 3.4.2 Game Theory Test

Figure 6 below shows the conceptual framework for the Game Theory Test. Starting from the left, it is proposed that if the servitization level between two

actors is at a base level (Baines and Lightfoot, 2013) their relationship is likely to be adversarial (Kemp and Stephen, 1999). Similarly, if the servitization relationship is advanced, then their relationship is likely to be cooperative. This paper seeks to investigate if changing the servitization level, indicated by the double-headed arrows below, can change a relationship from adversarial to cooperative and vice versa.

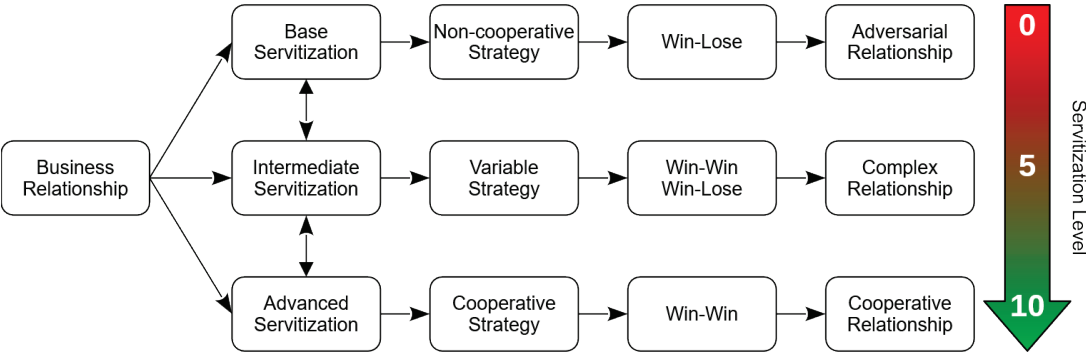


Figure 6: Hypothesised relationship between servitization level and game type

For this test, a sample size of 48 was deemed appropriate, see Table 9 below. The age of the subjects ranged from 25 to 51 with a median age of 43.0 years. The experience levels range from 12 to 39 years with a median value of 23.0 years. The nationalities were diverse and included: Europe, North and South America, the Middle East, Asia and Australasia. All of those questioned had experience in several geographic locations and had worked with several organisations. This combination offers a rich breadth of experience and knowledge and enables the provision of a comprehensive data set. The subjects were identified using a selective strategy (Easterby-Smith, Thorpe and Jackson, 2012) to ensure that they possessed the knowledge and experience of the oil industry needed to produce reliable data. Criticism is often made of such convenience sampling methods as not producing generalizable findings (Bryman, 2012). However, this paper is specifically focused on the oil industry, therefore, a selective sampling method enabled the selection of a group that was sufficiently diverse and representative by ensuring diversity in organisation type, experience levels and geographic locations. Post-hoc



analysis confirms that the effects were sufficiently pronounced that the sample size of 48 produced a statistical power >0.8, see Table 10. All respondents were contacted in advance and gave their consent to undertake the test and take part in a subsequent interview if randomly selected.

Departing from the traditional methodological application of game theory, this paper takes a novel approach to this research by using a game theory lens to investigate servitization strategy. This determination is achieved by inverting the typical game theory approach to use the outcomes of the game to understand the strategy being employed by each player, unlike typical applications which use game theory to develop the best strategy for a given situation. Game theory was selected as it provides an insight into the strategy being employed by each ‘player’ and allows the researcher to understand the **actual** strategy being used in a realistic representative scenario, and if a contradiction exists between this and the intended or expressed strategy of the player. Game theory is an established method used to work with game strategy, and so will produce robust findings (Peleg and Sudhölter, 2007; Tadelis, 2013). Other methods of analysis were unlikely to sufficiently address the strategy element of the interorganisational relationships in a format that is as established and accessible as game theory. The test is based on the classic game theory prisoners’ dilemma (Dixit and Nalebuff, 2010).

	Qualitative	Quantitative
High reward test: Service Company (HS)	13 Participants	12 Participants
High reward test: Operator (HO)		12 Participants
Low reward test: Service Company (LS)		12 Participants
Low reward test: Operator (LO)		12 Participants
Totals (n)	13	48

Table 9: Research Group Classification and Distribution

### 3.4.3 Strategy Testing

A game theory test was selected to investigate the expressed strategy used by employees within the oil industry. Game theory, unlike other methods, focuses on strategy and therefore has the virtue of discovering the actual conscious or subconscious strategy used and not the expressed strategy of the player. Game

theory is also a modern, but well-established, method for determining strategy and strategic outcomes of scenarios like the one presented to the test participants and can, therefore, be relied upon to provide robust findings. The participants were directed to complete a test to determine if they elected to use a cooperative or adversarial strategy when they were dealing with their regular day-to-day business partners. The test consisted of a version of the established prisoners' dilemma (Dixit and Nalebuff, 2010) modified with a realistic oilfield scenario where the Service Company (SC) provided a new tool generating a saving for the Operator (OC). The test used an inverted version of the prisoners' dilemma where the aim of the test was not to determine the outcome, which was already known, instead it was to use the outcome to determine the type of game strategy being employed by each actor, specifically competitive or non-competitive. One version (High reward) of the test examined a saving of \$1,025,000 and the other version (Low reward) a lesser saving of \$350,000. The difference in values between the two tests determined if value was a factor in the strategy of either party, the tests were otherwise identical.

During the test, the participants were asked to allocate a percentage share of the saving to the SC responsible for creating the saving. Each participant was asked to allocate the saving value based on what they thought was fair. The same participant was then asked to reconsider the realistic saving value based upon their experience and expectation if the event occurred in their current organisation, both these values were recorded.

#### **3.4.4 Semi-structured Interviews**

After the analysis of the Game Theory test, semi-structured interviews were carried out on a subset of the original forty-eight test participants. All test participants were contacted; three or four of each of the groups (high reward service company [HS], high reward operator [HO], low reward service company [LS] and low reward operator [LO]) were interviewed. Analysis of the interviews took place alongside the interviews; after interview nine additional themes emerged, i.e. thematic saturation was achieved (Galvin, 2015).

However, a total of thirteen interviews were conducted to balance the representation from each of the four groups used in the game theory test shown in Table 9. Each interview was conducted one-to-one, via Skype or in-person depending on the interviewee's location and lasted between 45 and 60 minutes.

In the interviews, interviewees were first asked to identify the level of servitization of their current organisation based on the scale, shown in Table 8, created by Baines and Lightfoot (2013) which has three levels: base, intermediate and advanced. There are many scales available such as Fang, Palmatier and Steenkamp (2008) who base their assessment on service revenue, or Homburg *et al.* (2002) who use the number of services as a measurement. Unlike these, which focus on a single parameter, the Baines and Lightfoot (2013) scale uses a broad range of factors to identify servitization levels. The scale does not require a lengthy analysis of data, for example, company accounts, and is written in a format that practitioners can easily understand and in subject areas they were familiar with without lengthy instruction. This scale was ideally suited for the relatively short interview sessions with subjects that were not familiar with servitization at a detailed academic level.

After the servitization level of the interviewee's organisation was identified, each of the interviewees was then interviewed about their experience of value co-creation and servitization levels in relation to cooperative and adversarial relationships. This part of the research process was designed to expand further on the initial results of the quantitative research, adding context and clarification. In order to understand the effect of base, intermediate or advanced levels of servitization the interviewees were also asked, via multiple questions, to comment if these servitization levels were more or less conducive to adversarial or cooperative relationships based on experience from their prior working history and experiences.

### 3.4.5 Qualitative Analysis

Each interview was transcribed and analysed using the NVivo 12 software platform. An abductive approach was adopted for the qualitative analysis (Dubois and Gadde, 2002), which aligns with the method proposed by Gioia, Corley and Hamilton (2013) who advise changing the research questions to progress the research in new directions. Initially 5 themes and 15 sub-themes were identified through discussion amongst the three coders to determine the servitization level and the influence of servitization on cooperation or non-cooperation. These first and second order themes increased to 7 themes and 28 sub-themes due to the abductive discursive process; a detailed summary is provided in the findings section. Gioia, Corley and Hamilton (2013) state that qualitative rigor begins with defining first and second order categories, or themes to be used during qualitative research, this is represented in Figure 7 below for this research.

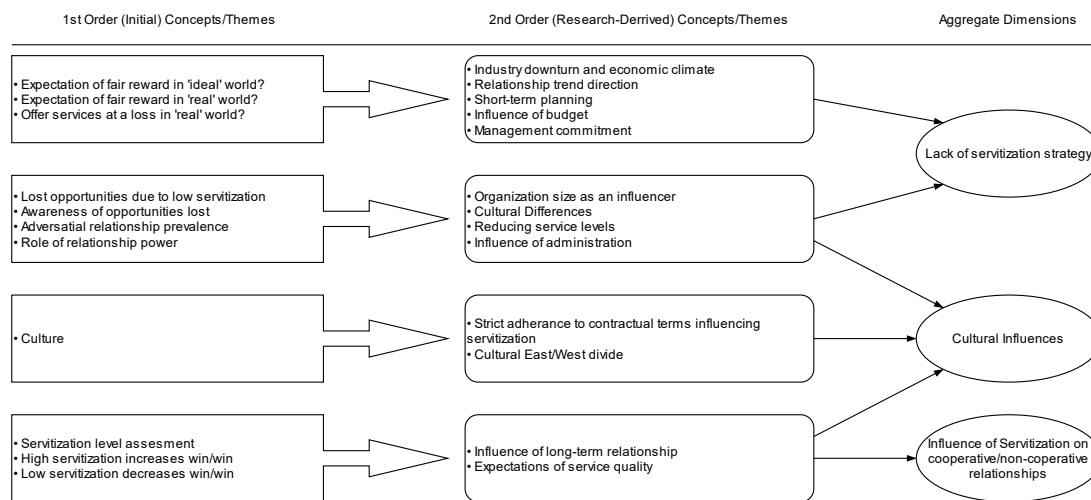


Figure 7: Data Structure, Adapted from Corley and Gioia (2004, p. 184)

## 3.5 Findings

### 3.5.1 Fairness and Strategy

The Shapley value states that each participant receives a reward that is fair in relation to their investment. This is characterized by the 'null player property' which states that if a participant contributes zero, then their reward should be zero (Calleja and Llerena, 2020). Thus, the Shapley value was used to indicate if the strategies being displayed during the test and the outcome of the

interaction were cooperative or non-cooperative. If the test found that a reward distribution approximated the Shapley value, this would indicate that all parties are acting cooperatively. If the value differs from the Shapley value, this indicates that they acted with a non-cooperative or adversarial strategy.

To determine if the participants in the test were cognisant of their cooperative or non-cooperative position, the value of their fair and realistic awards were compared. If the values were dissimilar, then each party was cognisant that the award they had offered was unfair, and they were, therefore, knowingly acting in a non-cooperative way. If the values were similar, this indicated the intention to act fairly and cooperatively. However, if the values were appreciably different from the Shapley value, then they were not behaving cooperatively, but were not cognisant of it. This is represented in Figure 8 below:

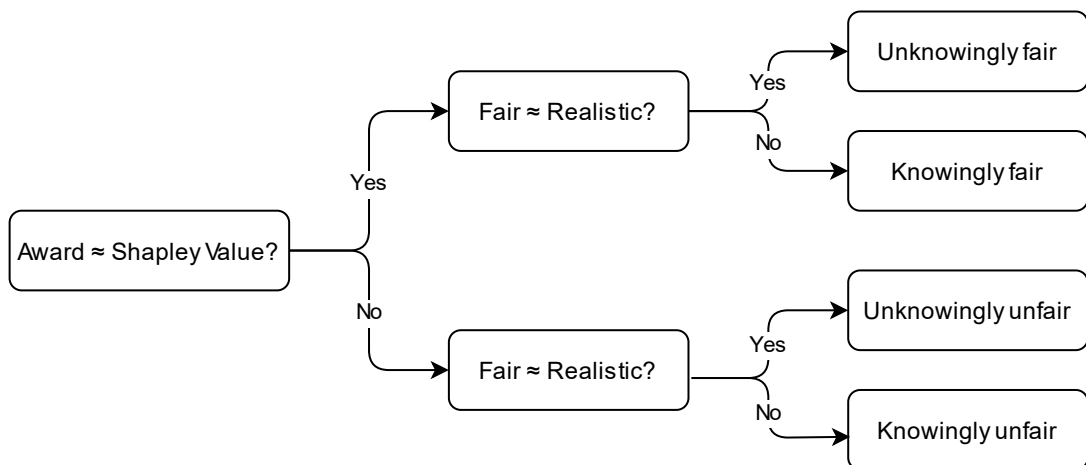
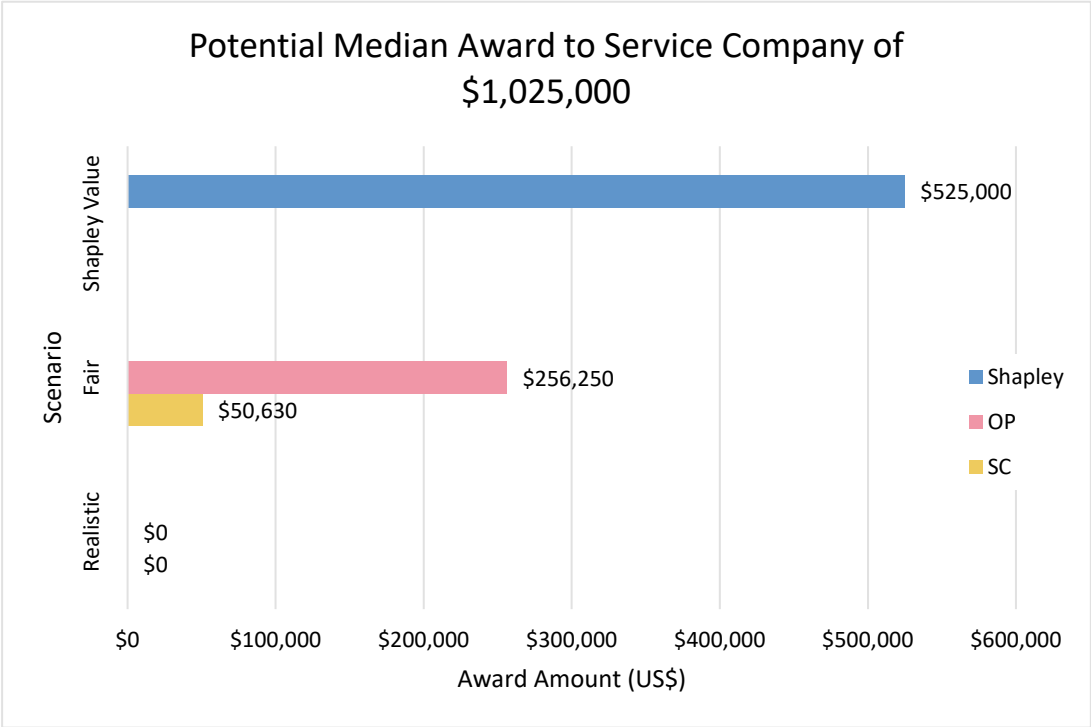


Figure 8: Fairness Analysis Flow Chart

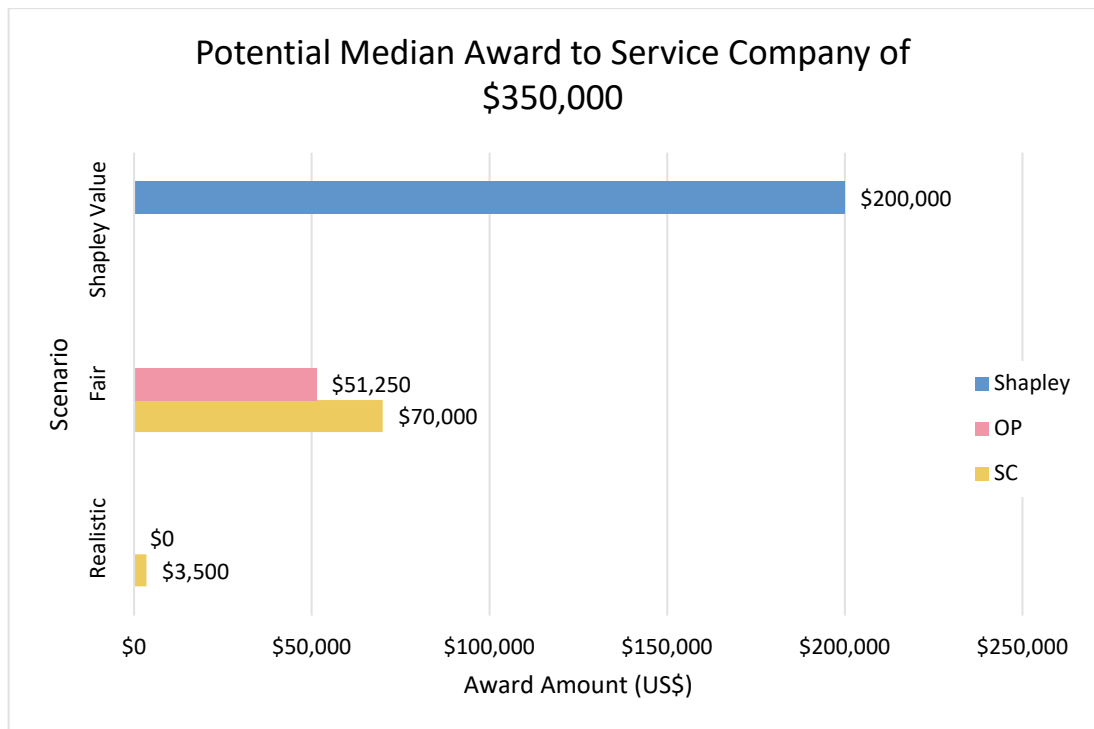
The following charts show the award to the SC for making high (Graph 1) and low (Graph 2) savings during the oilfield dilemma test. It is interesting to observe that in all cases the proposed reward is substantially lower than the Shapley value. In addition to this, and in all cases, there is a significant difference between the fair award and the realistic award, signifying that both parties were aware that the award was not fair. Median values and interquartile ranges (IQR) were used to represent central tendency rather than

the mean, which can present a skewed representation based upon the recommendation of Murphy *et al.* (1998) and Hartwig *et al.* (2020).



Graph 1: Median award to SC when value = \$1,025,000. n=24

Graph 1 shows that there is a significant difference between all the proposed rewards and the Shapley value. In addition to the above findings, a set of t-tests, see Table 10 below, were carried out which show that the difference between SC fair and realistic values were statistically significantly different ( $p=0.004$ ). Similarly, the OC fair and realistic values were statistically significantly different ( $p<0.001$ ). Using the Fairness Analysis Chart, Figure 8, we can determine that all parties were not working cooperatively, and all parties were cognisant of this.



Graph 2: Median award to SC when value = \$350,000. n=24

Graph 2 shows that there is also a significant difference between all the proposed rewards and the Shapley value, even for a lesser reward. T-tests, see Table 10 below, were carried out which show that the difference between SC fair and realistic values were statistically significantly different ( $p < 0.001$ ). Similarly, the OC fair and realistic values were statistically significantly different ( $p = 0.008$ ). Referring to Figure 8, we can determine that, again, all parties were not working cooperatively, and all parties were cognisant of this.

			n	Mean %	Mean s	SD	t	df	p	Power
High	Service company	Fair world	12	5.84	59,899	55,158	3.5615	11	0.004	0.899
		Real world		0.22	2,242	7,758				
	Operator	Fair world	12	23.95	245,521	144,780	5.7605	11	<0.001	0.999
		Real world		0.31	3,203	8,868				
Low	Service company	Fair world	12	22.34	78,196	48,411	6.1814	11	<0.001	0.999
		Real world		2.73	9,542	15,513				
	Operator	Fair world	12	17.35	60,711	47,027	3.2594	11	0.008	0.842
		Real world		3.67	12,833	22,943				

Table 10: Summary of statistical analysis

The servitization levels, as perceived by the respondents, within each organisation were also collected and it was found that the median servitization level claimed by OC employees was 5.0, or intermediate, with an IQR of 1.5. However, the SCs claimed a median servitization SD level of 6.5 which is slightly

above intermediate, with an IQR of 5.0. The OC has a small IQR which indicates that there is general agreement amongst this group that the servitization level is 5.0. However, the larger IQR of the SC would seem to indicate that there is less agreement within the group on servitization level.

### 3.5.2 A Deeper Understanding of the Situation

Table II shows the final coding framework developed in this research. Themes and sub-themes are listed, and the references attributed to each are shown in parentheses. The emergent themes are identified by an asterisk (\*). Appendix 1 provides a list and explanation of all themes and sub-themes.

Theme	Sub-theme (References)	Sub-sub-theme (References)
<b>Oilfield dilemma discussion (62)</b>	Offer Reward in Ideal World (16)	No (2)
		Yes (14)
	Offer Reward in Real World (17)	No (9)
		Yes (8)
	Offer Tool (15)	No (6)
		Yes (9)
	Long term relationship* (7)	
	Expected service* (3)	
	Contractual or procurement block* (4)	
<b>Servitization level (60)</b>	Level (17)	Base (0)
		Intermediate (15)
		Advanced (2)
	High servitization = increased chance of win/win (24)	Agree (13)
		Disagree (2)
	Low servitization = reduced chance of win/win (15)	Agree (12)
	Disagree (2)	
	Contracts and Procurement* (4)	
<b>Servitization application (186)</b>	Opportunities lost due to lack of servitization (22)	
	Awareness of opportunities lost due to lack of servitization (20)	Aware (18)
		Unaware (2)
	Adversarial relationship (30)	No (6)
		Yes (23)
	Power (25)	Authority (13)
		Influence (12)
	Organization size* (23)	
Culture* (22)		
Fading service levels* (17)		
Inter-organizational administration block* (27)		
<b>Antecedent factors (121)</b>	Culture (81)	Personal attitude to adversarial relationships (29)



Theme	Sub-theme (References)	Sub-sub-theme (References)
		Win/lose people (35)
		Win/win people (13)
	Industry Downturn and environment* (26)	
	Trend* (16)	Growing win/win (1)
		Reducing win/win (15)
	Revenue and Budget driven* (49)	
	Management commitment* (12)	
	Internal administration block* (14)	
<b>Servitization as a solution (68)</b>	Increasing servitization = win/win (53)	
	Decreasing servitization ≠ win/win (14)	
	Decreasing servitization = win/win (1)	
	Increasing servitization ≠ win/win (0)	
<b>East/West divide* (14)</b>		
<b>Short term planning* (21)</b>		

Table 11: Final thematic coding framework, n=13

The interview sessions were designed to deepen the understanding of the findings of the fairness analysis, which found that the relationship is knowingly unfair but acceptable to both SC and OC. One significant finding effect noted was the economic downturn in the oil industry, this lead to tightening of contractual terms and budget constraints and increased the likelihood of adversarial relationships. Many of the interviewees also noted that they had experience of organisations where advanced servitization levels created a more cooperative environment. Several senior SC and OC managers from various locations reported that organisations with higher levels of servitization were more cooperative, and vice versa.

### 3.5.2.1 The Relationship Between Servitization and Cooperation

The interviewees reported many examples of the necessity of collaboration between all actors for advanced levels of servitization (supporting Story *et al.*, 2017; Polova and Thomas, 2020). For example:

A senior SC Middle East account manager who identifies that greater levels of cooperation (servitization) will lead to more cooperative relationships:

*To build a relationship with your client and to maintain that, you've got to service a client and he's got to service you as well. Once you build up trust and respect, the business will just continue to grow.*

Likewise, a SC product champion in the US also states that greater levels of collaboration (servitization) create a balance of benefits for both parties compared to non-cooperative behaviour:

*The collaborative environment makes a huge difference, ... work[ing] together to explain ... the benefits of both rather than thinking ... you're going to squeeze more money out of me. So instead of this...more collaborative and open discussions... , interactions and collaborations help the situation to be a win-win; ... is very essential... high servitization is a win-win ... there has to be a very good balance from both sides.*

Finally, the quote below from a senior OC confirms that cooperation and trust lead to successful business relationships and win-win outcomes for both parties:

*If you have ... trust and partnership ..., it will almost always result in a win-win .. the operator then goes out of their way [to] find other ways to compensate you ... I've experienced that in multiple locations around the world.*

The three quotes above not only confirm that collaboration is required for servitization, but also indicate that this collaboration is a universal requirement. The three individuals quoted come from manufacturers (SC), customers (OC) and represent different cultural and geographical regions.

### *3.5.2.2 Resistance to Change and Industry Norms.*

The influence of organisational culture was brought up extensively during the semi-structured interviews. Additionally, resistance to change was found to be

universal, which indicates this is likely to be an 'industry norm' rather than a geographic or social cultural effect (Gordon, 1991). The oil industry is notorious for having a culture of change resistance as highlighted in their continued resistance to gender diversity (Miller, 2004). The example below, from a sales manager in the US confirms that there is an industry-wide culture of resistance to change impeding the application of servitization:

*The organisational culture barrier... some organisations which are culturally very... laggard in a sense where they just don't like changes.*

A similar observation was made by an OC manager in the Middle East, but this time referring to individuals exhibiting resistance to change and that this was a result of the effect of an industry norm:

*The biggest barrier is people and the mindset and opening up organisations to work collaboratively. So there's still a lot of resistance. There's still a lot of 'them and us' in oil ... and that's probably the biggest thing which is holding people back.*

During the semi-structured interviews, a number of interviewees attributed the resistance to change and adversarial attitude to an East-West cultural difference. However, these reports were inconsistent, even between interviewees with experience of working in multiple cultures. An East-West cultural difference would conflict with literature on this subject (Salacuse, 1998), therefore, we posit that this is not a social or geographical cultural difference but a result of an industry norm. An example of such a quote gathered during the semi-structured interviews by a SC Country Manager in the Middle East is presented below:

*If you're talking low-cost areas invariably they're [Middle East] just looking at the price and they may have old fashioned attitudes in terms of service companies... it's definitely the old fashioned attitude that wins.*

As discussed above an adversarial business culture was identified in many interviews. This was reported universally, from OC, SC and different regions. The quotation below serves as an example taken from a SC country manager who explains that there is a high occurrence of a win/lose culture and employees who naturally prefer to play a win/lose strategy:

*People who've got certain chips on their shoulders and think they're better than other people at their jobs when they're clearly not. And the jumping to rash decisions.*

These findings provide evidence that the oil industry has a universal industry norm, which cuts across geographical cultures, and instils an industry norm that encourages an aversion to change. The evidence also suggests that the same industry norm promotes an adversarial working relationship between all parties.

### 3.5.2.3 *Servitization Planning and Resources*

There were many observations on the effect of servitization strategy on the implementation of servitization, both from an organisational and personal perspective. The findings suggest that such planning is ubiquitously absent from all of the organizations represented in this research, instead, they rely upon a process of organic growth or, as Ruiz-Alba *et al.*, (2019, p. 629) phrase it, “flying blind”. Lack of planning can starve the servitization process of resources and the necessary management support required for the lengthy and difficult servitization process (Baines and Lightfoot, 2013). In addition to this it is recognised that some organisations may be unaware of the benefits of servitization, preferring to “buy hardware instead of outcomes” (Kohtamäki *et al.*, 2019, p. 381). This point is made by an account manager in the US who describes how companies are unwilling to undertake new strategies, such as servitization:

*It was getting better but then again with the downturn, it has also gone down significantly.... Deep down they probably are aware, but they're missing out on the opportunity and at the*

*same time justifying with the fact that what they're doing is already working so let's not change with bigger promises which may not even happen.*

#### 3.5.2.4 Environmental Influences

During the semi-structured interviews, the impact of the recent oil price decline and general environment within the oil industry was expressed as a potential cause for the problems in implementing servitization. The interviews provided support to show that there are significant internal (strict application of contractual and financial terms) and external influences which prevent the formation of mutually beneficial relationships between the relevant actors. The inhibition of these natural business relationships hinders the introduction of servitization within the oil industry. This point is made by a senior OC engineer from the Middle-East:

*I just think in the last three to five years with the ... there's been a huge culling of specialty service staff. It was pretty brutal the way people had careers ripped away from them, and forced redundancies, ... in that environment you can't afford to have much leeway... the working relationships are far more brutal.*

This observation was echoed by a SC engineer, also in the Middle East:

*The base problem is the people that control the money make the biggest decisions. And it's all based on cost and reducing costs, whereas they don't look at the big picture, the value of it.*

These findings compliment the findings of the game theory analysis and together provide a robust set of data which can be used to interpret the observable and underlying motivations of the strategies towards the observed inter and intra company relationships. Strong evidence has been provided relating to the stagnation of servitization and deservitization within the oil industry.

### 3.6 Discussion

The quantitative analysis has shown, with a high degree of statistical significance, that both the OC and SC are using an adversarial or non-cooperative strategy in their interactions. This finding was also confirmed in the interviews. Furthermore, the interviews revealed that the relationships appear to be becoming more adversarial and suggest that a cost-cutting environment, brought about by a prolonged industry downturn, may be responsible. Thus, illustrating how business relationships impact upon servitization strategies and outcomes; this finding is congruent with Kowalkowski *et al.*, (2015). Interestingly, this finding illustrates the complexity of the relationship that exists in a servitization ecosystem where goals and strategies are not always shared equally and value creation is not distributed fairly ((Lusch and Nambisan, 2015; Opresnik and Taisch, 2015; Kohtamäki *et al.*, 2019; Sklyar *et al.*, 2019; Story *et al.*, 2020).

The use of game theory and the test administered allowed the underlying nature of the relationship to be observed and could, therefore, differentiate between intent and action. When comparing the proposed awards from the test, the findings show that both parties were cognisant that their behaviour was unfair and non-cooperative, or adversarial. One could therefore suggest that not only a base, but an intermediate level of servitization is likely to create an environment where an adversarial relationship is prominent, see Figure 9 below. This finding is congruent with a form of mimetic isomorphism as described in institutional theory where the actors within the oil industry change or have changed their behaviour to become increasingly similar to each other (Haveman, 1993); in this case their preference for a non-cooperative strategy. Generally, the assumption of Institutional Theory and specifically isomorphism is that the process elevates these organisations to a more harmonious sameness (Martínez-Ferrero and García-Sánchez, 2017). However, in this research the isomorphism takes a darker form of a common, or shared, noncooperative sameness.

All parties expressed that they had experienced greater levels of cooperation in organisations with higher levels of servitization. Similarly, they also stated that they had experienced more adversarial behaviour when working for organisations with low levels of servitization within the oil industry. It was suggested that taking steps to increase or decrease servitization could therefore influence the development of an adversarial relationship into a cooperative relationship and vice versa. This shows that the servitization process is dynamic, complex and is not always one-directional (Valtakoski, 2017) and affected by the relationships of the actors involved, i.e., actors are both impacted by and influence the relationships they are involved in (Håkansson and Ford, 2002).

Figure 9 below shows the revised relationship between servitization level and game type. In the initial conceptualisation (see Figure 6) intermediate servitization was connected to a variable strategy which eventually led to a complex relationship. However, the findings of this research have shown that an intermediate level of servitization does not lead to a variable strategy, but instead leads to a non-cooperative strategy, as seen below in Figure 9. Therefore, the findings of this research indicate that both base and intermediate servitization levels result in an adversarial relationship and a win-lose strategy.

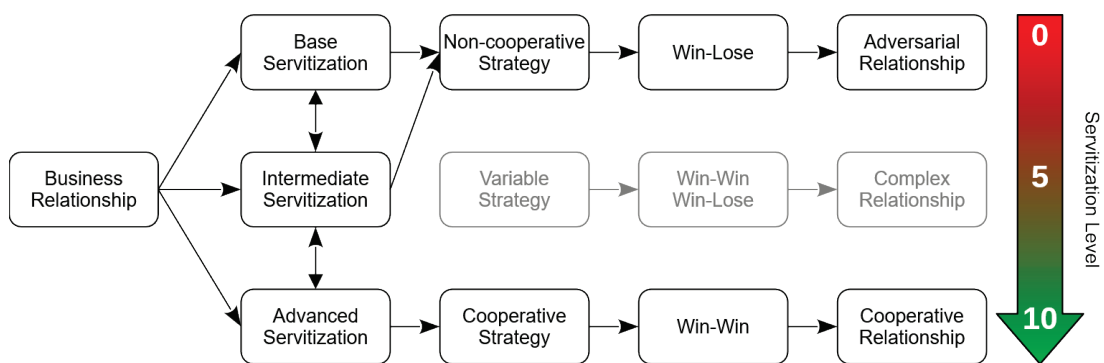


Figure 9: Proposed relationship between servitization level and game type

The findings have indicated that servitization at a base or intermediate level can produce the same outcome, i.e., a win-lose adversarial relationship. In order for servitization to become a game-changer it, therefore, needs to be

implemented at an advanced level. However, given the difficult and often non-linear progression of the servitization process and the absence of results on its progression through the basic and intermediate phases, it is questionable if it will receive the required management support and allocation of resources to reach the advanced level and provide a return on the investment. This may explain the apparent stagnation of the servitization process observed in the oil industry and similar organisations and industries observed in the academic literature (Andrews *et al.*, 2018; Raddats *et al.*, 2019).

### **3.7 Conclusion**

#### **3.7.1 Theoretical Contributions**

Little literature exists on the use of game theory and servitization (Zhong, 2014). Therefore, this research provides an opportunity to make a methodological contribution. In this section we identify three theoretical contributions to existing servitization theory derived from this research.

The first theoretical contribution shows that whilst there is acknowledgement that servitization is a dynamic process (Andrews *et al.*, 2018; Raddats *et al.*, 2019) and subject to deservitization (Brax, 2005), by using game theory we can add to existing theory by showing that cooperative relationships are only achievable in this context when advanced services are involved. This contribution was made possible by combining the methods used within this research and opens a new area of theoretical interest and research opportunities. This finding challenges the tacit assumption that the benefits of servitization improve linearly with an increase in servitization level, instead suggesting that there may be an exponential relationship, as shown in Figure 10 below.



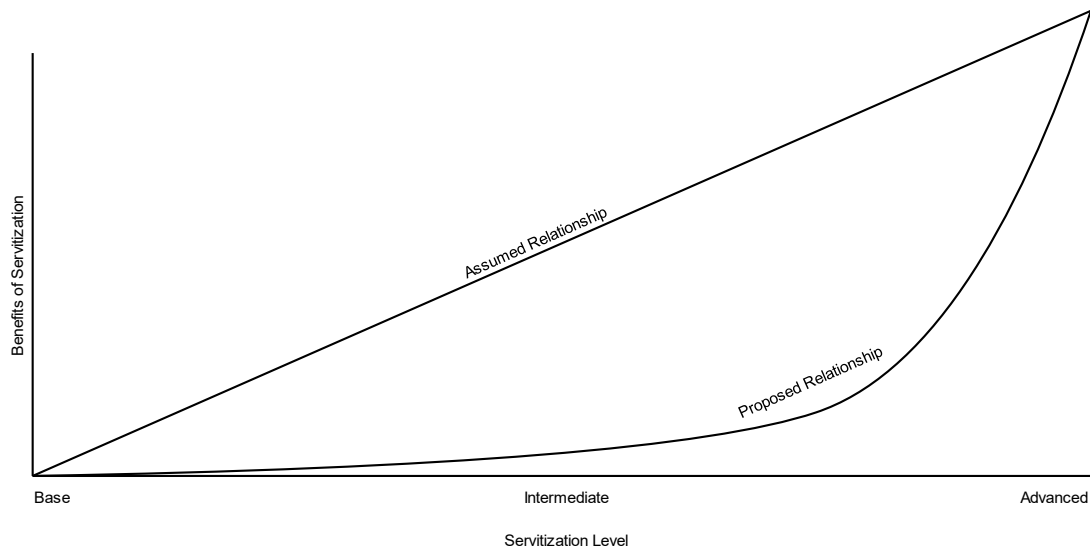


Figure 10: Sketch Showing Assumed and Proposed Relationship Between Servitization Level and Servitization Benefits

Secondly, our research shows how both industry and macro-level factors influence servitization strategies. A darker side of mimetic isomorphism (Haveman, 1993) appeared with respect to how employees of each organisation type were behaving in their business dealings. The research identified that this unfair behaviour was a conscious decision that both sides were aware of and, in the case of many of the SC, self-imposed. By exploring this from a multi-actor perspective, this extends understanding of the darker side of servitization. Finally, the link proposed by many of the interviewees between servitization, deservitization, and the economic environment reminds us that servitization is impacted by macro-environmental factors. Specifically, that an economic downturn may increase strict adherence to contractual terms and in so doing reduce the ability of employees to form cooperative relationships, and inevitably impedes the servitization process. These findings illustrate the insight that arises from adopting a relational lens for servitization research and how it provides additional insight into the theoretical understanding of servitization and the servitization paradox process.

### 3.7.2 Management and Practical Implications

This research provides practical insights for management teams wishing to implement a servitization strategy within their organisation. These relate to:

- The nonlinear application and return of servitization
- Criticality of management strategy and the effect of downturns
- The role of individual, organisational and geographical culture
- The motivators for management to implement servitization and reflection on unilateral application within networks

It has been suggested that the application of servitization is not a linear process (Andrews *et al.*, 2018; Raddats *et al.*, 2019). This research supports this position and goes further to propose that the return on servitization, especially in the interim stages of servitization, are also not linear. Specifically, that the cooperative relationships derived from servitization may not become evident until advanced levels of servitization have been achieved. Therefore, if an organisation wishes to take advantage of increased cooperation and the benefits of closer working relationships, the management team and organisational structure needs to be committed to achieving advanced levels of servitization.

The transition to servitization is a difficult and prolonged process, requiring management commitment to change within an organisation (Ulaga and Reinartz, 2011; Raddats *et al.*, 2018) and provision of suitable resources (Baines and Lightfoot, 2013; Lenka *et al.*, 2018b). A lack of management commitment was mentioned by the interviewees as a significant factor in the failure of the servitization process to reach advanced levels. Therefore, this research advocates that management should prioritise the preparation of a robust servitization strategy. Failure to prepare such a strategy may incur the detrimental effects of deservitization and failure to achieve the rewards if servitization is abandoned or stalled before advanced levels are achieved (Benedettini, Neely and Swink, 2015). Management commitment is especially important during the many industry specific downturns, such as the ongoing oil price crash of 2014 (England, 2020), and the more widespread global economic recessions. This research has shown that there is a tendency for management to reduce costs by strict enforcement contracts or introducing tighter constraints within new contracts, and it is not uncommon for

servitization to stall or revert to an earlier incarnation due to these restrictions, an observation also made by Andrews *et al.* (2018).

This research has shown that there is a resistance to change both at an organizational and individual levels within both OC and SC, which may slow the implementation of servitization. Both the OC and SC are aware that an adversarial relationship exists within the oil industry. It has been shown in this research that there is a propensity for a win-lose culture. However, this may be more a factor of industry norms (Blake and Mouton, 1961; Bülow and Kumar, 2011) than East-West cultural differences (Salacuse, 1998). Failure to address these aspects within the servitization strategy may slow or completely derail the servitization process.

The findings suggest that increasing servitization to advanced levels increases the likelihood of cooperation and in turn increases value co-creation.

Similarly, reducing or maintaining servitization levels at a base or even intermediate levels is likely to result in adversarial relationships and reduce the likelihood of value co-creation. Therefore, one can posit that management should endeavour to increase servitization levels in order to maximise the potential value co-creation possibilities. However, it must be recognised that these organisations exist within a highly complex service ecosystem and a unilateral change is unlikely to be successful. Therefore, a paradigm change within the entire ecosystem may be required (potentially requiring political or regulatory action) to realise the financial and environmental advantages that servitization can access from value co-creation and the efficient use of existing and new resources.

This research is of importance to many stakeholders as it may reduce the need to develop new oil reserves by increasing efficient use of existing reserves. It should therefore benefit the natural environment and economic and political stability of the nations which hold these reserves.

### **3.7.3 Limitations and Future Research**

This research was undertaken in the oil industry and, therefore, further research is needed to explore if the findings are generalisable to other contexts. However, there is no reason to suspect that advanced servitization may not promote cooperative relationships in other industries. Game theory provides an avenue to explore this further and also to investigate if there are other factors that impact on the level of servitization achieved.

The test taken by the participants was relevant to their industry and factored in elements such as the size of award, however, there is a possibility that the subjects could have responded differently to a different scenario or group of scenarios. Therefore, it would be prudent to confirm these findings with a greater range of tests across a wider range of industries. Due to the inherently complex and sometimes counterintuitive nature of game theory, the format of the test in this research was somewhat complex, especially for those not familiar with game theory. This complexity required an explanation of the test scenario and an opportunity for the person being tested to ask questions and seek clarification, removing the option of a self-administered electronic survey. This personal interaction limited the number of tests taken due to time constraints and other logistical issues. In order to increase the quantity of responses and apply this test to other industries, perhaps a version of the test could be administered simultaneously to a larger group with individual responses collected on paper or some form of electronic voting system. Such an approach could also work for a range of tests and applied to other industries, where the subject matter could be modified, but the underlying concept remained intact.

The research has identified that there is a statistically significant difference in servitization level within the SC when compared with the OC. It may be beneficial to perform additional research, perhaps with a larger sample group and using a more advanced method of assessing servitization level, to understand the reasons for this discrepancy and if this has any influence on the servitization process.

It has been mentioned that industry downturn appears to increase the likelihood for adversarial relationships, and the findings seem to suggest that cost cutting, and strict contract enforcement may be, at least in part, responsible for this. However, focusing on this financial and contractual aspect is warranted to identify the causal link between cost cutting, contractual enforcement and its impact on the servitization process. Furthermore, the acceptance of adversarial relationships by both SC and OC at the expense of servitization and value co-creation warrants further investigation.

Future game theory research could be conducted via researcher collaboration with practitioners. A servitizing company with a relatively large number of customers could offer two levels of new service value sharing with two separate groups of randomly allocated customers: low and high. The value created and volume of service activities could then be measured over time to identify the potential impact of different applied servitization strategies.

### **3.8 References**

Algaba, E., Fragnelli, V. and Sánchez-Soriano, J. (Eds.). (2019), *Handbook of the Shapley Value*, 1st ed., Chapman & Hall, Boca Raton.

Alvarado, V. and Manrique, E. (2010), "Enhanced Oil Recovery: An Update Review", *Energies*, Vol. 3 No. 9, pp. 1529–1575.

Åm, K. and Heiberg, S. (2014), "Public–private partnership for improved hydrocarbon recovery – Lessons from Norway’s major development programs", *Energy Strategy Reviews*, Vol. 3, pp. 30–48.

Andrews, D., Dmitrijeva, J., Bigdeli, A.Z. and Baines, T. (2018), "Snakes and Ladders in Servitization: Using a Game to Capture Inhibitors and Enablers of Transformation", *Research-Technology Management*, Vol. 61 No. 6, pp. 37–47.

Baines, T., Bigdeli, A.Z., Sousa, R. & Schroeder, A. 2020. Framing the servitization transformation process: A model to understand and facilitate the servitization journey. *International Journal of Production Economics*, 221, 107463, pp 1-16.

Baines, T. and Lightfoot, H. (2013), *Made to Serve*, 1st ed., John Wiley & Sons, Inc., Chichester, available at:<https://doi.org/10.1002/9781119207955>.

- Baines, T.S., Lightfoot, H.W., Benedettini, O. and Kay, J.M. (2009), "The servitization of manufacturing", *Journal of Manufacturing Technology Management*, Vol. 20 No. 5, pp. 547–567.
- Bandinelli, R. and Gamberi, V. (2011), "Servitization in oil and gas sector: outcomes of a case study research", *Journal of Manufacturing Technology Management*, Vol. 23 No. 1, pp. 87–102.
- Benedettini, O., Neely, A. and 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.
- Bentley, R.W. (2002), "Global oil & gas depletion: an overview", *Energy Policy*, Vol. 30 No. 3, pp. 189–205.
- Blake, R.R. and Mouton, J.S. (1961), "Reactions to Intergroup Competition under Win-Lose Conditions", *Management Science*, INFORMS, Vol. 7 No. 4, pp. 420–435.
- Brax, S. (2005), "A manufacturer becoming service provider – challenges and a paradox", edited by Gustafsson, A. *Managing Service Quality: An International Journal*, Vol. 15 No. 2, pp. 142–155.
- Brewer, J. and Hunter, A. (1989), *Multimethod Research: A Synthesis of Styles.*, 1st ed., Sage, Thousand Oaks.
- Bryman, A. (2012), *Social Research Methods*, 4th ed., Oxford University Press, Oxford.
- Bülow, A.M. and Kumar, R. (2011), "Culture and Negotiation", *International Negotiation*, Vol. 16 No. 3, pp. 349–359.
- Burton, J., Story, V.M., Raddats, C. and Zolkiewski, J. (2017), "Overcoming the challenges that hinder new service development by manufacturers with diverse services strategies", *International Journal of Production Economics*, Vol. 192 No. October 2017, pp. 29–39.
- Burton, J., Story, V., Zolkiewski, J., Raddats, C., Baines, T.S. and Medway, D (2016) " Identifying Tensions in the Servitized Value Chain", *Research-Technology Management*, Vol. 59, No. 5; pp. 38-47.
- Calleja, P. and Llerena, F. (2020), "Consistency, weak fairness, and the Shapley value", *Mathematical Social Sciences*, Vol. 105, pp. 28–33.
- Chatterjee, K. and Samuelson, W. (2014), *Game Theory and Business Applications*, 2nd ed., Springer, Boston.
- Corley, K.G. and Gioia, D.A. (2004), "Identity Ambiguity and Change in the Wake of a Corporate Spin-off", *Administrative Science Quarterly*, Vol. 49 No. 2, pp. 173–208.

- Creswell, J.W., Plano Clark, V.L., Gutmann, M., and Hanson, W. (2003), Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209–240). Thousand Oaks, CA: Sage.
- Crowley, E., Burton, J. and Zolkiewski, J. (2018), "Servitization intent as a factor in the servitization process", *Journal of Business & Industrial Marketing*, Vol. 33 Issue: 8, pp.1125-1140.
- Denzin, N.K. (1978), *The Research Act*, 1st ed., Aldine, Chicago.
- Dixit, A.K. and Nalebuff, B.J. (2010), *The Art of Strategy: A Game Theorist's Guide to Success in Business and Life*, 1st ed., W. W. Norton & Company, London.
- 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.
- Dyer, J.H. and Nobeoka, K. (2000), "Creating and Managing a High-Performance Knowledge-Sharing Network: The Toyota Case", *Strategic Management Journal*, Vol. 21 No. 3, pp. 345-367.
- Easterby-Smith, M., Horpe, R. and Jackson, P.R. (2012), *Management Research*, 4th ed., SAGE, London.
- Elkind, E. and Rothe, J. (2016), "Cooperative Game Theory", *Economics and Computation: An Introduction to Algorithmic Game Theory, Computational Social Choice, and Fair Division*, Springer, Berlin, Heidelberg, pp. 135–193.
- England, J. (2020), "Lower for Longer and the Risk of Oil and Gas Underinvestment", *Deloitte United States*, available at: <https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/lower-for-longer-risk-oil-gas-underinvestment.html> (accessed 2 March 2020).
- Fang, E. (Er), 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.
- Ferreira, F.N.H., Proença, J.F., Spencer, R. and Cova, B. (2013), "The transition from products to solutions: External business model fit and dynamics", *Industrial Marketing Management*, Vol. 42 No. 7, pp. 1093–1101.
- Finne, M. and Holmström, J. (2013) 'A manufacturer moving upstream: triadic collaboration for service delivery', *Supply Chain Management: An International Journal*, 18(1), pp. 21–33.
- Flick, U. (2009), *An Introduction to Qualitative Research*, 4th ed., SAGE, Los Angeles.

Galvin, R. (2015), "How many interviews are enough? Do qualitative interviews in building energy consumption research produce reliable knowledge?", *Journal of Building Engineering*, Vol. 1, pp. 2–12.

Gao, L. (2019), "Evolutionary game analysis of servitization transformation in manufacturing enterprises", presented at the 2019 5th International Conference on Green Power, Materials and Manufacturing Technology and Applications (GPMMTA 2019), Taiyuan, China, pp. 1–6.

Gebauer, H., Fleisch, E. and Friedli, T. (2005) "Overcoming the service paradox in manufacturing companies", *European Management Journal*, Vol. 23, No. 1, pp. 14–26.

Gebauer, H. and Kowalkowski, C. (2012), "Customer-focused and service-focused orientation in organizational structures", *Journal of Business & Industrial Marketing*, Vol. 27 No. 7, pp. 527–537.

Gioia, D.A., Corley, K.G. and Hamilton, A.L. (2013), "Seeking Qualitative Rigor in Inductive Research", *Organizational Research Methods*, Vol. 16 No. 1, pp. 15–31.

Gordon, G. G. (1991) 'Industry Determinants of Organizational Culture', *The Academy of Management Review*, 16(2), pp. 396–415.

Håkansson, H. and Ford, D. (2002) "How Should Companies Interact in Business Networks?", *Journal of Business Research*, Vol. 55, No. 2, pp. 133–139.

Håkansson, H. and Snehota, I. (eds.) (2017), *No Business Is An Island: Making Sense of the Interactive Business World*, Emerald Publishing Ltd., Bingley, UK

Hammoudi, A. (2018), *Game Theory Approach to Managerial Strategies and Value Creation*, 1st ed., Vol. 3, John Wiley and Sons Inc, Hoboken.

Harrison, R. L., Reilly, T. M. and Creswell, J. W. (2020) 'Methodological Rigor in Mixed Methods: An Application in Management Studies', *Journal of Mixed Methods Research*, 14(4), pp. 473–495

Hartwig, F.P., Smith, G.D., Schmidt, A.F., Sterne, J.A.C., Higgins, J.P.T. and Bowden, J. (2020), "The median and the mode as robust meta-analysis estimators in the presence of small-study effects and outliers", *Research Synthesis Methods*, Vol. 11 No. 3, pp. 397–412.

Haveman, H.A. (1993), "Follow the Leader: Mimetic Isomorphism and Entry Into New Markets", *Administrative Science Quarterly*, Vol. 38 No. 4, pp. 593–627.

Hezarkhani, B. (2017), "Optimal design of uptime-guarantee contracts under IGFR valuations and convex costs", *European Journal of Operational Research*, Vol. 256 No. 2, pp. 556–566.



Homburg, C., Hoyer, W.D. and Fassnacht, M. (2002), "Service Orientation of a Retailer's Business Strategy: Dimensions, Antecedents, and Performance Outcomes", *Journal of Marketing*, Vol. 66 No. 4, pp. 86–101.

Huikkola, T., Rabetino, R., Kohtamäki, M. and Gebauer, H. (2020) " Firm boundaries in servitization: Interplay and repositioning practices", *Industrial Marketing Management*, Vol. 90, pp. 90-105.

Johnson, R.B, Onwuegbuzie, A.J. and Turner, L.A. (2007), "Towards a definition of mixed methods research", *Journal of Mixed Methods Research*, Vol. 1, No.2, pp. 112-133.

Kamalaldin, A. Linde, L., Sjödin, D. and Parida, V. (2020) "Transforming provider-customer relationships in digital servitization: A relational view on digitalization", *Industrial Marketing Management*, Vol. 89, pp. 306-325.

Kamp, B. and Parry, G. (2017), "Servitization and advanced business services as levers for competitiveness", *Industrial Marketing Management*, Vol. 60, pp. 11–16.

Kemp, A.G. and Stephen, L. (1999), "Risk:reward sharing contracts in the oil industry: the effects of bonus:penalty schemes", *Energy Policy*, Vol. 27 No. 2, pp. 111–120.

Kesicki, F. (2010), "The third oil price surge - What's different this time?", *Energy Policy*, Vol. 38 No. 3, pp. 1596–1606.

King, Nigel., Horrocks, C. and Brooks, J. (2010), *Interviews in Qualitative Research*, 2nd ed., Sage Publications Ltd, Los Angeles.

Kohtamäki, M., Einola, S. and Rabetino, R. (2020), "Exploring servitization through the paradox lens: Coping practices in servitization", *International Journal of Production Economics*, Vol. 226, 107619, pp.1-15.

Kohtamäki, M., Parida, V., Oghazi, P., Gebauer, H. and Baines, T. (2019), "Digital servitization business models in ecosystems: A theory of the firm", *Journal of Business Research*, Vol. 104, pp. 380–392.

Koivisto, J. and Hamari, J. (2019), "The rise of motivational information systems: A review of gamification research", *International Journal of Information Management*, Vol. 45, pp. 191–210.

Korstjens, I. and Moser, A. (2017) 'Series: Practical guidance to qualitative research. Part 2: Context, research questions and designs', *European Journal of General Practice*, 23(1), pp. 274–279. doi: 10.1080/13814788.2017.1375090.

Kowalkowski, C., Gebauer, H., Kamp B. and Parry, G. (2017) "Servitization and deservitization: Overview, concepts, and definitions", *Industrial Marketing Management*, Vol. 60 (January), pp. 4-10.

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. 1, pp. 59–69.

Kremer, D., Seregini, M., Canepa, A., Zanetti, C. and Gusmeroli, S. (2016), "The Focus-activity Framework for Evaluating PSS Cooperation Readiness of Manufacturing Firms", *Procedia CIRP*, Vol. 47, pp. 132–137.

Kumar, R. and Markeset, T. (2007), "Development of performance-based service strategies for the oil and gas industry: a case study", *Journal of Business & Industrial Marketing*, Vol. 22 No. 4, pp. 272–280.

Lee, S., Yoo, S. and Kim, D. (2016), "When is servitization a profitable competitive strategy?", *International Journal of Production Economics*, Vol. 173, pp. 43–53.

Lenka, S., Parida, V., Sjödin, D.R. and Wincent, J. (2018), "Towards a multi-level servitization framework", *International Journal of Operations & Production Management*, Vol. 38 No. 3, pp. 810–827.

Lexutt, E. (2020), "Different roads to servitization success – A configurational analysis of financial and non-financial service performance", *Industrial Marketing Management*, Vol., 84, pp.105-125.

Lima, B.B. de, Câmara, S.F., Mota, T.L.N. da G., Silva, A.L. e and Padilha, P. (2018), "Management of Innovation Networks: a choice for collaboration considering the game theory", *Business and Management Studies*, Vol. 4 No. 2, p. 24.

Lusch, R. F. and Nambisan, S. (2015) 'Service Innovation: A Service-Dominant Logic Perspective', *MIS Quarterly*, 39(1), pp. 155–175.

Ma R., Feng C., Jiang L. (2020) "Evolutionary Game Analysis of Service Outsourcing Strategy for Manufacturing Enterprises Based on Servitization", In: Zhang J., Dresner M., Zhang R., Hua G., Shang X. (eds) *LISS2019*. Springer, Singapore. [https://doi.org/10.1007/978-981-15-5682-1\\_19](https://doi.org/10.1007/978-981-15-5682-1_19)

Martínez-Ferrero, J. and García-Sánchez, I.-M. (2017), "Coercive, normative and mimetic isomorphism as determinants of the voluntary assurance of sustainability reports", *International Business Review*, Vol. 26 No. 1, pp. 102–118.

Miller, G. E. (2004) 'Frontier Masculinity in the Oil Industry: The Experience of Women Engineers', *Gender, Work & Organization*, 11(1), pp. 47–73.

- "Mission, Vision, Values". (2020), *Halliburton*, available at: <https://www.halliburton.com/en-US/about-us/corporate-profile/mission-vision-values.html?node-id=ijzrw073> (accessed 5 November 2020).
- Morgan, R.M. and Hunt, S.D. (1994), "The Commitment-Trust Theory Of Relationship Marketing", *Journal of Marketing*, Vol. 58 (July 1994), pp. 20 -38.
- Murphy, M.K., Black, N.A., Lamping, D.L., McKee, C.M., Sanderson, C.F., Askham, J. and Marteau, T. (1998), "Consensus development methods, and their use in clinical guideline development.", *Health Technology Assessment*, Vol. 2 No. 3, pp. 1-88.
- Ng, I., Parry, G., Smith, L., Maull, R. and Briscoe, G. (2012), "Transitioning from a goods-dominant to a service-dominant logic: Visualising the value proposition of Rolls-Royce", *Journal of Service Management*, Vol. 23 No. 3, pp. 416-439.
- Opresnik, D. and Taisch, M. (2015) 'The value of Big Data in servitization', *International Journal of Production Economics*, 165, pp. 174-184.
- Parra, F. (2004), *Oil Politics - A Modern History of Petroleum*, Vol. 25, L. B. Tauris & Co. Ltd., New York, available at:<https://doi.org/10.2307/41323035>.
- Peillon, S. and Dubruc, N. (2019), "Barriers to digital servitization in French manufacturing SMEs", *Procedia CIRP*, Vol. 83, pp. 146-150.
- Peleckis, K. (2015), "The Use of Game Theory for Making Rational Decisions in Business Negotiations: A Conceptual Model", *Entrepreneurial Business and Economics Review*, Vol. 3 No. 4, pp. 105-121.
- Peleg, B. and Sudhölter, P. (2007), *Introduction to the Theory of Cooperative Games*, 2nd ed., Springer, Berlin, available at:<https://doi.org/10.1007/978-3-540-72945-7>.
- Polova, O. and Thomas, C. (2020) 'How to perform collaborative servitization innovation projects: the role of servitization maturity', *Industrial Marketing Management*, 90, pp. 231-251.
- Raddats, C., Burton, J. and Ashman, R. (2015), "Resource configurations for services success in manufacturing companies", *Journal of Service Management*, Vol. 26 No. 1, pp. 97-116.
- Raddats, C., Burton, J., Zolkiewski, J. and Story, V. (2018), "Overcoming the Challenges of Servitisation: Aligning Responses to Service Strategy", *Practices and Tools for Servitization*, Springer International Publishing, Cham, pp. 171-184.
- Raddats, C. and Kowalkowski, C. (2014) "rategies", *Journal of Business-to-Business Marketing*, Vol. 21, No. 1, pp. 19-34.

Raddats, C., Kowalkowski, C., Benedettini, O., Burton, J. and Gebauer, H. (2019), "Servitization: A contemporary thematic review of four major research streams", *Industrial Marketing Management*, Vol. 83, pp. 207–223.

Raddats, C., Zolkiewski, J., Story, V. M., Burton, J., Baines, T. and Ziaee Bigdeli, A. (2017) 'Interactively developed capabilities: evidence from dyadic servitization relationships', *International Journal of Operations & Production Management*, 37(3), pp. 382–400.

Reim, W., Sjödin, D.R. and Parida, V. (2019) "Servitization of global service network actors—A contingency framework for matching challenges and strategies in service transition", *Journal of Business Research*, 104, pp.461-471.

Ross, D. (2019), "Game Theory", *The Stanford Encyclopedia of Philosophy*, Metaphysics Research Lab, Stanford University.

Ruiz-Alba, J. L., Soares, A., Rodríguez-Molina, M. A. and Frías-Jamilena, D. M. (2019) 'Servitization strategies from customers' perspective: the moderating role of co-creation', *Journal of Business & Industrial Marketing*, 34(3), pp. 628–642.

Salacuse, J.W. (1998), "Ten Ways that Culture Affects Negotiating Style: Some Survey Results", *Negotiation Journal*, Vol. 14 No. 3, pp. 221–240.

Salonen, A., Saglam, O. and Hacklin, F. (2017), "Servitization as reinforcement, not transformation", *Journal of Service Management*, Vol. 28, reim No. 4, pp. 662–686.

Shapley, L.S. (1953), "A value for n-person games", *Contributions to the Theory of Games II*, 1st ed., Princeton University Press, Princeton, pp. 307–317.

Shi, V.G., Baines, T., Baldwin, J., Ridgway, K., Petridis, P., Bigdeli, A.Z., Uren, V., et al. (2017), "Using gamification to transform the adoption of servitization", *Industrial Marketing Management*, Vol. 63, pp. 82–91.

Shi, V.G., Baldwin, J., Ridgway, K. and Scott, R. (2013), "Gamification for servitization a conceptual paper", *Frameworks and Analysis*, p. 114.

Sklyar, A., Kowalkowski, C., Tronvoll, B. and Sörhammar, D. (2019) 'Organizing for digital servitization: A service ecosystem perspective', *Journal of Business Research*, 104, pp. 450–460.

Story, V.M., Raddats, C., Burton, J., Zolkiewski, J. and Baines, T. (2017), "Capabilities for advanced services: A multi-actor perspective", *Industrial Marketing Management*, Vol. 60 No. May, pp. 54–68.

Story, V., Zolkiewski, J., Verleye, K., Nazifi, A., Hannibal, C., Grimes, A. and Abboud, L. (2020) 'Stepping out of the shadows: Supporting actors' strategies

for managing end-user experiences in service ecosystems', *Journal of Business Research*, 116, pp. 401–411.

Süße, T. and Wilkens, U. (2014), "Preparing Individuals for the Demands of PSS Work Environments through a Game-based Community Approach – Design and Evaluation of a Learning Scenario", *Procedia CIRP*, Vol. 16, pp. 271–276.

Tadelis, S. (2013), *Game Theory: An Introduction*, 1st ed., Princeton University Press, Oxford.

Tronvoll, B., Sklyar, A., Sörhammar, D. and Kowalkowski, C. (2020), "Transformational shifts through digital servitization", *Industrial Marketing Management*, Vol. 89, pp. 293–305.

Uлага, W. and Reinartz, W.J. (2011), "Hybrid Offerings: How Manufacturing Firms Combine Goods and Services Successfully", *Journal of Marketing*, Vol. 75 No. 6, pp. 5–23.

Valtakoski, A. (2017) "Explaining servitization failure and deservitization: A knowledge-based perspective", *Industrial Marketing Management*, Vol. 60, January, pp. 138-150.

Welbers, K., Konijn, E.A., Burgers, C., de Vaate, A.B., Eden, A. and Brugman, B.C. (2019), "Gamification as a tool for engaging student learning: A field experiment with a gamified app", *E-Learning and Digital Media*, Vol. 16 No. 2, pp. 92–109.

"Who We Are". (2020), *Schlumberger*, available at: <https://www.slb.com/who-we-are> (accessed 11 April 2020).

Winter, E. (2002), "The shapley value", *Handbook of Game Theory with Economic Applications*, Vol. 3, Elsevier, London, pp. 2025–2054.

Zhong, H. (2014), "Game analysis of product-service integration", *Journal of Industrial Engineering and Management*, Vol. 7 No. 5, pp. 1447–1467.

Zitha, P., Felder, R., Zornes, D., Brown, K. and Mohanty, K. (2008), "Increasing Hydrocarbon Recovery Factors", *Society of Petroleum Engineers*, pp. 1–9.

### 3.9 Appendix 1

Theme	Sub-theme	Description
Oilfield dilemma discussion	The level of awareness of both personal and organisational attitudes to servitization.	
	Offer reward in Ideal World	Expectation of a reward in an ideal world scenario and what is a fair reward
	Offer reward in Real World	Expectation of a reward in a real-world scenario and what is a realistic reward
	Offer Tool	Attitudes of SC and OC to win-lose relationships and if these relationships are common within the setting
	Long term relationship	How the intention to maintain long term relationships influences business decisions
	Expected service	How the expectation of service is expressed as a business differentiator
	Contractual or procurement block	The impact of contractual or procurement restrictions on the ability to participate in a win-win scenario
Servitization Level	Perceptions of levels of servitization	
	Level	Servitization level of different organisations and what constitutes the level
	High servitization = increased chance of win/win	Advanced levels of servitization and its contribution to a win/win culture.
	Low servitization = reduced chance of win/win	Base levels of servitization and its influence on a win/win culture
	Contracts and procurement	Contracts and procurement procedures removing the ability to form close relationships with their business partners
Servitization Application	How servitization impacts the health of a business	
	Opportunities lost due to lack of servitization	Lost/sacrificed servitization opportunities
	Awareness of opportunities lost due to lack of servitization	Awareness of lost servitization opportunities

Theme	Sub-theme	Description
	Power	Interorganisational power and its impact on servitization and/or cooperation strategy.
	Organisation size	How the size of the organisation, with respect to its counterparts or irrespective of its counterparts' size impact servitization
	Culture	How organisational culture impacts servitization
	Fading service levels	Impact of diminishing levels of service on the business relationship and the servitization process
	Inter-organisational administration block	Barriers to servitization caused by the rigidity of intracompany administration
Antecedent Factors	Antecedents to servitization	
	Culture	Culture in the context of personal attitudes to relationships
	Industry downturn and environment	Impact of wider environmental factors on the servitization process
	Trend	Trends with respect to servitization and relationship type
	Revenue and budget driven	Impact of resource availability on the application of servitization
	Management Commitment	Differences in managerial intent, e.g., where senior managers appear to be more committed to servitization than less senior managers
	Internal administration block	Business practices of organisations which restrict the implementation of servitization
Servitization as a solution	Perceptions of different levels of servitization	
	Increasing servitization = win/win	How increasing servitization results in a win/win outcome
	Increasing servitization ≠ win/win	How increasing servitization does not result in a win/win outcome
	Decreasing servitization = win/win	How decreasing servitization results in an increased possibility of a win/win outcome
	Decreasing servitization ≠ win/win	How decreasing servitization decreases the possibility of a win/win outcome
East/West divide		Differences between Eastern and Western cultures

<b>Theme</b>	<b>Sub-theme</b>	<b>Description</b>
Short term planning		Management commitment not being forward looking enough to see a servitization plan through to fruition



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#### 4 Paper 3: Trust, Distrust and the Servitization Paradox

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The following paper has been submitted to International Journal of Operations & Production Management

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The paper was created from an earlier conference paper:

Wagstaff, S., Burton, J. and Zolkiewski, J. (2021b) 'Trust, Distrust and the Servitization Paradox', in. *Manchester Doctoral Conference*, Manchester, UK.

# Trust, Distrust and the Servitization Paradox

## 4.1 Abstract

**Purpose** – The antecedents of the servitization paradox have not been widely explored. This research focuses on the influence that trust and distrust have on efforts to transition to advanced levels of servitization and how they relate to the servitization paradox. It also focuses the perspective of both the service provider and service user, thereby providing insight into the dynamics surrounding the servitization paradox.

**Design/methodology/approach** – Research was undertaken in the oil industry by combining elements of three separate studies, comprising: industry wide surveys, interviews and a focused ethnographic case study, in a mixed method approach.

**Findings** – This research has indicated that high levels of distrust are incompatible with an organisation's journey to advanced servitization, suggesting that an organisation wishing to avoid the servitization paradox should first abandon the intermediate operational advantages of distrust. The performance of an organisation, changing from high distrust to low distrust, is likely to deteriorate until the advantages of servitization can supersede the shortfalls.

**Originality/value** – This research adds to the current understanding of servitization barriers and provides an explanation for the mechanism which drives the servitization paradox. This insight may enable practitioners to better understand the complexities of the servitization journey. The findings suggest that an entire network, and not just a single organisation, must be willing to reduce distrust for the duration of the potentially lengthy and difficult transition to advanced levels of servitization.

**Keywords:** Servitization, Trust, Distrust, Ethnography, Paradox, Mixed-Methods, Networks

**Paper type:** Research paper

**Funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## 4.2 Introduction

Servitization remains a growing area of interest as a mechanism for businesses to create new revenue streams, access untapped opportunities and to secure existing business (Kohtamäki *et al.*, 2021). Traditionally, servitization was seen as a process where a manufacturer linearly transformed from a product-centric to a service-centric organisation (Baines *et al.*, 2020). Significant investment of time and financial resources are required to implement servitization, and failure of the servitization process is therefore costly and may place the organisation at a disadvantage compared to its servitized peers (Valtakoski, 2017). Recently, however, it has been proposed that instead of these organisations undertaking a dichotomous ‘either-or’ transition, they must use a hybrid (Burton *et al.*, 2017) ‘both-and’ philosophy (Kohtamäki, Einola and Rabetino, 2020). Many organisations fail to reconcile this paradox (Windahl and Lakemond, 2010) which can lead to a partial or complete failure of the servitization process, referred to as the servitization paradox (Brax, 2005).

Extant research into the servitization paradox currently focuses on intracompany factors such as tensions (Oliva and Kallenberg, 2003; Kohtamäki, Einola and Rabetino, 2020). In contrast, this research extends the current theory by investigating the effect that intercompany trust and/or distrust has on the servitization paradox. It is argued that trust between organisations is a critical component of servitization (Baines and Lightfoot, 2013; Annarelli, Battistella and Nonino, 2019; Palo, Åkesson and Löfberg, 2019). However, this literature generally fails to explicitly distinguish between trust and distrust which are separate entities and not two extremes of the same unidimensional continuum (Deutsch, 1958; Rotter, 1967; Lewicki, McAllister and Bies, 1998). Counterintuitively, it has been argued that high levels of distrust have several advantages in business relationships (Cook, Hardin and Levi, 2009) which are: caution, scepticism, vigilance, misplaced trust, complexity and naivety (Lewicki, McAllister and Bies, 1998; Vlaar, Van den Bosch and Volberda, 2007; Lee and Lee, 2018). However, this research shows that high levels of distrust can hinder the development of servitization.

Consequently, an organisation wishing to progress to an advanced servitization level may need to first forgo the advantages associated with high distrust. This research extends servitization theory by explicitly including relational dynamics related to the interplay between trust and distrust as manufacturers integrate more services into their portfolio of offerings. It illustrates that these dynamics have a significant influence on the levels of servitization that can be achieved and gives additional insight into dynamics that drive the servitization paradox.

In order to investigate the effect that trust and distrust have on servitization, a mixed method approach was used. The method included surveys, interviews and a focused ethnographic case study. The focus of the ethnographic case study was a national oil company in the Middle East. The industry surveys and interviews used a broader sample, using different manufacturers and customers from many global locations to increase the depth of understanding and increase the generalisability of the findings.

### **4.3 Literature Review**

#### **4.3.1 Servitization**

Servitization is often referred to as a transformation process where an organisation or network of organizations (Ferreira *et al.*, 2013; Story *et al.*, 2017) transition from a product-centric to a service-centric strategy (Raddats and Burton, 2011; Ng *et al.*, 2012; Kowalkowski *et al.*, 2017; Lexutt, 2020). An example of servitization is provided by the Goodyear Tire Company which traditionally sold tyres to individuals and commercial transport fleets. However, Goodyear has created the Total Mobility Service (Goodyear *Total Mobility*, 2015), a service which monitors tyre use on behalf of their commercial transport customers and proactively repairs or replaces tyres before catastrophic failure. This service provides Goodyear with an additional revenue stream from these services and, by extending tyre life, minimising downtime and reducing fleet operating costs for their customers. Although servitization is generally viewed from the manufacturer's perspective, and this asymmetry is reflected in much of the available literature, recent literature has

recognised that for servitization to succeed, customers must play a critical role as the active recipient of these services (Raddats *et al.*, 2019). Simply stated, an offered service will only succeed if the customer sees value and is willing to engage in, and pay for, this service.

The application of servitization is of significant interest to many organizations (Ruiz-Alba *et al.*, 2019) given the potential additional revenue streams (Strähle, Fülleman and Bendig, 2012) and the increased competitive advantages it offers (Gebauer, Friedli and Fleisch, 2006; Raddats, Burton and Ashman, 2015). However, it must be acknowledged that the transformation from supplying products to customised services can be difficult (Iriarte *et al.*, 2018), prolonged (Baines *et al.*, 2020) and prone to failure (Valtakoski, 2017). Thus, critical to the success of servitization, is a well-defined strategy or plan (Raddats *et al.*, 2018) which is generally absent in one or both of customer and manufacturing organisations (Kumar and Markeset, 2007; Bandinelli and Gamberi, 2011; Wagstaff, Burton and Zolkiewski, 2020c).

It is a common business axiom that “you can’t manage what you don’t measure”. There are arguments about the validity of this statement (Deming, 2011; Ryan, 2014), which state that improvements can be made without measuring, or there are improvements which cannot be measured. However, Drucker’s statement is generally regarded as a truism; therefore, we can assume that if continued management support is needed, some form of servitization measurement is desirable to justify the initial and continued investment. As well as internally measuring servitization progress organisations may find value in gauging their progress against their customers and competition in the industry sector in which they operate (Kohtamäki *et al.*, 2018). Several methods of servitization level measurement rely upon a single element such as Fang, Palmatier and Steenkamp (2008) who use service revenue or Homburg, Hoyer and Fassnacht (2002) who use the number of services to determine servitization level (Wagstaff, Burton and Judy Zolkiewski, 2021a).

In contrast to the single element methods above, the meta-analysis performed by Liu, Zhang and Gao (2020) conclude that multi-dimensional and non-financial servitization measurement tools are preferable when assessing servitization levels in large organisations. For example, Adrodegari and Saccani (2020) use as many as 85 measurement categories to determine servitization level. In contrast, Baines and Lightfoot (2013) produced a scale which gives three distinct levels of servitization; Base, Intermediate and Advanced, see Table 13 below. Maheepala *et al.*, (2018) later created a complimentary tool to measure servitization level in 10 categories. Any of these tools could provide a value for an organisation's servitization level and how they compare to their peers but require significantly different levels of resources and access to potentially confidential information to make these determinations.

#### **4.3.2 The Servitization Paradox**

Initial theories of servitization assumed that an organisation or network transitioned linearly from a goods-dominant logic to a service-dominant logic (Oliva and Kallenberg, 2003; Lütjen, Tietze and Schultz, 2017; Baines *et al.*, 2020). However, scholars and organisations wishing to develop servitization have come to understand that organisations are not undertaking a linear transition from manufacturer to service company (Kohtamäki, Einola and Rabetino, 2020), as described in classic organisation theory (Jay, 2013), but instead must use the lens of paradox theory to apply a paradoxical 'both-and' philosophy (Kohtamäki, Einola and Rabetino, 2020). Smith and Lewis (2011, p. 386) define a paradox as "contradictory yet interrelated elements that exist simultaneously and persist over time". The need for a goods-dominant logic and service-dominant logic to exist simultaneously within an organisation or network of organisations are two such contradictory elements which create this servitization paradox (Kohtamäki *et al.*, 2018). Many organisations fail to reconcile the servitization paradox (Davies, Brady and Hobday, 2006; Windahl and Lakemond, 2010) which can lead to deservitization, a temporary, cyclic or permanent process of reversal, stagnation or complete failure of the servitization process (Brax, 2005; Gebauer, Fleisch and Friedli, 2005; Kastalli

and Van Looy, 2013; Johnstone, Wilkinson and Dainty, 2014; Kowalkowski *et al.*, 2017; Valtakoski, 2017).

The servitization paradox requires further study due its potential to delay or reverse the application of servitization (Smith, 2014). Further study is required to ascertain what actions or coping mechanisms could be employed by an organisation to influence the likelihood of successful servitization or deservitization (Rabetino *et al.*, 2018). Failure of an organisation to understand and formulate strategies which take into account the servitization paradox will impede the transition to servitization and increase the risk of deservitization (Burton *et al.*, 2017; Kohtamäki, Einola and Rabetino, 2020). Thus, additional study into the servitization paradox is required to give insight into how to increase the likelihood of successful servitization and if this is the best course of action for an organisation or network (Rabetino *et al.*, 2018).

#### **4.3.3 Trust and Distrust**

The discussion and conceptualization of trust in business relationships provokes a great deal of debate, (e.g., Morgan and Hunt, 1994), the relationship between trust and distrust, likewise, garners attention (Blois, 1999; MacDuffie, 2011). Trust between manufacturers and their customers is recognized as a critical element in servitization (Baines and Lightfoot, 2013; Kohtamäki *et al.*, 2018; Annarelli, Battistella and Nonino, 2019; Palo, Åkesson and Löfberg, 2019). However, the servitization literature does not provide a precise definition of trust and distrust, as separate entities. It is important to clarify that the absence of trust or low levels of trust are different from distrust (Lewicki, McAllister and Bies, 1998; Guo, Lumineau and Lewicki, 2017). Both trust and distrust simplify, contain and manage social uncertainty and complexity in interactions (Luhmann, 1979; Lewicki, McAllister and Bies, 1998), but do so by different mechanisms. Traditional thinking has considered trust and distrust to be two extremes of the same unidimensional continuum (Deutsch, 1958; Rotter, 1967; Lewicki, McAllister and Bies, 1998). However, this has been challenged, by the view that trust and distrust are distinct elements that can coexist simultaneously (Lewicki, McAllister and Bies, 1998).



Somewhat counterintuitively, misplaced trust can have dysfunctional consequences (Scheer, 2012) and distrust can be beneficial in a business relationship (Cook, Hardin and Levi, 2009) as it promotes; caution, scepticism, vigilance and guards against misplaced trust, complexity and naivety (Lewicki, McAllister and Bies, 1998; Vlaar, Van den Bosch and Volberda, 2007; Lee and Lee, 2018). Vlaar, Van den Bosch and Volberda (2007, p. 410) confirm this finding, stating that “partners may cultivate trust and distrust at the same time so as to reap the benefits from both and to compensate for the weaknesses associated with each of them individually”.

There are many interpretations of trust, which are complicated by everyday use and heterogeneous technical definitions of these terms (Kramer, 1999). To add to this complexity, the use of trust is contextual and related to the subject matter. Therefore, trust can be treated as a homonym, where it can mean to rely upon, the expectation of goodwill, or a combination of the two. Blois (1999) argues that both of these elements, reliance (or competence) and goodwill are required for trust to exist, stating that “it is possible to rely where we specifically do not trust”, even in situation where we believe the other party is competent. (Blois, 1999, p. 199). Hence, the definition of trust involves the expectation of competence with beneficial conduct and distrust is the expectation of competence or incompetence with injurious conduct (Luhmann, 1979; Lewicki, McAllister and Bies, 1998). A comparison between high and low trust and high and low distrust are presented in Figure II below and provides a graphical explanation of these terms.

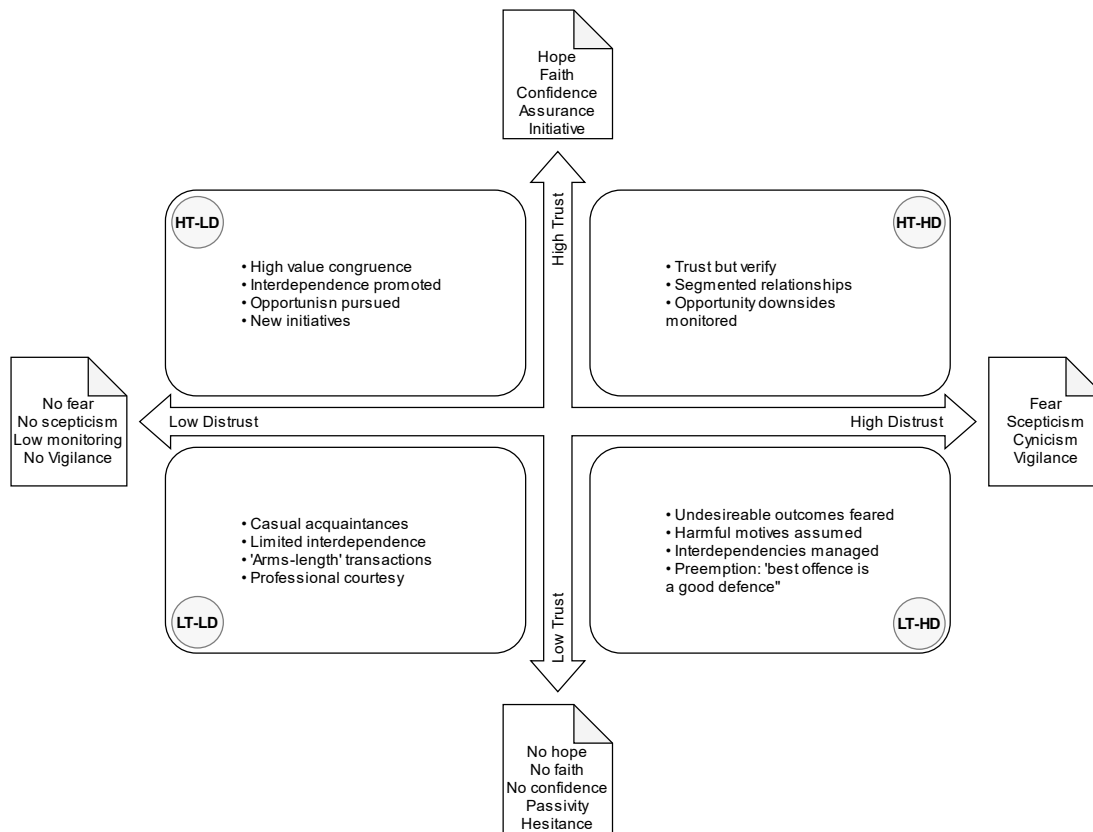


Figure II: Integrating trust and distrust, adapted from Lewicki, Elgoibar and Euwema (2016, p. 99)

As previously stated, the servitization literature (Baines and Lightfoot, 2013; Kohtamäki *et al.*, 2018; Annarelli, Battistella and Nonino, 2019; Palo, Åkesson and Löfberg, 2019) discusses trust, but does not explicitly state if it is discussing high or low levels of trust or distrust. This suggests that research into how different levels of trust/distrust influence on the transition to servitization is needed. An analysis of the literature suggests that the reference to 'trust' discussed in the above which is required for advanced servitization is actually referring to a condition of high trust and low distrust. This conclusion was drawn by analysing the specific virtues of trust described in these articles and matching them to the quadrant in Figure II. Hence, the following research questions have been developed:

Q1: Does the level of trust influence the level of servitization?, and, if so, how?

Q2: Does the level of distrust influence the level of servitization?, and, if so, how?

Q3: Do the level(s) of trust and distrust relate to the servitization paradox?

#### **4.4 Methodology**

The oil industry was selected to perform this research as it has unsuccessfully attempted to progress to an advanced level of servitization for many years.

Thus, this industry provides an ideal candidate to examine if intercompany trust and distrust are factors influencing this servitization paradox.

Furthermore, the oil industry is one in which servitization remains relatively under-researched (Bandinelli and Gamberi, 2011), and operates in complex customer and manufacturer networks so provides a good context to explore the research questions. In the oil industry the manufacturers are referred to as Service Companies as they provide the hardware and, in some instances, the technical support to Operators to enable them to produce the oil reservoirs. The customers are referred to as the Operators as they operate the oil reservoir in question and have the primary contract with the government to produce the oil or gas.

A mixed method approach was used which takes advantage of the benefits of both qualitative and quantitative techniques. Using multiple techniques allows the researcher to benefit from the increased insight, scope and depth each technique brings (Flick, 2009). By combining each technique using triangulation (Denzin, 1978) confidence in the research is increased (Bryman, 2004) and is more comprehensive (King and Horrocks, 2010) and we also compensate for the weaknesses of each individual method by the use of these complimentary techniques (Brewer and Hunter, 1989) and corroboration of data (Johnson, Onwuegbuzie and Turner, 2007). This research looked at both the manufacturers' and customers' perspectives to understand the relationship between trust, distrust and servitization from each perspective. Three separate and independent phases were performed over three years and have been combined for the purposes of this research:

**Phase 1** concluded in 2019 and used semi-structured interviews, to investigate servitization levels within the oil industry for both manufacturers and customers on a qualitative level.

**Phase 2** concluded in 2020 and used a combination of semi-structured interviews and a separate pilot survey to investigate servitization levels within the oil industry for both manufacturers and customers.

**Phase 3** concluded in 2021 and combined a comprehensive servitization level survey, a trust and distrust survey and an ethnographic study to specifically investigate trust and distrust within the oil industry for both manufacturers and customers. This was an insider ethnography allowing the research to be undertaken over the relatively short period of six months (Bryman, 2012).

The phases above formed a logical progression, phase 1 identified the servitization levels through a panel of experts within the oil industry. Then phase 2 used a second set of interviews and a pilot survey to confirm these findings within a more diverse group of oil industry employees within the professional network of one of the researchers/authors. Finally, phase 3 sought to see if there was a link between servitization level and trust and distrust using a focused ethnography and survey samples recruited via one of the author's LinkedIn network.

Multiple phases using different, but complimentary, research methods were used to provide a robust foundation of research, building upon the strengths and compensating for the faults of each method (Brewer and Hunter, 1989). The methods and timeline are discussed further in the following sections and are summarised in Figure 12 below.

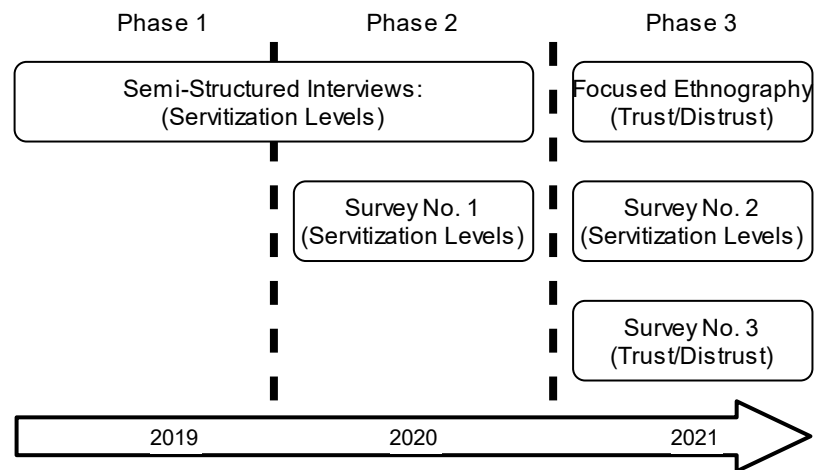


Figure 12: Combination of 3 Research Phases

#### 4.4.1 Semi-Structured Interviews to Determine Servitization Level

Semi-structured interviews were carried out to investigate servitization level within the target industry. The interviews were performed in two separate phases with two separate groups, the first in 2019 and the second in 2020. The results were combined and are included in this research. In each instance, the groups researched were selected from experienced oil industry professionals from diverse management levels, company types and with different geographic experiences. They had experience in the following locations: Europe, North and South America, the Middle East, Asia and Australasia. A summary of the groups is provided in Table 12 below.

	n	Age Range	Median Age	Oil Experience Range	Median Oil Experience Range
Phase 1	12	28-50	42.5	5-30	16.5
Phase 2	13	25-51	48.0	12-39	23.0
Combined	25	25-51	45.0	5-39	19.0

Table 12: Servitization Level Interviews Demographics, Phase 1 and 2

There are several potential methods which could have been used for determining servitization level. The scale used by Baines and Lightfoot (2013) was selected which uses several factors, listed in Table 13 below. During the pilot interviews it was confirmed that the descriptions used in Table 13 were phrased using language which was familiar to the interviewees and in common usage within the oil industry, therefore this was adopted in the research.

Type	Defined by	Organizational stretch	Examples of services offered
Base services	An outcome focused on product provision	Based on the execution of production competence (i.e. we know how to build it)	Product/equipment provision, spare part provision, warranty
Intermediate services	An outcome focused on maintenance of product condition	Based on exploitation of production competences to also maintain the condition of products (i.e. because we know how to build it, we know how to repair it)	Scheduled maintenance, technical help desk, repair, overhaul, delivery to site, installation, operator training, operator certification, condition monitoring, in-field service
Advanced services	An outcome focused on capability delivered through performance of the product	Based on translation of production competences to also manage the product's performance (i.e. because we know how to build it, we know how to keep it operational)	Customer support agreement, risk and reward sharing contract, revenue-through-use contract, rental agreement

Table 13: Categorisation of product services, adapted from Baines and Lightfoot (2013, p. 66)

This phase of research used a systematic combining method (Dubois and Gadde, 2002) and interview sessions were held individually in the office of the interviewee or using a video communication software such as Zoom or Microsoft Teams, due to the ongoing COVID-19 global pandemic guidelines (World Health Organization, 2020). The duration of each interview was approximately one hour and these were later transcribed for entry into the NVivo qualitative analysis software package. The systematic combining process eventually produced 10 themes and 17 sub-themes when phase 1 and phase 2 were combined, and are summarised in Table 14 below.

	Theme	Sub-Theme
Phase 1 Interviews	Attitude to Servitization	
	Level of Servitization	Base
		Intermediate
		Advanced
		Cyclic
	Future of Servitization	Challenges
		Decreasing
		Increasing
		Driver – Internal
		Driver – External
Driver – Other		
Level Compared to Peers		
Uniformity of Servitization Within their Organization		

Phase 2 Interviews	Measurement Matrix	
	Level of Servitization	Base
		Intermediate
		Advanced
	Higher Servitization = win/win	Agree
		Disagree
	Lower servitization = win/win	Agree
		Disagree
Influence of outside agencies		

Table 14: Summary of Thematic Analysis for Phase 1 and Phase 2

The systematic combining process uses abductive reasoning and allows the researcher to refine and improve the thematic analysis during the research process, moving between theory and the real-world (King and Brooks, 2018). In systematic combining, the data drives the research direction, within the original scope and parameters of the research objectives (King and Horrocks, 2010), allowing investigation of unforeseen, but relevant, themes as they emerge.

#### 4.4.2 Servitization Level Survey

The pilot survey conducted during Phase 2 was provided to a study group of 48 participants and all 48 were returned complete and are included in the findings section of this paper. The purpose of this survey was to compliment the interviews already discussed in the previous section. All subjects were asked to identify the servitization level of the organisation they currently worked for. The value was based on a scale of 0 to 10, with 0 being base level 10 being advanced level, this is shown in Figure 13 below.

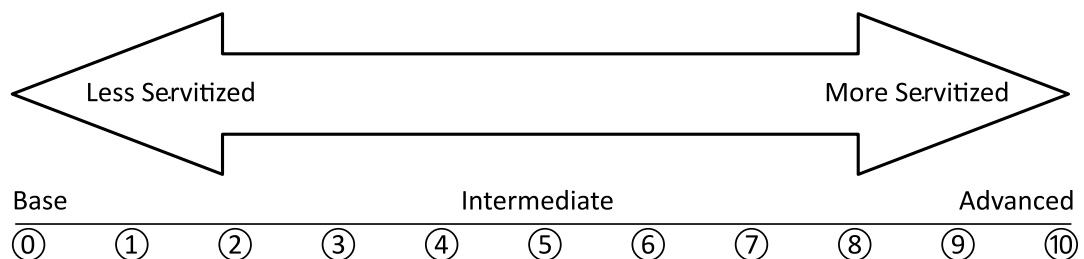


Figure 13: Servitization Scale 0-10

The assessment of servitization level was based upon the criteria created by Baines and Lightfoot (2013) which identifies three levels, base, intermediate and advanced. Subjects were first presented with Table 13 above and provided

with a brief explanation of the concept of servitization, where required. They were then presented with the scale similar to Figure 13 above showing the location of base, intermediate and advanced servitization levels to allow them to calibrate the model. Subjects were then asked to provide the corresponding value based on their experience of their current employer and their servitization relationship with their business counterparts.

In order to confirm the above analysis an additional survey was issued in phase 3 via direct email communication to 2155 employees of SC and OC. The groups represented the four major service companies in the Middle East; Schlumberger, Halliburton, Baker and Weatherford. The Operators represented the national oil company of the UAE and an international operator in Qatar. The survey provided a brief explanation of the subject and used the voting button feature of Outlook to automatically record and report the value of the servitization level (see Figure 13).

#### **4.4.3 Trust and Distrust Focused Ethnography**

Ethnography has made a major contribution to the study of corporations, large organizations and governments, which have traditionally relied exclusively upon quantitative data (Hepsø, 2012). The definition of an ethnography is given by Brewer (2004, p. 10) as:

*The study of people in naturally occurring settings or 'fields' by means of methods which capture their social meanings and ordinary activities, involving the researcher participating directly in the setting, if not also the activities, in order to collect data in a systematic manner but without meaning being imposed on them externally.*

A focused ethnographic case study combines a focused ethnography and a case study allowing the researcher to investigate causality in ethnographic observations, which can be problematic in observation-only ethnographies (Timmermans and Tavory, 2007).



A focused ethnography, also known as a micro or mini ethnography (Wolcott, 1990), is a type of ethnography which focuses on a specific theme within a defined group (Bryman, 2012). Unlike a conventional ethnography which may last for many months or even years (Bryman, 2012). It is possible to perform a focused ethnography in a familiar field reducing, or eliminating the cultural immersion time normally required (Thomas, 2013). Thus, the focused ethnography can be conducted from as little as two weeks to several months (Boyle, 1994; Muecke, 1994; Weinstein and Ventres, 2000; Bryman, 2012), and is well suited to hybrid or mixed research methods, such as those employed in this paper (Wolcott, 1990).

The ethnography consisted of direct observation, a reflective journal, informal conversations, semi-structured interviews, and collection of publicly available company literature (Brewer, 2004; Gordon, 2011) conducted over four months within a national oil company in the Middle East. The research was undertaken by an author of this paper who was an employee of this company and the research can, therefore, be classified as an insider ethnography where the observer is an “overt full member of the group” (Bryman, 2012, p. 434). An insider ethnography is a form of ethnographic research undertaken in the researcher’s ‘home’ environment. The goal of the ethnography researcher is to become an insider and understand the research with an insiders' perspective (O’Reilly, 2009a). It, therefore, follows that the best way to achieve this goal is for the researcher to become, or already be an ‘insider’. An insider ethnography, therefore, allows the researcher to take advantage of emic subtleties of a given observation which may go unnoticed by the outside observer (Easterby-Smith, Thorpe and Jackson, 2012). O’Reilly (2009a) also argues that inside ethnographers blend seamlessly into the environment and are better positioned to understand the subtleties of complex situations as well as grasping the nuances and technical terminology of the group. Furthermore, the members of the group are more likely to be forthcoming with a familiar colleague who appears less threatening than an external observer whose motives they are unsure of. O’Reilly (2009a) also states that the inside

ethnographer is unlikely to misinterpret and misrepresent the complex interactions that occur and see the detail and nuance beneath the surface of otherwise benign interactions.

Critics of insider ethnography identify a risk of over-identification with the subject matter or 'going native' (Bryman, 2012). Whilst this is a valid concern, Aguilar (1981) argues that the insider ethnographers' training and scientific curiosity will focus them on the relevant events and observations, and that the outsider observer is not immune to the same risks of over-identification or going native.

Once all data was collected, it was compiled and then transferred to NVivo and categorised into themes using a similar thematic analysis process as described in the previous sections. The final set of 11 themes were used to determine the existence and magnitude of trust and distrust between the manufacturer, customer and inter-organisational trust and distrust within the customers organisation.

#### **4.4.4 Trust and Distrust Survey**

This survey was composed of 321 participants recruited via LinkedIn and focused on trust and distrust within the oil industry and used the diagram shown in Figure 11 to define these terms. The 321 subjects were asked to review the diagram and assign a quadrant for their current working relationship with their business partners, based upon the descriptions contained within the diagram. Of the 321 requests issued, 218 subjects responded, representing a response rate of 67.9%. which is comfortably above the average response rate of 52.7% identified by Baruch and Holtom (2008) in similar studies. The results of this survey are presented in Graph 3 and discussed in the Findings Section of this paper.

#### **4.5 Findings**

The findings presented below give insight to the levels of servitization observed in the oil industry first from the interviews taken during Phase 1 which are then complimented by the survey carried out in Phase 2. To

determine the existence of a link between servitization level and trust/distrust the findings of the focused ethnography shall be presented. Finally, the survey findings carried out in Phase 3 on the subject of trust and distrust shall be presented to compliment the focused ethnography, this is summarised in Figure 12 earlier in this paper.

#### **4.5.1 Interview Findings for Servitization Level**

Interviews were used to discuss the various aspects of servitization and over several questions confirmed the interviewees' assessment of their servitization level within their organisation, and organisations they had previously worked in. The interviewees of both customers and manufacturers classified their organisations as having an intermediate servitization levels. As one manager from a manufacturer stated:

*We're around the middle, perhaps we should be higher, but I don't think our clients want us to be seen as equals, they want to be in control and keep us in our place, especially the Majors, and we can never be full partners under those conditions.*

This statement was echoed by a senior sales engineer for a manufacturer who also confirmed an intermediate servitization level:

*So, if I'm looking at my clients and where we are today, I would say we are probably in the middle because there's very well-defined contracts and we are there every day. But I want to get to a point where we were partners, but let's face it, we're not. So I would say a five.*

This score is also confirmed by the customers who generally scored their servitization levels in the same range as the manufacturers, as can be seen in the following comments from a senior manager in a customer organisation:

*It is slightly related to a service company probably integrated, you know we don't have them in the office, they don't work with us on a day-to-day basis, it is very much a company contractor ... I would say a 5 based on that.*

**4.5.2 Servitization Level Survey Findings**

Complimenting the qualitative research, the survey carried out in Phase 2 suggests that the oil industry generally operates in the intermediate servitization range, as calibrated on the scale shown in Figure 13. An additional survey was conducted in Phase 3 which supports the previous findings. Prior to issuing the survey in phase 3 a G\*Power analysis was performed which indicated that for a small effect size (0.2) and statistical power of 0.8 a sample size of 788, or more, was required. The final sample size was 834, which represents a response rate of 38.7%, and indicates the survey results are a representative sample of the group. The results of the t test - Means: Difference between two independent means (two groups) are provided below for the following two hypotheses.

$H_0$  = There is no difference between the servitization levels of operators and Service Companies

$H_1$  = There is a difference between the servitization levels of operators and service companies

An F-test first was carried out on the data which had a F value of 2.860 and an F Crit. value of 1.175. Given that  $F > F_{Crit}$ . we can state that the variances in the two data sets are unequal. A two tailed t-test was then performed on the data with the following outcome:

	SC Results	OC Results
Mean	5.699530516	5.426470588
Variance	7.391858603	2.584260731
Observations	426	408
df	695	
t-stat	1.774248196	
P(T<=t) two-tail	0.076459836	
t Critical two-tail	1.963383175	

Table 15: t-Test: Two-Sample Assuming Unequal Variances, n = 834, RR = 38.7%

The table above shows that t-stat is not greater than t Crit. value therefore we cannot reject  $H_0$ , which confirms that the servitization levels are intermediate and do not significantly differ by organization type.

In accordance with the method outlined by Keeney et al. (2011), the median value was calculated for the servitization levels to eliminate outliers and provide a more representative data set. The results show that the median servitization level for the operators was 5.0 and the service companies was 6.0, with a combined median value of 5.0, which indicates an intermediate servitization level (Baines and Lightfoot, 2013) for both organization types. This intermediate level indicates that both parties are willing to participate in activities such as scheduled maintenance, installation, and operator training, for example. However, an intermediate servitization relationship indicates that both parties are, as yet, unwilling to enter into customer support agreements, reward sharing contracts or revenue-through-use contracts (Baines and Lightfoot, 2013).

#### **4.5.3 Focused Ethnography, Trust and Distrust**

##### *4.5.3.1 High and Low Trust*

The aim of this ethnographic research was to observe the nature of trust and distrust being used by the manufacturers and customers to gain a deeper understanding of their working relationship. Lewicki, McAllister and Bies (1998) have identified that the concept of hope is an indicator of trust. Hope is indicative of high trust and 'no hope' is indicative of low trust. An example of hope was recorded in the observation journal of the embedded author, which recalled an instance where a contractor supplied out-of-contract equipment for free in the expectation of generating good will and securing future business. Another example demonstrating hope of good future relationships was recorded in one of the discussions with a customer:

*It should be in the organisation's interests that the service company also are profiting out of the relationship because that would be ultimately important for their future relationship.*

There were few observed instances of 'no hope' recorded in the observation journal of the embedded author or mentioned during the other interactions. Therefore, the findings would appear to indicate that the relationship is generally one of hope.

Similarly, confidence and no confidence are indicators of high and low trust, respectively. It was recorded in the observation journal of the embedded author that confidence was generally expressed as technical confidence. In one observed interaction the selection of equipment was based entirely on the confidence the manager held in the existing manufacturer's ability to deliver their product on time. There were many such instances, and it appeared that the overall level of confidence in technical ability between the manufactures and customer was expected to be high. This observation was also recorded in several observations, one such example from a manufacturer is presented below:

*And they want to pick up the phone once and get the job done and it's done by people who know what they're talking about, etc., etc.*

Lewicki, McAllister and Bies (1998) identify that passivity and hesitance are traits of low trust, the occurrence of these as recorded in the observation journal of the embedded author were very few. Where these were recorded, they were in relation to a specific act or incident and not representative of the general atmosphere of the contractors or manufacturers overall relationships.

#### 4.5.3.2 High and Low Distrust

Fear is identified by Lewicki, McAllister and Bies (1998) as an element of high distrust, and one such example was recorded in the observation journal of the embedded author, where fear was expressed in relation to the motives of the manufacturers. As one customer expressed:

*Because the service companies can prey, especially if they have experience working with these big operators, they'll know their weaknesses and inflexibilities, and know what they can and can't do.*

One customer also provided an awareness of the manufacturers fear during their interview:

*Service providers have been hammered by us, the operator, for some of their failures to a point where they're beaten and bruised and wounded. And they don't want to come back and face that again.*

Whilst the above identify fear within the relationships, fear itself is not identified by Lewicki, McAllister and Bies (1998) as a potential positive outcome of high distrust, but instead as a catalyst to generate other related characteristics such as: scepticism, cynicism, watchfulness and vigilance which may have a positive influence on value creation.

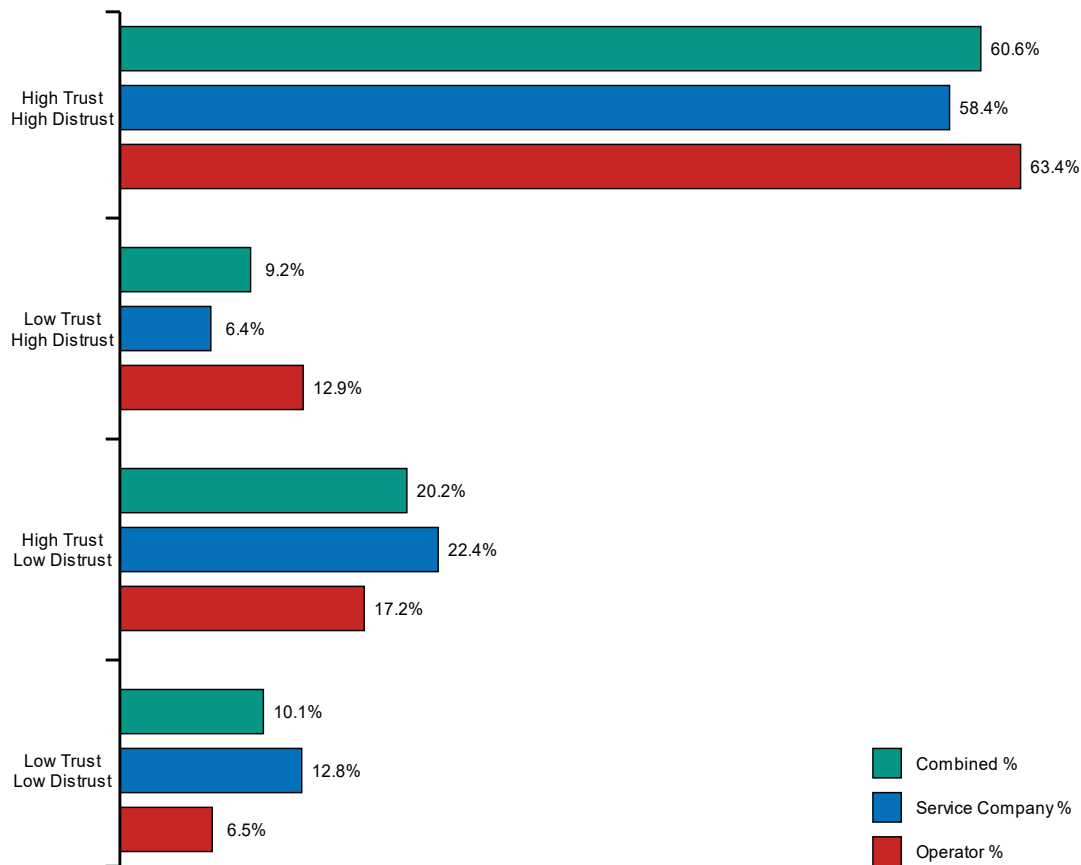
It was also observed that there could be an underlying scepticism in the working relationship between the customers and manufacturers, as one manufacturer succinctly stated in an informal conversation:

*I want to get to a point where we were partners, but let's face it, we're not.*

There was a high degree of vigilance and watchfulness in the working relationships, for example there were several occasions recorded in the observation journal of the embedded author, where the customer requested the CVs for the manufacturer's employees and then insisted that only those favoured employees worked on their project. To all of these demands the manufacturer agreed without complaint, and when questioned one subject stated "it is all a part of business in this industry that we have to do these things".

#### **4.5.4 Trust and Distrust Survey Findings**

Graph 3 below shows the results of the survey to determine the type of trust that are present within the oil industry. These figures support the position that a high proportion of the industry operates in a high trust and high distrust environment. This finding is also supported by the quantitative study discussed above.



Graph 3: Questionnaire Trust-Distrust Results, n = 218, Response rate = 67.9%

A chi-square independence test was performed on the findings above to determine if there was a statistically significant difference between the responses of the OC and the SCs. To perform this test the following hypotheses were constructed:

$H_0$  = Trust/Distrust relationship is independent of organization type

$H_1$  = Trust/Distrust relationship is NOT independent of organization type

The chi-square statistic ( $X^2$ ) was calculated to be 5.525 and the critical value was determined to be 7.815 for 3 degrees of freedom and a 'p' value of 0.05. As the value of  $X^2$  is less than the critical value we *cannot* reject the null hypothesis ( $H_0$ ). Additionally, the post-hoc statistical power was calculated to be 0.974 which is greater than the 0.8 threshold. It can be concluded with a reasonable degree of statistical significance that the trust and distrust relationship is independent of the organization type.



#### **4.6 Discussion**

The findings show that 60.6% of the 218 respondents of the survey appear to operate in the high trust and high distrust condition. It is also noted that 20.2% of interviewees reported a high trust low distrust condition. Such a high proportion high trust and high distrust of would suggest that there is an equilibrium position in the oil industry of high trust and high distrust which corresponds to an intermediate servitization level. These findings add confidence to the previous interpretation of the extant literature having found that the trust required to transition to advanced levels of servitization is referring to high levels of trust and low levels of distrust. Therefore, future servitization literature should consider the balance of trust and distrust instead of a general reference to trust.

Interview participants discussed periods in their current or former organisations where servitization levels had increased or decreased, an observation documented by Andrews et al. (2018). This observation suggests that at any given time the organisations within the oil industry network may exist in a state of flux, oscillating between various levels of servitization. However, it remains unlikely that a value of 20.2% high trust and low distrust would be of significant size to achieve 'critical mass' and cause a paradigm shift within an entire industry network.

For advanced levels of servitization to be reached, an organization or the network in which such an organisation exists, must transition from their current trust/distrust condition to a high trust and low distrust condition. Note that the findings suggest that moving to a low distrust condition may be, at least temporarily, harmful to the organisation as they may forego the potential advantages of distrust (Cook, Hardin and Levi, 2009) which are; caution, scepticism, vigilance, misplaced trust, complexity and naivety (Lewicki, McAllister and Bies, 1998; Vlaar, Van den Bosch and Volberda, 2007; Lee and Lee, 2018). The research found that most organisations exist with high levels of trust and high levels of distrust. The participants also reported multiple

attempts to move towards higher levels of servitization. However, these attempts were unsuccessful due to the reluctance of the organisation and industry as a whole to forego the advantages and culture of high distrust, causing performance to decline and reversion to an intermediate servitization level. From this analysis it can be determined that the oil industry resides in an area of stability at an intermediate servitization level which corresponds to a high trust high distrust position. This journey through servitization and trust/distrust is represented below in Figure 14.

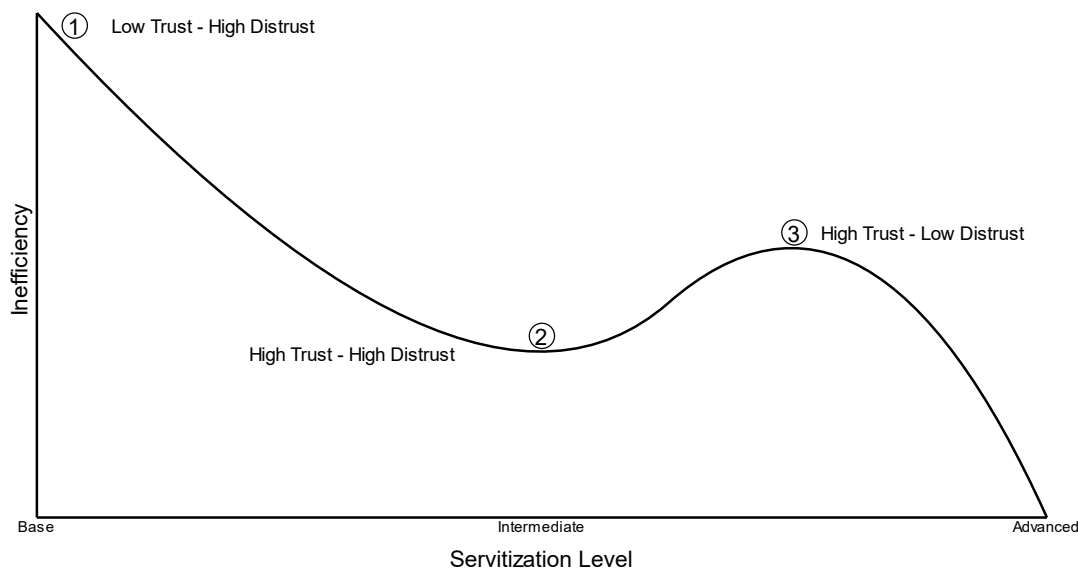


Figure 14: Relationship between Trust Distrust and Servitization

The chart in Figure 14 represents the journey an organisation or network of organisations may take on their servitization journey in relation to trust and distrust. Where the x-axis defines the servitization level as described by Baines and Lightfoot (2013) and the y-axis describes inefficiency. The Cambridge Dictionary ('Inefficiency', 2022) defines business inefficiency as “a situation in which someone or something fails to use resources such as time, materials, or labour in an effective way”. The inefficiencies described in the above graph may present themselves as one, or a combination of:

- Financial inefficiency, where expenses (as a percentage of revenue) are above optimal and return on investment is below expectations
- Labour inefficiency, where labour productivity of employees is reduced
- Eco-inefficiency, where the business impact of the environment is excessive

- Operational inefficiency, where the business processes of the organization are costly and/or excessively long

Hence, we observe that moving from a base servitization level with low trust and high distrust condition ① to an intermediate servitization state ② and then to an advanced state will require transitioning through an intermediate state ③. Moving to state ③ also requires moving from a state of high distrust to a state of low distrust and abandoning in the benefits of high distrust, which are: caution, scepticism, vigilance and guards against misplaced trust, complexity and naivety (Lewicki, McAllister and Bies, 1998; Vlaar, Van den Bosch and Volberda, 2007; Lee and Lee, 2018). A short-term management perspective or limited resources may be intolerant to these losses and the servitization effort is likely to stall or revert to the equilibrium position ②, restoring the advantages of high distrust. This reversion to the equilibrium position appears to be a point of servitization equilibrium for the oil industry and the reversion is identified as the servitization paradox (Brax, 2005; Gebauer, Fleisch and Friedli, 2005). Therefore, this research indicates that the servitization paradox in the oil industry could be due, at least in part, to a reluctance to forgo the advantages gained from distrust and not a failing of servitization.

As discussed above, for an organisation to transition to an advanced servitization state it should be prepared to risk a temporary, but often prolonged, loss in performance due to abandoning the benefits of distrust before the benefits of servitization can replace this deficit. However, a further complication exists as organisations operate in complex networks, therefore, the entire network or at least a significant proportion of it, (Tronvoll *et al.*, 2020) must make this prolonged and difficult (Baines *et al.*, 2020) paradigm shift simultaneously, and be prepared to invest the time and resources needed to reach the final goal. One must question if such a coordinated change in operating philosophy is possible in the current oil industry.

Referring back to the research questions, the chart and discussion above supports a link between servitization, trust and distrust and that a reliance on

distrust can lead to the servitization paradox. Hence, the findings of this paper indicate that a paradox exists within the oil industry where the benefits of servitization, and distrust appear to be in conflict. Transitioning to advanced levels of servitization requires significant effort and dedication of resources (Iriarte *et al.*, 2018; Baines *et al.*, 2020) and, as this research has shown, abandoning of the benefits high distrust can bring. One must question if the oil industry, or any other industry, is prepared to sacrifice distrust in the pursuit of advanced levels of servitization. Key to this to this predicament is an assessment of the relative benefits of servitization compared to high distrust. If the benefits are significantly greater then there should be a business case to make the difficult transition. Alternatively, if the benefits are insignificant or less than high distrust then there remains little or no motivation for the network to transition to advanced servitization levels. Research into the relative benefits of each philosophy would therefore allow organisations to make an informed decision on this question and potentially break the paradox.

Choosing between servitization and high distrust assumes that the organisation or network in question has an understanding of servitization and its relationship with trust and distrust. Literature shows that such an understanding of servitization in the oil industry is generally absent (Kumar and Markeset, 2007; Bandinelli and Gamberi, 2011; Wagstaff, Burton and Zolkiewski, 2020c). Furthermore, this research indicates that knowledge of the conflict between distrust and servitization is also absent. It may, therefore, benefit future organisations if future research took place to further document this relationship and its effects providing organisations and networks with the knowledge to make an informed decision if servitization is the best option for them.

#### **4.7 Conclusions and Management Implications**

With reference to the first and second research questions, the findings of this research have provided evidence that the level of trust and distrust can influence the level of servitization within the oil industry. A high percentage of

the manufacturers and customers surveyed in this research operated at an intermediate servitization level in both. The findings also show that the industry appears to operate in a condition of high trust and high distrust. This research along with an interpretation of the current servitization literature supports the argument that high levels of trust are required for greater levels of servitization. This research also proposes that the oil industry appears to be locked into a paradox where it cannot transition to advanced servitization without first giving up the benefits of high distrust. Therefore, we can answer the first research question by stating that the level of trust that exists between the customer and manufacturer influences the ability of either party to increase their servitization level. Similarly, we can answer the second research question by finding that the inability to progress beyond high distrust also influences the ability of organisations to progress to greater levels of servitization.

The third research question refers to the servitization paradox in relation to the influence of trust and distrust on servitization. This research has extended servitization theory by explicitly including relational dynamics related to the interplay between trust and distrust as manufacturers integrate more services into their portfolio of offerings. It illustrates that these dynamics of trust and distrust have a significant influence on levels of servitization that can be achieved and gives additional insight into dynamics that drive the servitization paradox.

This paper provides an explanation for the servitization paradox, as an organisation wishing to transition to an advanced servitization level must first endure a prolonged negative outcome by abandoning distrust before the advantages of servitization can replace and improve upon these losses. This provides an explanation as to why the oil industry appears to be trapped in the servitization paradox where any attempt to advance their level of servitization meets with a short-term negative outcome. This could be due to the beneficial qualities of high distrust and a reluctance to abandon these benefits. In Figure 15 we can see that the oil industry currently appears to follow the green dotted

path to servitization and the eventual outcome of an adversarial relationship. To achieve advanced servitization it is proposed that if an organisation were to follow the blue dashed path and convert to a low distrust industry they could achieve a cooperative relationship and advanced servitization. This conversion is difficult, as senior management must first understand the servitization paradox and formulate a strategy to work with it. Therefore, an understanding or education in the servitization paradox, which was not evident during the research, a finding which is reflected in the literature (Bertoni, Panarotto and Larsson, 2016), is required.

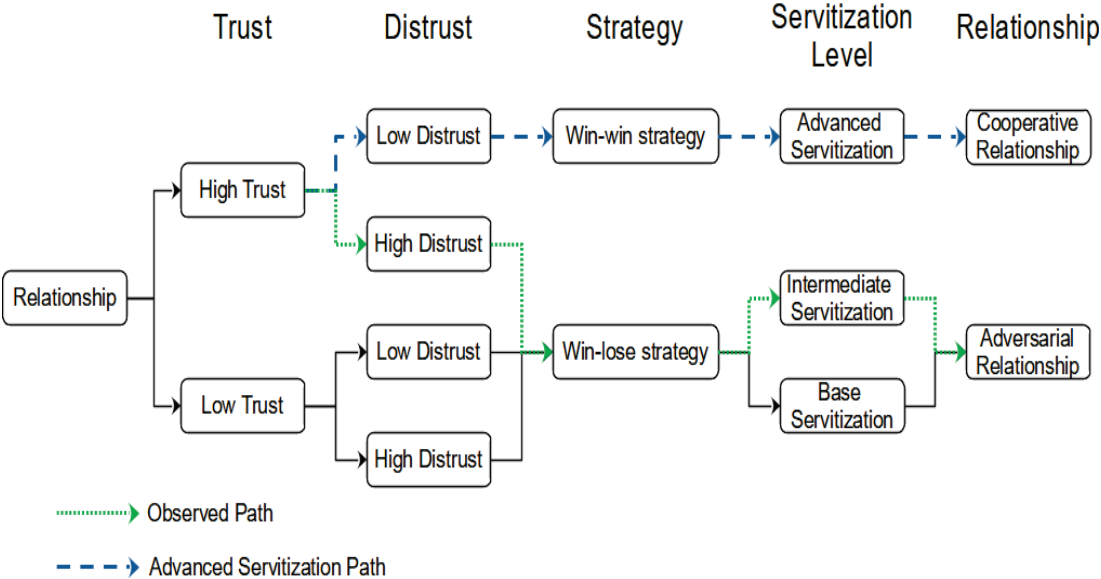


Figure 15: Trust, Distrust and Servitization Flow Chart

Complicating the transition to advanced servitization is the observation that a unilateral change is unlikely to be successful as each organisation operates in a complex network (Story *et al.*, 2017). Therefore, an industry wide initiative would be required to change from a high distrust to a low distrust philosophy to achieve advanced servitization. This transition requires sustained management support with a long-term perspective. Given that the intermediate steps to advanced servitization, this will have a negative outcome for their business performance and given the volatile nature of this industry (Bergholt, Larsen and Seneca, 2019) and the current industry downturn (England, 2020) this support seems unlikely at this time, or in the near future. Hence, if a high percentage, such as the 60.6% of the indicated in the survey presented

previously, of oil industry organisation are currently in the high trust and high distrust category they must determine if they have the need to transition to an advanced servitization level. If they confirm this need, they could join the other 20.2% in the high trust and low distrust category and influence the entire network. However, they may determine that they are content to continue benefiting from the existing philosophy of an intermediate servitization level and high distrust environment.

#### **4.8 Limitations and Areas of Future Research**

This research has provided evidence that the oil industry is subject to the servitization paradox due, at least in part, to its reluctance to forgo the advantages of high distrust. This research was limited to a single industry, but the research does not indicate that the findings are unique to the oil industry. Therefore, it would be of interest to see if this servitization equilibrium of high distrust as a factor of the servitization paradox is unique to the oil industry or common to other industries.

The discussion in this research has interpreted the definition of trust within the extant servitization literature to mean high trust and low distrust. Whilst this interpretation is supported by the findings of this paper, further research to confirm this interpretation would be beneficial to future research into the relationship between trust, distrust, servitization and the servitization paradox. Additionally, inclusion of such a definition of trust/distrust in future servitization literature would add clarity to that research and further explore the findings of this paper.

The need for further research has been identified in the relative advantages of high distrust and advanced servitization at an organisation and network level. It could be the case that high distrust is more advantageous than advanced levels of servitization or vice versa. Research into the relative advantages may provide organisations and networks the knowledge needed to make an informed decision if advanced servitization is truly the best option for them.

#### 4.9 References

- Adrodegari, F. and Saccani, N. (2020) 'A maturity model for the servitization of product-centric companies', *Journal of Manufacturing Technology Management*, 31(4), pp. 775–797. doi: 10.1108/JMTM-07-2019-0255.
- Aguilar, J. (1981) 'Insider research: an ethnography of a debate', in *Anthropologists at home in North America: methods and issues in the study of one's own society*. Cambridge: Cambridge University Press, pp. 15–28.
- Andrews, D., Dmitrijeva, J., Bigdeli, A. Z. and Baines, T. (2018) 'Snakes and Ladders in Servitization: Using a Game to Capture Inhibitors and Enablers of Transformation', *Research-Technology Management*, 61(6), pp. 37–47. doi: 10.1080/08956308.2018.1516930.
- Annarelli, A., Battistella, C. and Nonino, F. (2019) *The Road to Servitization: How Product Service Systems Can Disrupt Companies' Business Models*. Cham: Springer International Publishing. doi: 10.1007/978-3-030-12251-5.
- Baines, T. and Lightfoot, H. (2013) *Made to Serve*. 1st edn. Chichester: John Wiley & Sons, Inc. doi: 10.1002/9781119207955.
- Baines, T., Ziaee Bigdeli, A., Sousa, R. and Schroeder, A. (2020) 'Framing the servitization transformation process: A model to understand and facilitate the servitization journey', *International Journal of Production Economics*, 221, pp. 1–16. doi: 10.1016/j.ijpe.2019.07.036.
- Bandinelli, R. and Gamberi, V. (2011) 'Servitization in oil and gas sector: outcomes of a case study research', *Journal of Manufacturing Technology Management*, 23(1), pp. 87–102. doi: 10.1108/17410381211196302.
- Baruch, Y. and Holtom, B. C. (2008) 'Survey response rate levels and trends in organizational research', *Human Relations*, 61(8), pp. 1139–1160. doi: 10.1177/0018726708094863.
- Bergholt, D., Larsen, V. H. and Seneca, M. (2019) 'Business cycles in an oil economy', *Journal of International Money and Finance*, 96, pp. 283–303. doi: 10.1016/j.jimonfin.2017.07.005.
- Bertoni, M., Panarotto, M. and Larsson, T. C. (2016) 'Boundary objects for PSS Design', *Procedia CIRP*, 47, pp. 329–334. doi: 10.1016/j.procir.2016.03.226.
- Blois, K. J. (1999). Trust in business-to-business relationships: An evaluation of its status. *Journal of Management Studies*, 36(2), 197-215.
- Boyle, J. (1994) 'Styles of Ethnography', in *Critical issues in qualitative research methods*. Thousand Oaks: Sage Publications, pp. 158–185.



- Brax, S. (2005) 'A manufacturer becoming service provider – challenges and a paradox', *Managing Service Quality: An International Journal*, 15(2), pp. 142–155. doi: 10.1108/09604520510585334.
- Brewer, J. (2004) 'Ethnography', in *Essential guide to qualitative methods in organizational research*. London: SAGE Publications, pp. 332–342.
- Brewer, J. and Hunter, A. (1989) *Multimethod research: A synthesis of styles*. 1st edn. Thousand Oaks: Sage.
- Bryman, A. (2004) 'Triangulation', in *The SAGE Encyclopedia of Social Science Research Methods*. Thousand Oaks: Sage Publications, Inc., pp. 1142–1143. doi: 10.4135/9781412950589.n1031.
- Bryman, A. (2012) *Social Research Methods*. 4th edn. Oxford: Oxford University Press.
- Burton, J., Story, V. M., Raddats, C. and Zolkiewski, J. (2017) 'Overcoming the challenges that hinder new service development by manufacturers with diverse services strategies', *International Journal of Production Economics*, 192(October 2017), pp. 29–39. doi: 10.1016/j.ijpe.2017.01.013.
- Cook, K. S., Hardin, R. and Levi, M. (2009) *Cooperation without trust?* New York: Russell Sage Foundation.
- Davies, A., Brady, T. and Hobday, M. (2006) 'Charting a Path Toward Integrated Solutions', *MIT Sloan Management Review*, 47(3), pp. 39–48.
- Deming, W. E. (2011) *The New Economics*. 2nd edn. Cambridge: MIT Press.
- Denzin, N. K. (1978) *The Research Act*. 1st edn. Chicago: Aldine.
- Deutsch, M. (1958) 'Trust and suspicion', *Journal of Conflict Resolution*, 2(4), pp. 265–279. doi: 10.1177/002200275800200401.
- Dubois, A. and Gadde, L.-E. (2002) 'Systematic combining: an abductive approach to case research', *Journal of Business Research*, 55(7), pp. 553–560. doi: 10.1016/S0148-2963(00)00195-8.
- Easterby-Smith, M., Thorpe, R. and Jackson, P. R. (2012) *Management Research*. 4th edn. London: SAGE.
- England, J. (2020) *Lower for Longer and the Risk of Oil and Gas Underinvestment*, *Deloitte United States*. Available at: <https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/lower-for-longer-risk-oil-gas-underinvestment.html> (Accessed: 2 March 2020).
- Fang, E. (Er), Palmatier, R. W. and Steenkamp, J.-B. E. M. (2008) 'Effect of Service Transition Strategies on Firm Value', *Journal of Marketing*, 72(5), pp. 1–14. doi: 10.1509/jmkg.72.5.001.

Ferreira, F. N. H., Proença, J. F., Spencer, R. and Cova, B. (2013) 'The transition from products to solutions: External business model fit and dynamics', *Industrial Marketing Management*, 42(7), pp. 1093–1101. doi: 10.1016/j.indmarman.2013.07.010.

Flick, U. (2009) *An Introduction to Qualitative Research*. 4th edn. Los Angeles: SAGE.

Gebauer, H., Fleisch, E. and Friedli, T. (2005) 'Overcoming the Service Paradox in Manufacturing Companies', *European Management Journal*, 23(1), pp. 14–26. doi: 10.1016/j.emj.2004.12.006.

Gebauer, H., Friedli, T. and Fleisch, E. (2006) 'Success factors for achieving high service revenues in manufacturing companies', *Benchmarking: An International Journal*, 13(3), pp. 374–386. doi: 10.1108/14635770610668848.

*Goodyear Total Mobility* (2015) *Goodyear*. Available at: [https://www.goodyear.eu:443/uk\\_en/truck/services/goodyear-total-mobility.jsp](https://www.goodyear.eu:443/uk_en/truck/services/goodyear-total-mobility.jsp) (Accessed: 19 December 2020).

Gordon, W. (2011) 'Behavioural Economics and Qualitative Research – A Marriage Made in Heaven?', *International Journal of Market Research*, 53(2), pp. 171–185. doi: 10.2501/IJMR-53-2-171-186.

Guo, S.-L., Lumineau, F. and Lewicki, R. J. (2017) 'Revisiting the Foundations of Organizational Distrust', *Foundations and Trends in Management*, 1(1), pp. 1–88. doi: 10.1561/34000000001.

Hepsø, V. (2012) 'Doing Corporate Ethnography as an Insider (Employee)', in *Advancing Ethnography in Corporate Environments*. 1st edn. Walnut Creek: Taylor & Francis Group, pp. 151–174.

Homburg, C., Hoyer, W. D. and Fassnacht, M. (2002) 'Service Orientation of a Retailer's Business Strategy: Dimensions, Antecedents, and Performance Outcomes', *Journal of Marketing*, 66(4), pp. 86–101. doi: 10.1509/jmkg.66.4.86.18511.

Iriarte, I., Hoveskog, M., Justel, D., Val, E. and Halila, F. (2018) 'Service design visualization tools for supporting servitization in a machine tool manufacturer', *Industrial Marketing Management*, 71, pp. 189–202. doi: 10.1016/j.indmarman.2018.01.003.

Iyer, G.R., Sharma, A. & Evanschitzky, H. (2006). Global marketing of industrial products: Are interpersonal relationships always critical? *Industrial Marketing Management*, 35(5), 611–620.

Jay, J. (2013) 'Navigating Paradox as a Mechanism of Change and Innovation in Hybrid Organizations', *Academy of Management Journal*, 56(1), pp. 137–159. doi: 10.5465/amj.2010.0772.

- Johnson, R. B., Onwuegbuzie, A. J. and Turner, L. A. (2007) 'Toward a Definition of Mixed Methods Research', *Journal of Mixed Methods Research*, 1(2), pp. 112–133. doi: 10.1177/1558689806298224.
- Johnstone, S., Wilkinson, A. and Dainty, A. (2014) 'Reconceptualizing the Service Paradox in Engineering Companies: Is HR a Missing Link?', *IEEE Transactions on Engineering Management*, 61(2), pp. 275–284. doi: 10.1109/TEM.2013.2289738.
- Kasabov, E. (2007) 'Towards a contingent, empirically validated, and power cognisant relationship marketing', *European Journal of Marketing*, 41(1/2), pp. 94–120. doi: 10.1108/03090560710718139.
- 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), pp. 169–180. doi: 10.1016/j.jom.2013.02.001.
- Keeney, S., Hasson, F. and McKenna, H. (2011) *The Delphi Technique in Nursing and Health Research*. Oxford: Wiley-Blackwell. doi: 10.1002/9781444392029.
- King, N. and Brooks, J. (2018) 'Thematic Analysis in Organisational Research', in *The SAGE Handbook of Qualitative Business and Management Research Methods: Methods and Challenges*. London: SAGE Publications Ltd, pp. 219–236. doi: 10.4135/9781526430236.n14.
- King, Nigel. and Horrocks, C. (2010) *Interviews in qualitative research*. 2nd edn. Los Angeles: Sage Publications Ltd.
- Kohtamäki, M., Baines, T., Rabetino, R. and Bigdeli, A. Z. (2018) *Practices and Tools for Servitization*. Cham: Springer International Publishing. doi: 10.1007/978-3-319-76517-4.
- Kohtamäki, M., Einola, S. and Rabetino, R. (2020) 'Exploring servitization through the paradox lens: Coping practices in servitization', *International Journal of Production Economics*, 226, p. 107619. doi: 10.1016/j.ijpe.2020.107619.
- Kohtamäki, M., Rabetino, R. and Einola, S. (2018) 'Paradoxes in Servitization', in *Practices and Tools for Servitization*. Cham: Springer International Publishing, pp. 185–199. doi: 10.1007/978-3-319-76517-4\_10.
- Kowalkowski, C., Gebauer, H., Kamp, B. and Parry, G. (2017) 'Servitization and deservitization: Overview, concepts, and definitions', *Industrial Marketing Management*, 60, pp. 4–10. doi: 10.1016/j.indmarman.2016.12.007.

Kumar, R. and Markeset, T. (2007) 'Development of performance-based service strategies for the oil and gas industry: a case study', *Journal of Business & Industrial Marketing*, 22(4), pp. 272–280. doi: 10.1108/08858620710754531.

Lee, Jeongyoon and Lee, Junesoo (2018) 'When you trust and distrust the other side: The roles of asymmetric power in a policy network', *Academy of Management Proceedings*, 2018(1), p. 11026. doi: 10.5465/AMBPP.2018.199.

Lewicki, R. J., McAllister, D. J. and Bies, R. J. (1998) 'Trust and Distrust: New Relationships and Realities', *The Academy of Management Review*, 23(3), pp. 438–458. doi: 10.2307/259288.

Lexutt, E. (2020) 'Different roads to servitization success – A configurational analysis of financial and non-financial service performance', *Industrial Marketing Management*, 84(June), pp. 105–125. doi: 10.1016/j.indmarman.2019.06.004.

Liu, C., Zhang, G. and Gao, P. (2020) 'A Meta-Analysis of the Relationship Between Servitization and Firm Performance', in *Proceedings of the Fifth International Conference on Economic and Business Management (FEBM 2020)*, Sanya, China: Atlantis Press. doi: 10.2991/aebmr.k.201211.077.

Lowe, A., Norris, A. C., Farris, A. J. and Babbage, D. R. (2018) 'Quantifying Thematic Saturation in Qualitative Data Analysis', *Field Methods*. SAGE Publications, 30(3), pp. 191–207. doi: 10.1177/1525822X17749386.

Lütjen, H., Tietze, F. and Schultz, C. (2017) 'Service transitions of product-centric firms: An explorative study of service transition stages and barriers in Germany's energy market', *International Journal of Production Economics*, 192, pp. 106–119. doi: 10.1016/j.ijpe.2017.03.021.

MacDuffie, J.P. (2011). Inter-organizational trust and the dynamics of distrust. *Journal of International Business Studies*, 42(1), 35-47.

Maheepala, S.D.S.R., Warnakulasooriya, B.N.F. and Weerakoon Banda, Y.K. (2018) 'Measuring Servitization', in *Practices and Tools for Servitization*. Cham: Springer International Publishing, pp. 41–58. doi:10.1007/978-3-319-76517-4\_3.

Morgan, R. M. and Hunt, S. D. (1994) 'The Commitment-Trust Theory of Relationship Marketing', *Journal of Marketing*, 58(3), p. 20. doi: 10.2307/1252308.

Muecke, M. (1994) 'On the Evaluation of Ethnographies', in *Critical issues in qualitative research methods*. Thousand Oaks: Sage Publications, pp. 186–209.

Ng, I., Parry, G., Smith, L., Maull, R. and Briscoe, G. (2012) 'Transitioning from a goods-dominant to a service-dominant logic: Visualising the value

proposition of Rolls-Royce', *Journal of Service Management*, 23(3), pp. 416–439. doi: 10.1108/09564231211248480.

Oliva, R. and Kallenberg, R. (2003) 'Managing the transition from products to services', *International Journal of Service Industry Management*, 14(2), pp. 160–172. doi: 10.1108/09564230310474138.

O'Reilly, K. (2009) 'Insider ethnographies', in *Key Concepts in Ethnography*. London: SAGE Publications Ltd, pp. 110–118. doi: 10.4135/9781446268308.n20.

Palo, T., Åkesson, M. and Löfberg, N. (2019) 'Servitization as business model contestation: A practice approach', *Journal of Business Research*, 104, pp. 486–496. doi: 10.1016/j.jbusres.2018.10.037.

Rabetino, R., Harmsen, W., Kohtamäki, M. and Sihvonen, J. (2018) 'Structuring servitization-related research', *International Journal of Operations & Production Management*, 38(2), pp. 350–371. doi: 10.1108/IJOPM-03-2017-0175.

Raddats, C. and Burton, J. (2011) 'Strategy and structure configurations for services within product-centric businesses', *Journal of Service Management*. Edited by R. P. Fisk, 22(4), pp. 522–539. doi: 10.1108/09564231111155105.

Raddats, C., Burton, J. and Ashman, R. (2015) 'Resource configurations for services success in manufacturing companies', *Journal of Service Management*, 26(1), pp. 97–116. doi: 10.1108/JOSM-12-2012-0278.

Raddats, C., Burton, J., Zolkiewski, J. and Story, V. (2018) 'Overcoming the Challenges of Servitisation: Aligning Responses to Service Strategy', in *Practices and Tools for Servitization*. Cham: Springer International Publishing, pp. 171–184. doi: 10.1007/978-3-319-76517-4\_9.

Raddats, C., Kowalkowski, C., Benedettini, O., Burton, J. and Gebauer, H. (2019) 'Servitization: A contemporary thematic review of four major research streams', *Industrial Marketing Management*, 83, pp. 207–223. doi: 10.1016/j.indmarman.2019.03.015.

Raddats, C., Zolkiewski, J., Story, V. M., Burton, J., Baines, T. and Ziaee Bigdeli, A. (2017) 'Interactively developed capabilities: evidence from dyadic servitization relationships', *International Journal of Operations & Production Management*, 37(3), pp. 382–400. doi: 10.1108/IJOPM-08-2015-0512.

Rotter, J. B. (1967) 'A new scale for the measurement of interpersonal trust', *Journal of Personality*, 35(4), pp. 651–665. doi: 10.1111/j.1467-6494.1967.tb01454.x.

Ruiz-Alba, J. L., Soares, A., Rodríguez-Molina, M. A. and Frías-Jamilena, D. M. (2019) 'Servitization strategies from customers' perspective: the moderating role of co-creation', *Journal of Business & Industrial Marketing*, 34(3), pp. 628–642. doi: 10.1108/JBIM-02-2017-0028.

Ryan, L. (2014) “If You Can’t Measure It, You Can’t Manage It”: Not True’, *Forbes*, February. Available at: <https://www.forbes.com/sites/lizryan/2014/02/10/if-you-cant-measure-it-you-cant-manage-it-is-bs/#2e13740a7b8b> (Accessed: 16 September 2019).

Scheer, L. (2012) ‘Trust, Distrust and Confidence in B2B Relationships’, in *Handbook of Business-to-Business Marketing*. Cheltenham: Edward Elgar Publishing, pp. 332–347. doi: 10.4337/9781781002445.

Smith, W. K. (2014) ‘Dynamic Decision Making: A Model of Senior Leaders Managing Strategic Paradoxes’, *The Academy of Management Journal*, 57(6), pp. 1592–1623.

Smith, W. K. and Lewis, M. W. (2011) ‘Toward a Theory of Paradox: A Dynamic equilibrium Model of Organizing’, *Academy of Management Review*, 36(2), pp. 381–403. doi: 10.5465/amr.2009.0223.

Story, V. M., Raddats, C., Burton, J., Zolkiewski, J. and Baines, T. (2017) ‘Capabilities for advanced services: A multi-actor perspective’, *Industrial Marketing Management*, 60(May), pp. 54–68. doi: 10.1016/j.indmarman.2016.04.015.

Strähle, O., Füllemann, M. and Bendig, O. (2012) *Service now! Time to wake up the sleeping giant*. Munich: Bain & Company, pp. 1–35. Available at: [www.bain.de](http://www.bain.de) (Accessed: 19 September 2019).

Thomas, G. (2013) *How to do your Research Project*. 2nd edn. London: Sage Publications Ltd.

Timmermans, S. and Tavory, I. (2007) ‘Advancing Ethnographic Research through Grounded Theory Practice’, in *The SAGE Handbook of Grounded Theory*. London: SAGE Publications Ltd, pp. 493–512. doi: 10.4135/9781848607941.n23.

Tomlinson, E. C. and Lewicki, R. J. (2006) ‘Managing distrust in intractable conflicts’, *Conflict Resolution Quarterly*, 24(2), pp. 219–228. doi: 10.1002/crq.170.

Tronvoll, B., Sklyar, A., Sörhammar, D. and Kowalkowski, C. (2020) ‘Transformational shifts through digital servitization’, *Industrial Marketing Management*, 89, pp. 293–305. doi: 10.1016/j.indmarman.2020.02.005.

Valtakoski, A. (2017) ‘Explaining servitization failure and deservitization: A knowledge-based perspective’, *Industrial Marketing Management*, 60, pp. 138–150. doi: 10.1016/j.indmarman.2016.04.009.

Vlaar, P. W. L., Van den Bosch, F. A. J. and Volberda, H. W. (2007) ‘On the Evolution of Trust, Distrust, and Formal Coordination and Control in Interorganizational Relationships: Toward an Integrative Framework’, *Group &*

*Organization Management*, 32(4), pp. 407–428. doi: 10.1177/1059601106294215.

Wagstaff, S., Burton, J. and Zolkiewski, J. (2020) ‘Tensions and territoriality: the dark side of servitization’, *Journal of Business & Industrial Marketing*, ahead-of-print(ahead-of-print). doi: 10.1108/JBIM-01-2020-0067.

Weinstein, J. and Ventres, W. (2000) ‘Mini-ethnography: meaningful exploration made easy’, *Family Medicine*, 32(9), pp. 600–602.

*Why This Oil Crisis Is Different To 2008* (2016) *OilPrice.com*. Available at: <https://oilprice.com/Energy/Energy-General/Why-This-Oil-Crisis-Is-Different-To-2008.html> (Accessed: 24 December 2020).

Windahl, C. and Lakemond, N. (2010) ‘Integrated solutions from a service-centered perspective: Applicability and limitations in the capital goods industry’, *Industrial Marketing Management*, 39(8), pp. 1278–1290. doi: 10.1016/j.indmarman.2010.03.001.

Wolcott, H. F. (1990) ‘Making a Study “More Ethnographic”’, *Journal of Contemporary Ethnography*, 19(1), pp. 44–72. doi: 10.1177/089124190019001003.

Wood, K. (2005) ‘Market for intelligent wells may triple in next 5 years’, *Oil & Gas Journal*. Available at: <https://www.ogj.com/home/article/17236382/market-for-intelligent-wells-may-triple-in-next-5-years> (Accessed: 3 December 2020).

*World Health Organization* (2020) *Coronavirus disease (COVID-19)*. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (Accessed: 20 December 2020).

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## **5 Conclusion**

The following sections bring together the three papers used to construct this thesis. The first section will summarise the significant findings and then provide a discussion before relating this to the literature and research questions. The second section will discuss how the findings add to current theory and understanding of servitization and the implications this knowledge brings to practice and practical applications. The third section will discuss the limitations of this research and indicate future areas of research to build upon the work of this thesis.

### **5.1 Discussion and Key Findings**

The aim of this thesis was to use the oil industry to investigate the factors which influence the application of servitization. The research has found that servitization has the potential to cause tension and territoriality within the organizations investigated and has the potential to influence the probability of servitization success or failure. The findings also show that by using game theory we can demonstrate that the relationships between OC and SC are adversarial at base and intermediate servitization levels. Finally, the research has shown that high levels of distrust may provide some explanation as to why some organizations may be predisposed to an adversarial relationship and the servitization paradox. The following sections will discuss in detail these and other findings which were observed during this research, and how these address the research questions which are repeated below:

- RQ1. Does servitization lead to tension and territoriality within a servitizing organization, and what is the impact of this on the servitization process?
- RQ2. What strategies do organizations employ in their business relationships, and how does this influence the servitization levels within those organizations?
- RQ3. Are the relations within the oil industry based on trust or distrust, and how does this explain the servitization progress within this industry?

### 5.1.1 A Balanced Manufacturer and Customer Centric Focus

This research adds to the theory and available literature on servitization, which tends to adopt a manufacturer centric approach and often neglects the customer perspective in the network of servitizing relationships. This research has provided balanced representation of manufacturer and customer perspectives in relation to servitization. The customer servitization perspective is conspicuously absent in current literature which is generally based on the manufacturing organization (Pereira, Kreye and Carvalho, 2019). However, this research recognises that the customer is a critical element (Baines and Lightfoot, 2013) in understanding the servitization process, and to under-represent them would provide a skewed and incomplete understanding of servitization in the larger network (Ruiz-Alba *et al.*, 2019).

Unilateral attempts by a single organization within a network or smaller uncoordinated groups to servitize are generally unsuccessful (Tronvoll *et al.*, 2020). Instead, engagement of a significant proportion of the network is required to achieve the 'critical mass' required to allow the prolonged and difficult (Baines *et al.*, 2020) fundamental change to more advanced levels of servitization and unlock the benefits of value co-creation and industry efficiency. Failure to make this network transition may inevitably result in failure to develop the necessary capabilities, the servitization paradox and reduced likelihood that management and staff will make future servitization attempts due to their negative experience.

This research supports the extant literature which identifies that servitization networks are extremely complex and, in this respect, the oil industry is similar to the servitized relationships observed in other industries (Henneberg, Gruber and Naudé, 2013). Each OC interacts with a multitude of SCs, who in turn interact with their suppliers, and so on, creating networks of near infinite size and complexity (Ford and Redwood, 2005; Agostini, 2016). However, this network is generally simplified in extant literature to a more manageable and simplistic dyadic approach (Morgan, Deeter-Schmelz and Moberg, 2007). This dyadic approach can overlook the complex interactions that take place within

networks (Raddats *et al.*, 2017), such as those identified within this research, see page 158 in paper 3.

### **5.1.2 Servitization Levels and Change**

This research has shown that there is a difference in organizational appetite for change within the SCs and the OCs. Findings have shown that SCs were eager to embrace change, and that OCs were more cautious about change, see section 2.5.2 . This finding contradicts the current understanding of change, which assumes that both parties generally have a similar enthusiasm for change (Rowland and Higgs, 2012).

This research also identified a personal dimension to change where much of the resistance to change resides within individuals (Jones, 2013; Lenka *et al.*, 2018a; Oberle, 2020). Instances of RCS (repetitive change syndrome) (Abrahamson, 2004) were observed within OC and SC during the interview sessions conducted for each paper and were offered by many informants as potential explanations for the lack of servitization progress.

This research supports and builds upon the work of Crowley, Burton and Zolkiewski (2018) who discuss the lack of a unified organisational servitization mindset. Such that, the lack of strategic organisational alignment identified by Crowley, Burton and Zolkiewski (2018) may be influenced by management seniority level. This research has shown that the appetite for servitization application changes with management seniority levels. Senior management expressed a genuine commitment to servitization. However, it was observed that this commitment steadily decreased as it disseminated down the management hierarchy until the lower levels of management and staff were merely paying 'lip service' to the servitization process.

Analysis of the interview material has shown that the difference in organizational appetite for change may be due to the differing business models of the SC and OC. It was observed that the SC seeks to differentiate themselves from their competition and change is one way to do this (Tongur and Engwall, 2014). However, the OC has a different motivation, seeing value in change

only if it has a reasonable probability of producing a better, safer or more efficient outcome. For example, even a minor failure for an OC can escalate and have enormous financial consequences, one pertinent example being the Deepwater Horizon incident in the Gulf of Mexico which cost BP billions of dollars (BBC News, 2016; Bousso, 2018) and had devastating environmental consequences.

At the individual level, the engineer accountable for a change decision carries the responsibility for failure, which could result in loss of credibility, termination of employment and potentially legal consequences. However, remaining with existing methods introduces no additional personal risk. RCS (Abrahamson, 2004) describes a situation where employees become cynical of repeated changes and refuse to invest their time or effort, assuming there will be another, often contradictory, change in the future.

All three papers of this thesis have confirmed the findings in the servitization literature (Barnett *et al.*, 2013; Kowalkowski and Kindström, 2013; Visnjic and Looy, 2013; Kowalkowski *et al.*, 2017; Raddats *et al.*, 2019) that change within an organization is a fundamental requirement of servitization. This research also supports current theory (Burton *et al.*, 2016) that change brings about resistance at an individual (Jones, 2013; Lenka *et al.*, 2018a; Oberle, 2020) and at a group organizational level (van Dijk and van Dick, 2009). The change brought about by servitization had many different but interrelated effects. Change was shown to provide several different motivations for each organization type and each management level, as well as influencing personal behaviours and attitudes. The level of cynicism observed closely matches the phenomenon of RCS supporting the literature on this subject (e.g. Abrahamson, 2004). Instrumental in the RCS was the observation that the applications of change did not follow an established method of change theory proposed by scholars such as Lewin (1947), i.e., unfreeze, implement and then refreeze.

Servitization level is an important consideration in the research undertaken in this thesis. The median servitization level claimed by OC employees was 5.0, or intermediate, with an IQR of 1.0. However, the SCs claimed a median servitization level of 6.0, which is slightly above intermediate, with an IQR of 5.0. This research shows that both OC and SC consistently rate themselves as having an intermediate level of servitization. However, there was a much greater range of opinion about the level of servitization with the SCs indicating less agreement compared to the OCs. Such a finding indicates that the servitization experience and interaction is different for SCs and OCs.

During the interviews, ethnography and other observations, it was found that there was a positive relationship between greater servitization level and cooperation and lesser levels of servitization with non-cooperation. Combining the prevailing intermediate servitization level and the finding that relationships are adversarial, it would seem plausible that both base and intermediate servitization levels produce an adversarial outcome.

Despite the lack of a standard measure of servitization in the literature examined (Kohtamäki *et al.*, 2018), this research has shown through triangulation of analysis of data from interviews and qualitative interpretation that most organizations within the oil industry appear to be operating at an intermediate level of servitization. The analysis derived from the research data agrees with the literature that greater levels of servitization result in more cooperative relationships and vice versa (Baines and Lightfoot, 2013). This identification of servitization level and link to relationship type were instrumental in answering each of the research questions.

### **5.1.3 Management Capability and Planning**

This research has identified that management support for servitization declined as it moved from more senior management tiers to more junior tiers. It was also confirmed that most managers within the oil industry have an engineering background with little formal education in management theory or practice (Farr and Brazil, 2009). The research also identified a lack of

knowledge of the benefits of servitization, the servitization paradox, and the incompatibility between distrust and servitization. This lack of management education may explain the absence of a formal servitization plan or strategy. Instead, most participants reported an “organic” progression towards servitization (Ruiz-Alba *et al.*, 2019) based upon tacit knowledge that servitization, or servitization by another name, was a desirable goal (Tongur and Engwall, 2014; Jovanovic, Engwall and Jerbrant, 2016; Wang, Lai and Shou, 2018).

The lack of management planning and capability may result in managers being reluctant, and perhaps unable (Nudurupati *et al.*, 2011) to defend the resources required to maintain or increase the level of servitization during a recession or other challenging environments. Such an economic downturn in the oil industry may lead to adversarial relationships and tightening of contractual terms and budget constraints. In the absence of a well-defined servitization strategy, it is unlikely that there will be sufficient resources and management support for the servitization process (Eriksson *et al.*, 2016). Starved of resources, the servitization progress would inevitably begin to fail and move the servitization level to a less servitized equilibrium position. This process of reversion to an earlier servitization state describes the servitization paradox (Brax, 2005). However, when the economic environment is more favourable, there are fewer constraints on budgets, managers may be more confident in requesting and approving resources to improve servitization.

Option “a” in Figure 4 on page 70 shows one example of a failure mechanism when a servitization strategy is absent. The figure shows the effect of tensions and territoriality arising from the absence of a servitization strategy and change process, see option ‘a’. The figure also shows the potential effect of using an established change process (Lewin, 1947), see option ‘b’.

This research supports the current literature which finds that an understanding of servitization and servitization strategy in the oil industry is generally absent (Kumar and Markeset, 2007; Bandinelli and Gamberi, 2011),

with my thesis paper (Wagstaff, Burton and Judith Zolkiewski, 2021) contributing to this understanding.

The discussion above provides insight into the research questions confirming that the lack of planning can be a contributory factor to the tensions and territoriality which, in turn, influence the progress of servitization. The discussion also provides insight indicating that the lack of a servitization strategy and general management theory will increase the likelihood of the servitization paradox and regress the servitization level to an earlier state of distrust, resulting in adversarial behaviours.

#### **5.1.4 Cooperative or Adversarial Behaviour**

Using the game theory test to differentiate between cooperative and adversarial strategies, it was seen that in all cases both the OC and SC used an adversarial strategy. Furthermore, discriminating between 'fair' and 'real' world scenarios enabled the conclusion that the relationships are intentionally adversarial, and both parties willingly accept, or have been conditioned to accept this as their normal working relationship. The findings have shown that both parties expect to treat or be treated unfairly. For example, even when a mutually acknowledged valuable contribution is made, both parties still expect no offer of reward, or one that is significantly below the Shapley value, even when free to do so. Many individuals offered examples of actual events in their personal experience which closely mirrored the circumstances and outcome of the game theory tests.

One interesting finding was that the monetary value of the potential reward generated from the saving had little influence on the likelihood or value of a reward. This finding would seem to indicate that the adversarial behaviour is not primarily motivated by economic factors, but is most likely based upon an industry norm, i.e., this is the way business is conducted in the oil industry. Similarly, the expectation of little or no reward was universal, such that when the SC employee was given the opportunity to give themselves a fair reward they, without exception, declined to do so, even in a situation where there

would be no impediments or repercussions in doing so. An explanation offered by many of the SC claimed that they were willing to sacrifice this potential revenue in the expectation of future reward or good will, and the OC confirmed that they expected this sacrifice to gain or maintain their future goodwill. However, when questioned further, the SC expressed doubt that this reciprocity would materialise, which was also confirmed during interviews with the OC.

The ubiquitous presence of adversarial strategies in the oil industry is evident throughout all three papers which comprise this thesis, but was studied in detail in paper 2. Given that these adversarial relationships exist in an environment of predominantly intermediate servitization, it is reasonable to posit that both base and intermediate servitization levels naturally coexist in adversarial environments, as shown in Figure 9 on page III. This finding also suggests that only when high levels of cooperation exist could advanced servitization and the benefits it provides become a reality. During the course of this research many experienced employees were interviewed. The findings of these interviews revealed that the incidence of cooperative relationships occurred in organisations with advanced levels of servitization. However, most reported that despite the mutual advantages the long-term cooperation was unsustainable and most relationships eventually devolved in a darker form of mimetic isomorphism to the previous adversarial condition which mirrored the majority of the industry.

#### **5.1.5 Trust and Distrust and the Servitization Journey**

An analysis of the literature, discussed previously, confirms that the reference to 'trust' discussed in servitization literature (Baines and Lightfoot, 2013; Kohtamäki *et al.*, 2018; Annarelli, Battistella and Nonino, 2019; Palo, Åkesson and Löfberg, 2019), which is required for advanced servitization, is actually referring to a condition of high trust and low distrust. The findings of this research have shown that 60.6% of the 218 respondents in a survey of oil professionals appear to operate in working relationships with high trust and



high distrust. The survey also showed that a much lower proportion (20.2%) of these professionals operate in high trust and low distrust relationships.

Statistical analysis was performed which concluded that the organization type had no statistically significant influence on the type of trust in the relationships. During the interviews and through observations made during the ethnography, the researcher noted that many of those interviewed had experienced differing levels of trust, distrust and servitization during their careers. This observation supports the previous finding that the oil industry undergoes periods of servitization and deservitization and is supported by literature (e.g. Andrews *et al.*, 2018).

To transition to an advanced servitization level the organization must redefine their working relationships from high distrust to low distrust. However, it is noted that, somewhat counterintuitively, moving to a low distrust condition may be temporarily harmful to the organization. The organization must forgo the potential advantages of distrust (Cook, Hardin and Levi, 2009) which are; caution, scepticism, vigilance, misplaced trust, complexity and naivety (Lewicki, McAllister and Bies, 1998; Vlaar, Van den Bosch and Volberda, 2007; Lee and Lee, 2018). This journey through servitization and trust/distrust is represented in Figure 14 on page 154.

As can be seen in Figure 14 the journey from intermediate servitization to advanced servitization must transition from a state of high distrust to a state of low distrust. During this transition the benefits of distrust will be lost before the benefits of advanced servitization can replace them. It is during this period, especially in difficult environments, where deservitization would appear to be a favourable alternative. This reduction in benefits from advancing servitization causing deservitization provides a potential explanation for the servitization paradox.

This research has revealed that a paradox exists within the oil industry where the benefits of servitization, and distrust appear to be in conflict. Transitioning to advanced levels of servitization requires significant effort and dedication of

resources (Iriarte *et al.*, 2018; Baines *et al.*, 2020) and, as this research has shown, abandoning of the benefits high distrust can bring. One must question if the oil industry, or any other industry, is prepared to sacrifice distrust in the pursuit of advanced levels of servitization. Key to this predicament is an assessment of the relative benefits of servitization compared to those of high distrust.

The above findings answer the second research question by identifying that the strategies employed in the oil industry are universally adversarial, which has a negative effect on servitization. The findings also answer the final research question by showing that the relationships are based predominantly on distrust and a tendency to revert to a distrust state explains the mechanics of the servitization paradox. Finally, the research also supports recent literature which recognises that servitization is not a linear progression, but is a complex journey requiring prolonged support and a long-term vision (Andrews *et al.*, 2018).

Servitization literature acknowledges that the servitization process is lengthy (Baines *et al.*, 2020) and difficult (Iriarte *et al.*, 2018), with many organizations failing to successfully achieve it (Valtakoski, 2017). The findings of this research support this literature but add greater granularity to the observations. The data illustrated that internal factors such as tensions, management support and repetitive change syndrome were present and influenced the likelihood of servitization success. In addition to this, the findings also show that external factors such as economic recession and inter-company relationships can also influence servitization progress by increasing the likelihood of adversarial relationships.

The findings support recent literature which identifies that the application of servitization is unlikely to be a unidimensional linear progression from a goods-dominant logic to a service-dominant logic (Oliva and Kallenberg, 2003; Lütjen, Tietze and Schultz, 2017; Baines *et al.*, 2020). The roles of external environments and internal/external relationships provide context to

the research questions proposed in this thesis. This research has indicated that the effects of internal and external tensions may influence the progress of servitization. Specifically, that an economic downturn may increase strict adherence to contractual terms and in so doing reduce the ability of employees to form cooperative relationships, and inevitably impede the servitization process.

#### **5.1.6 Findings Summary**

This thesis has successfully addressed the research questions using robust and complementary research methods which have contributed to theory and highlighted new areas of research. Taken in sequence, the research questions are briefly discussed below.

RQ1. Does servitization lead to tension and territoriality within a servitizing organization, and what is the impact of this on the servitization process?

This research has shown that tensions and territoriality are an undesirable outcome of servitization. However, this research also suggests that the creation of a robust servitization strategy may reduce this effect and increase the chances of a successful servitization application.

RQ2. What strategies do organizations employ in their business relationships, and how does this influence the servitization levels within those organizations?

The research has shown by using a novel inverted game theory test that the actual approach used by all parties is an adversarial win-lose strategy. The application of servitization in such a culture is challenging. However, all parties are aware and supportive of this culture.

RQ3. Are the relations within the oil industry based on trust or distrust, and how does this explain the servitization progress within this industry?

The findings suggest that a high proportion of the oil industry operates in a high-trust, high-distrust condition and unable to transition to an advanced servitization state due to its unwillingness to forego the advantages of distrust.

## **5.2 Contributions to Theory and Practice**

The DBA aims to contribute to both theoretical and practical (practitioner) theory. The following sections discuss the contributions this thesis has made to theory and knowledge in the area of servitization, and then provides discussion on how these insights can influence management practice.

### **5.2.1 Theoretical Implications**

This thesis has, over the course of the three papers, made several contributions to theory which are discussed below. The first of these theoretical contributions illustrates how the use of game theory adds to existing theory by showing that advanced servitization relationships are only achievable when cooperative relationships and strategies are used. Specifically, the research shows that, an intermediate level of servitization does not lead to a variable strategy, as originally hypothesised, but instead leads to a non-cooperative strategy. Therefore, both base and intermediate servitization levels result in an adversarial relationship and a win-lose strategy, and only an advanced level of servitization can lead to a cooperative relationship, as seen in Figure 9. The additional research carried out in paper 1 and paper 3 confirm the findings discovered in paper 2 and add further weight to these findings and contributions to theory.

The next theoretical contribution in this thesis expands on the growing literature describing servitization as a dynamic process. This research supports recent literature which identifies that servitization can progress or devolve via a deservitization mechanism (Brax, 2005) and may then re-evolve to a higher servitization level and is, therefore, not a unidirectional process (Andrews *et al.*, 2018; Raddats *et al.*, 2019). However, this research adds to this theory by identifying that the benefits of servitization relative to the level of servitization, as it moves to and from base and advanced levels, is not linear.

This research shows that the relationship is more complex having to first transition through a positive, and then a negative benefit period to eventually realise a net gain. This finding expands upon the work published in paper 2, which initially assumed a positive return on servitization application at all stages from base to advanced, see Figure 10. However, by combining those findings with the findings from paper 3, we can now show that the abandonment of high distrust creates a period of negative benefit. This relationship discussed above is not contained in papers 1, 2 or 3 but is derived here from a combination of their findings and is shown in Figure 16 below.

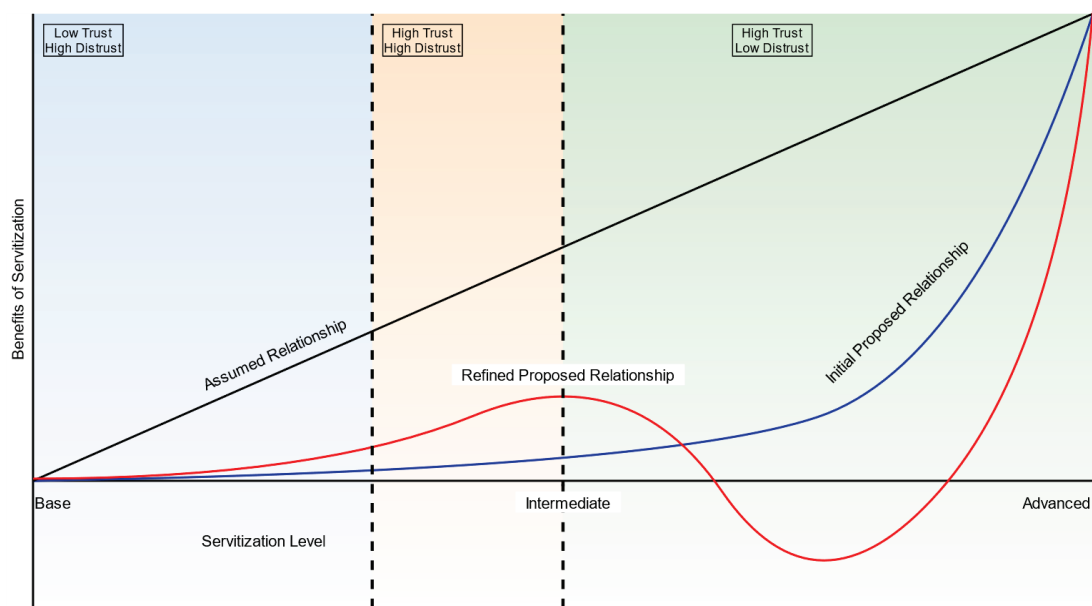


Figure 16: Refined Sketch Showing Assumed and Proposed Relationship Between Servitization Level and Servitization Benefits

This addition to theory may provide awareness of the servitization paradox which describes the negative outcome of servitization undertaken by some organisations and the failure or deservitization of the servitization process. The findings in this thesis summarised in the sketch in Figure 16 offers some insight into the servitization paradox. The sketch shows that an organisation must survive the negative post-intermediate stage of servitization before benefiting from the rewards of advanced servitization. In many situations such as an industry or global recession, many organisations may not have the resources to survive this post-intermediate stage of servitization. These

organisations may then revert to a more beneficial, but less servitized, incarnation of their organisation.

### **5.2.2 Practitioner Implications**

The first practitioner contribution of this research shows how industry and macro-level factors influence servitization strategies. The research calls into question the common understanding of institutional theory and specifically isomorphism that the process elevates these organizations to a more harmonious sameness (Martínez-Ferrero and García-Sánchez, 2017). However, this research has shown that isomorphism can take a darker form of a common or shared adversarial sameness. Mimetic isomorphism as presented in institutional theory explains how the actors within the oil industry change or have changed their behaviour to become similar to each other (Haveman, 1993), in this case their preference for a non-cooperative strategy, which appears to have become an industry norm.

The next contribution has identified that adversarial behaviour was a conscious decision that both the SC and OC were aware of, and with many of the SC, self-imposing this unfair behaviour. The tendency of the OC to withhold a fair reward is understandable. However, the further finding that the willingness of the SC to self-impose an unfair reward is an unexpected finding which was not identified during the literature search and extends the understanding of the darker side of servitization. Furthermore, the finding highlights a form of cognitive dissonance, where the participants in the game theory test and interviews held conflicting beliefs. The participants expressed that the industry should be fair, but when put to the test or questioned further it was found that this desire for fairness was superseded by the inclination to operate in an adversarial way.

In addition to current theory an observation proposed by many of the interviewees provided a link between servitization, deservitization, and the economic environment confirms macro-environmental factors impact servitization. Specifically, that an economic downturn may increase strict

adherence to contractual terms and in so doing reduce the ability of employees to form cooperative relationships. The inability to form cooperative relationships will, inevitably, impede the servitization process. These findings illustrate the insight that arises from adopting a relational lens for servitization research and how it provides additional insight into the theoretical understanding of servitization and the servitization paradox mechanism.

The interpretation of the servitization paradox when viewed through the lens of distrust provides one of the most significant theoretical contributions of this research. A greater understanding of a potential mechanism which may drive the servitization paradox was discovered when the relational dynamics link between distrust and servitization was explored. It illustrates that these dynamics of trust and especially distrust have a significant influence on application of servitization. The findings add to this theory by indicating that an organization wishing to transition to an advanced servitization level must first endure a prolonged negative outcome by abandoning distrust before the advantages of servitization can replace and improve upon these losses. This provides an explanation why the oil industry appears to be trapped in the servitization paradox where any attempt to advance their level of servitization meets with a short-term negative outcome. This could be due to the beneficial qualities of high distrust and a reluctance to abandon these benefits.

In Figure 15 we can see that a significant proportion of the oil industry currently appears to follow the green dotted path to intermediate servitization and the eventual outcome of an adversarial relationship. To achieve advanced servitization, it is proposed that if an organization were to follow the blue dashed path and convert to a low distrust industry, they could achieve a cooperative relationship and advanced servitization. This conversion is difficult, as senior management must first understand the servitization paradox and devise a strategy to deal with it. Therefore, an understanding or education in the servitization paradox is required, which was not evident during the research, a finding which is reflected in the literature (Bertoni, Panarotto and Larsson, 2016).

The final practitioner contribution extends current understanding of servitization theory by showing that both the OC and SC believe the natural conclusion of servitization in the resulting environment would be biased in favour of the OC, instead of a balanced and mutually beneficial outcome, which is the accepted model (Baines and Lightfoot, 2013). It is, therefore, difficult to envisage how servitization can develop and become successful in the existing environment with the expectation that both parties will not act amicably. All the changes above require commitment from all levels of management to overcome the difficulties discussed. To make this commitment, management must be educated on the benefits of servitization and the mechanisms to make it work, or tensions and territoriality coupled with cynicism and fear of a biased application will prevent development and realisation of the compounded benefits of servitization.

### **5.2.3 Management Implications**

The purpose of this thesis is to both add to theory and the understanding of servitization and to provide useful insight for the practical application of servitization. The following section provides such insight into the practical applications of servitization drawn from the research and application of theory, both existing and new. The management implications are summarised below:

1. Education in servitization and the servitization paradox
2. Provision of a robust servitization strategy and infrastructure
3. Long term management commitment to servitization in place of a high distrust culture
4. Change of business practices in the organization and larger network

This research confirms extant literature (Bertoni, Panarotto and Larsson, 2016) by identifying a general tacit understanding that a highly servitized cooperative relationship would be good for business. In addition to this it was observed that all levels of management within the oil industry were largely unfamiliar with the subject of servitization, (Shi *et al.*, 2013; Salonen, Saglam



and Hacklin, 2017). Therefore, it is recommended that all tiers of management should become familiar with servitization theory and literature, specifically, on the application of servitization, the servitization paradox and deservitization in order to avoid the following potential difficulties. Such knowledge would also allow an organisation, and industry at large, to make an informed determination if servitization was the most appropriate strategy to meet their aspirations and goals. This research has shown that advanced levels of servitization may not be desirable for some industries, such as the oil industry. Such industries may prefer to remain in the default intermediate servitization level and benefit from the advantages of distrust that this position allows. However, it would appear that this default position in the oil industry was arrived at without a full understanding of servitization rather than an informed and directed strategy.

During all research phases of this thesis, it became clear that there was no defined servitization strategy in any of the organisations examined. A phrase that was repeatedly used was “organic” the term was further explored and confirmed to mean: to develop without guidance or a defined strategy. This finding is supported by literature, such as Ruiz-Alba *et al.* (2019), who described similar observations in pharmaceutical organizations who were “flying blind” in their application of servitization. The research supports existing theory by emphasizing that a lack of consistent support or a comprehensive servitization implementation strategy inhibits servitization (cf. Pettigrew, Ferlie and McKee, 1992). Given the general lack of servitization knowledge already discussed, this finding is not surprising, however, the repercussions of this lack of planning were manifold. Such a plan would undoubtedly reduce the disruption caused by servitization and circumvent many of the observed difficulties that are instrumental in the observed servitization paradox. Hence, management should prioritise the preparation of a robust servitization strategy. Failure to prepare such a strategy may incur the detrimental effects of deservitization.

Preparation of a servitization strategy would also cement management commitment to the long and difficult servitization process (Baines *et al.*, 2020). A lack of management commitment has been identified in this research as a significant factor in the failure of the servitization process to reach advanced levels. Management must be fully committed to a sustained implementation of servitization, even during the difficult business periods discussed previously. Furthermore, management commitment must transcend the volatile nature of the industry, as cooperative relationships derived from servitization may not emerge until advanced levels of servitization have been achieved. This research has identified that cooperation can exist before advanced, or even intermediate, levels of servitization are reached and this cooperation can be productive. However, inconsistently applied cooperation interspersed with adversarial behaviour may limit the potential benefit that an advanced level of servitization has the potential to deliver. Therefore, if an organization wishes to take advantage of increased cooperation and the benefits of closer working relationships through servitization, the management team and organizational structure need to be committed to achieving advanced levels of servitization. However, this management commitment must be implemented across all management tiers. Differences in strategic intent across organizations and between different managerial layers provide an impediment to servitization and increase the likelihood of failure.

For the successful implementation of servitization, specific servitization related support mechanisms need to be established to support the change process. A better understanding of servitization and a comprehensive servitization strategy would ensure that such support mechanisms are in place. Such a structured servitization strategy should also contain suitable safeguards to allocate, prevent, or lessen the impact of the changes caused by the servitization journey. The observed failure to devise, implement and support such a strategy across all management tiers may explain the lack of required management support and allocation of resources needed to reach the

advanced levels of servitization and provide a return on the investment. This may explain the apparent stagnation of the servitization process observed in the oil industry and similar organizations and industries observed in the academic literature (Andrews *et al.*, 2018; Raddats *et al.*, 2019).

Research has confirmed that the transition to a servitized organization is difficult and not without risk (Ulaga and Reinartz, 2011; Raddats *et al.*, 2018). Any organization wishing to implement servitization must commit fully to a paradigm shift in business practices (Barnett *et al.*, 2013). This research has shown that the adversarial strategy use by both OC and SC needs to change in order for servitization to progress beyond the current basic and intermediate levels. However, it must be recognised that a unilateral change by a single, or small group, of organizations is unlikely to be successful as each organization operates in a complex network (Story *et al.*, 2017). Therefore, an industry wide initiative would be required to change from a culture of high distrust to a low distrust culture to achieve advanced servitization. Such a paradigm change within the entire network is required to realise the financial and environmental advantages that advanced levels of servitization can achieve in the development of value co-creation and the efficient use of natural resources.

A transition from high distrust to advanced servitization would require sustained management support with a long-term perspective. Given that the intermediate steps to advanced servitization will have a lengthy negative, but temporary, outcome on business performance. Additionally, the volatile nature of this industry (Bergholt, Larsen and Seneca, 2019), and the current industry downturn (England, 2020) this support seems unlikely without a robust strategy and commitment to the servitization process. Therefore, any organization wishing to attempt the servitization process must first determine if they are content to continue benefiting from the existing culture of an intermediate servitization level and high distrust environment or see additional value and opportunity from undertaking the servitization process.

### **5.3 Limitations and Future Research**

The following section discusses the limitations of this research and the validity of the findings in relation to the research questions. This section also provides suggestions for further research that could build upon this work to add greater understanding of servitization and its application.

#### **5.3.1 Methodological Approach**

Pragmatism was the selected methodological approach used in this thesis and the papers which make up this thesis. Pragmatism's reliance on mixed methods has been criticised by some scholars. This criticism stems from the view that the usefulness of the mixed methods is not known in advance (Weaver, 2018). However, this potential limitation was mitigated due to the methods use of triangulation between several different research methods, with each compensating for the shortfalls of the other, thus, providing a robust set of findings.

This paradigm was versatile in that both quantitative and qualitative methods could be used and deductive, inductive and abductive logic could also be used. Whilst this versatility was beneficial there were findings which were identified for future research that could benefit from an alternative paradigm. For example, the finding relating to macro-economic influences on servitization could benefit from a positivist paradigm with more reliance upon a purely quantitative approach. However, despite the specificity of other paradigms, the pragmatic paradigm was well suited to the diversity of research methods and mix of quantitative and qualitative research methods used throughout each paper and the thesis as a whole.

#### **5.3.2 Servitization in the Oil Industry**

This research used the oil industry as the single focus of this thesis and the use of a single industry could be regarded as the most limiting factor of this research. Whilst, arguably results may not be generalisable, the findings of this study have provided the ability to focus on the detail and explanation of the causal process of servitization within the oil industry. Furthermore, this study

was conducted as part of a DBA degree and the inherently specific findings are instrumental in understanding the real-life business problems encountered within the oil industry. The oil industry was selected as the author had access to data and was familiar with the nuances of this industry. The DBA thesis seeks to take existing business theories and combine them with real-life business problems whilst expanding the body of knowledge in the field of study.

This industry was selected as it provides a good example of an industry that has had relationships with OC and SC in one form or another since the start of the 20<sup>th</sup> century (*History*, 2021). However, as this research has shown, the industry remains trapped in the servitization paradox, unable to progress beyond an intermediate level of servitization. This industry also operates in complex customer and manufacturer networks, thus providing a suitable context to explore these fields of research. Research in a single industry ensured that the findings were more robust by eliminating unrelated factors which could influence the data when comparing two or more different industries.

### **5.3.3 Adversarial Relationship**

The findings have shown that there is a common adversarial relationship between the OC and SC organizations at the expense of servitization and value co-creation. This finding was based upon an analysis of interviews and a test issued based upon game theory. The finding adequately addressed the second research question on business relationships. However, further testing using multiple scenarios may confirm the findings produced here and provide additional insight. Hence, it must be noted that due to the inherently complex and sometimes counterintuitive nature of game theory, the current format of the test required one-to-one interaction between the research subject and the researcher, removing the option of a self-administered electronic survey. This personal interaction limited the number of tests taken due to time constraints and other logistical issues, such as the ongoing COVID-19 global pandemic. A potential solution may be to present the test to a live or virtual panel with

some form of anonymous electronic voting system or paper ballot, allowing detailed explanation from the researcher and clarification from the research subjects.

The adversarial culture discovered was observed and allowed conclusions to be drawn with relevance to this thesis. Many participants in the interviews and observations identified that oil price was driven by industry specific fluctuations and the larger global economy. The cyclic nature of the oil price created an environment of cost cutting, and strict contract enforcement which may contribute to this adversarial culture. Exploration of this finding may provide additional insight into the causes of adversarial behaviour within the oil industry, but were beyond the scope of this research. However, a study to understand the causes of this behaviour may prove to be an interesting area of research for a researcher with specialist knowledge in this field. A study focusing on this financial and contractual aspect is, therefore, warranted to identify any causal link between cost cutting, contractual enforcement and its influence on the servitization process.

#### **5.3.4 Attitude to Servitization Between OC and SC**

This research has shown that there was agreement on many subjects, and that there were areas where manufacturers and customers had differing opinions. In many instances, explanations for these differences have been offered. For example, the research has identified that there is a statistically significant difference in servitization level within the SC when compared with the OC, and that each has a different attitude to change and risk. However, there remain several instances where an explanation was not possible or rooted in the psychology of the participants and, therefore beyond the scope of this thesis. It may be of interest to understand if these opinions were born of an organizational culture or a form of conditioning or industry norm (Appelbaum, Iaconi and Matousek, 2007), or the grouping of like minds (Haveman, 1993), or some other factor.

### **5.3.5 High Distrust -v- Advanced Servitization**

This research has provided evidence that the oil industry is subject to the servitization paradox due, at least in part, to its reluctance to forgo the advantages of high distrust. This finding addresses the final research question and suggests a mechanism by which the servitization paradox can be explained. Therefore, this finding is unlikely to be unique to the oil industry and further research would be of use to confirm these findings within the oil industry and other similar industries.

The discussion in this research took great care to interpret the definition of trust within the extant servitization literature, finding that its meaning was high trust and low distrust. Whilst this interpretation is supported by the findings of this paper, further research to confirm this interpretation would be beneficial to future research into the relationship between trust, distrust, servitization and the servitization paradox. Additionally, inclusion of such a definition of trust/distrust in future servitization literature would add clarity to that research to further explore the findings of this paper.

The need for further research has been identified in the relative advantages of high distrust and advanced servitization at an organization and network level. It could be the case that high distrust is more advantageous than advanced levels of servitization or vice versa. Research into the relative advantages may provide organizations and networks the knowledge needed to make an informed decision if advanced servitization is truly the best option for them.

### **5.3.6 COVID-19 Global Pandemic**

The research for this thesis commenced in 2019 and relied heavily upon interactions with subjects in the form of interviews and observations. However, as the COVID-19 pandemic took hold the opportunity for face-to-face research became more difficult, especially as businesses and whole communities went into lock-down. However, as the use of video conferencing tools such as Zoom and MS Teams became more mainstream the ability to conduct interviews using these technologies became feasible. Therefore, the

impact of COVID-19 created a delay in the ability to carry out research, but the increased use of video conferencing technology made it possible to finish the research to a satisfactory conclusion.



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## 6 References

- Abrahamson, E. (2004) 'Avoiding Repetitive Change Syndrome', *MIT Sloan Management Review*, 45(2), pp. 93–95.
- Adler, M. and Ziglio, E. (eds) (1996) *Gazing into the oracle: the Delphi method and its application to social policy and public health*. London: Jessica Kingsley Publishers.
- Adrodegari, F. and Saccani, N. (2020) 'A maturity model for the servitization of product-centric companies', *Journal of Manufacturing Technology Management*, 31(4), pp. 775–797. doi:10.1108/JMTM-07-2019-0255.
- Agostini, L. (2016) 'Organizational and Managerial Activities in the Development Process of Successful SME Marketing Networks', *European Management Review*, 13(2), pp. 91–106. doi:https://doi.org/10.1111/emre.12069.
- Aguilar, J. (1981) 'Insider research: an ethnography of a debate', in *Anthropologists at home in North America: methods and issues in the study of one's own society*. Cambridge: Cambridge University Press, pp. 15–28.
- Algaba, E., Fragnelli, V. and Sánchez-Soriano, J. (eds) (2019) *Handbook of the shapley value*. 1st edn. Boca Raton: Chapman & Hall.
- Alghisi, A. and Saccani, N. (2015) 'Internal and external alignment in the servitization journey – overcoming the challenges', *Production Planning & Control*, 26(14–15), pp. 1219–1232. doi:10.1080/09537287.2015.1033496.
- Alvarado, V. and Manrique, E. (2010) 'Enhanced Oil Recovery: An Update Review', *Energies*, 3(9), pp. 1529–1575. doi:10.3390/en3091529.
- Åm, K. and Heiberg, S. (2014) 'Public–private partnership for improved hydrocarbon recovery – Lessons from Norway's major development programs', *Energy Strategy Reviews*, 3, pp. 30–48. doi:10.1016/j.esr.2014.06.003.
- Anderson, J.C. and Narus, J.A. (1995) 'Capturing the Value of Supplementary Services', *Harvard Business Review*, 73(1), pp. 75–83.
- Andrews, D., Dmitrijeva, J., Bigdeli, A.Z. and Baines, T. (2018) 'Snakes and Ladders in Servitization: Using a Game to Capture Inhibitors and Enablers of Transformation', *Research-Technology Management*, 61(6), pp. 37–47. doi:10.1080/08956308.2018.1516930.
- Annarelli, A., Battistella, C. and Nonino, F. (2019) *The Road to Servitization: How Product Service Systems Can Disrupt Companies' Business Models*. Cham: Springer International Publishing. doi:10.1007/978-3-030-12251-5.
- Appelbaum, S.H., Iaconi, G.D. and Matousek, A. (2007) 'Positive and negative deviant workplace behaviors: causes, impacts, and solutions', *Corporate*

*Governance: The international journal of business in society*, 7(5), pp. 586–598. doi:10.1108/14720700710827176.

Ardichvili, A., Maurer, M., Li, W., Wentling, T. and Stuedemann, R. (2006) 'Cultural influences on knowledge sharing through online communities of practice', *Journal of Knowledge Management*, 10(1), pp. 94–107. doi:10.1108/13673270610650139.

Ashkanasy, N.M., Ayoko, O.B. and Jehn, K.A. (2014) 'Understanding the physical environment of work and employee behavior: An affective events perspective', *Journal of Organizational Behavior*, 35(8), pp. 1169–1184. doi:10.1002/job.1973.

Baines, T. and Lightfoot, H. (2013) *Made to Serve*. 1st edn. Chichester: John Wiley & Sons, Inc. doi:10.1002/9781119207955.

Baines, T. and Shi, V.G. (2015) 'A Delphi study to explore the adoption of servitization in UK companies', *Production Planning & Control*, 26(14–15), pp. 1171–1187. doi:10.1080/09537287.2015.1033490.

Baines, T., Ziaee Bigdeli, A., Bustinza, O.F., Shi, V.G., Baldwin, J. and Ridgway, K. (2017) 'Servitization: revisiting the state-of-the-art and research priorities', *International Journal of Operations & Production Management*, 37(2), pp. 256–278. doi:10.1108/IJOPM-06-2015-0312.

Baines, T., Ziaee Bigdeli, A., Sousa, R. and Schroeder, A. (2020) 'Framing the servitization transformation process: A model to understand and facilitate the servitization journey', *International Journal of Production Economics*, 221, pp. 1–16. doi:10.1016/j.ijpe.2019.07.036.

Baines, T.S., Lightfoot, H.W., Benedettini, O. and Kay, J.M. (2009) 'The servitization of manufacturing', *Journal of Manufacturing Technology Management*, 20(5), pp. 547–567. doi:10.1108/17410380910960984.

Ball, H.L. (2019) 'Conducting Online Surveys', *Journal of Human Lactation*, 35(3), pp. 413–417. doi:10.1177/0890334419848734.

Bandinelli, R. and Gamberi, V. (2011) 'Servitization in oil and gas sector: outcomes of a case study research', *Journal of Manufacturing Technology Management*, 23(1), pp. 87–102. doi:10.1108/17410381211196302.

Barnett, N.J., Parry, G., Saad, M., Newnes, L.B. and Goh, Y.M. (2013) 'Servitization: Is a Paradigm Shift in the Business Model and Service Enterprise Required?', *Strategic Change*, 22(3–4), pp. 145–156. doi:10.1002/jsc.1929.

Baruch, Y. and Holtom, B.C. (2008) 'Survey response rate levels and trends in organizational research', *Human Relations*, 61(8), pp. 1139–1160. doi:10.1177/0018726708094863.

- Batras, D., Duff, C. and Smith, B.J. (2014) 'Organizational change theory: implications for health promotion practice', *Health Promotion International*, 31(1), pp. 231–241. doi:10.1093/heapro/dau098.
- BBC News (2016) *BP says total Gulf spill bill \$61.6bn*, *BBC News*. Available at: <https://www.bbc.com/news/36798842> (Accessed: 5 March 2019).
- Beale, N. and Nethercott, S. (1988) 'Certificated sickness absence in industrial employees threatened with redundancy', *Br Med J (Clin Res Ed)*, 296(6635), pp. 1508–1510. doi:10.1136/bmj.296.6635.1508.
- Benedettini, O., Neely, A. and Swink, M. (2015) 'Why do servitized firms fail? A risk-based explanation', *International Journal of Operations & Production Management*, 35(6), pp. 946–979. doi:10.1108/IJOPM-02-2014-0052.
- Bentley, R.W. (2002) 'Global oil & gas depletion: an overview', *Energy Policy*, 30(3), pp. 189–205. doi:10.1016/S0301-4215(01)00144-6.
- Beretta, R. (1996) 'A critical review of the Delphi technique: The Delphi technique is a useful method for surveying informed opinion but researchers should be aware of all its pros and cons, suggests Ruth Beretta', *Nurse Researcher*, 3(4), pp. 79–89. doi:10.7748/nr.3.4.79.s8.
- Bergholt, D., Larsen, V.H. and Seneca, M. (2019) 'Business cycles in an oil economy', *Journal of International Money and Finance*, 96, pp. 283–303. doi:10.1016/j.jimonfin.2017.07.005.
- Bertoni, M., Panarotto, M. and Larsson, T.C. (2016) 'Boundary objects for PSS Design', *Procedia CIRP*, 47, pp. 329–334. doi:10.1016/j.procir.2016.03.226.
- Bhaskar, R. (2011) *Reclaiming reality: a critical introduction to contemporary philosophy*. 1st edn. London: Routledge (Classical texts in critical realism).
- Bigdeli, A., Baines, T., Bustinza, O.F. and Shi, V. (2017) 'Organisational change towards servitization: a theoretical framework', *Competitiveness Review*, 27(1), pp. 12–39. doi:10.1108/CR-03-2015-0015.
- Bigdeli, A.Z., Baines, T.S., Bustinza Sánchez, Ó.F. and Shi, V.G. (2015) 'Holistic approach to evaluating servitization: A content, context, process framework', in *Operations management for sustainable competitiveness*. Neuchâtel: Université de Neuchâtel. Available at: <http://hdl.handle.net/10481/40948> (Accessed: 7 October 2018).
- Blackhurst, J., Wu, T. and Craighead, C.W. (2008) 'A systematic approach for supply chain conflict detection with a hierarchical Petri Net extension', *Omega*, 36(5), pp. 680–696. doi:10.1016/j.omega.2006.02.001.
- Blake, R.R. and Mouton, J.S. (1961) 'Reactions to Intergroup Competition under Win-Lose Conditions', *Management Science*, 7(4), pp. 420–435.

Blois, K.J. (1999) 'Trust in Business to Business Relationships: An Evaluation of its Status', *Journal of Management Studies*, 36(2), pp. 197–215. doi:10.1111/1467-6486.00133.

Bouso, R. (2018) *BP Deepwater Horizon costs balloon to \$65 billion*, Reuters. Available at: <https://www.reuters.com/article/us-bp-deepwaterhorizon/bp-deepwater-horizon-costs-balloon-to-65-billion-idUSKBNIF50NL> (Accessed: 5 March 2019).

Boyle, J. (1994) 'Styles of Ethnography', in *Critical issues in qualitative research methods*. Thousand Oaks: Sage Publications, pp. 158–185.

Brady, S.R. (2015) 'Utilizing and Adapting the Delphi Method for Use in Qualitative Research', *International Journal of Qualitative Methods*, 14(5), p. 160940691562138. doi:10.1177/1609406915621381.

Bratman, M.E. (1999) *Faces of Intention: Selected Essays on Intention and Agency*. 1st edn. Cambridge University Press. doi:10.1017/CBO9780511625190.

Brax, S. (2005) 'A manufacturer becoming service provider – challenges and a paradox', *Managing Service Quality: An International Journal*, 15(2), pp. 142–155. doi:10.1108/09604520510585334.

Brewer, J. (2004) 'Ethnography', in *Essential guide to qualitative methods in organizational research*. London: SAGE Publications, pp. 332–342.

Brewer, J. and Hunter, A. (1989) *Multimethod research: A synthesis of styles*. 1st edn. Thousand Oaks: Sage.

Brown, G. and Zhu, H. (2016) 'My workspace, not yours: The impact of psychological ownership and territoriality in organizations', *Journal of Environmental Psychology*, 48, pp. 54–64. doi:10.1016/j.jenvp.2016.08.001.

Bryman, A. (2004) 'Triangulation', in *The SAGE Encyclopedia of Social Science Research Methods*. Thousand Oaks: Sage Publications, Inc., pp. 1142–1143. doi:10.4135/9781412950589.n1031.

Bryman, A. (2012) *Social Research Methods*. 4th edn. Oxford: Oxford University Press.

Bülow, A.M. and Kumar, R. (2011) 'Culture and Negotiation', *International Negotiation*, 16(3), pp. 349–359. doi:10.1163/157180611X592905.

Burke, W.W. and Litwin, G.H. (1992) 'A Causal Model of Organizational Performance and Change', *Journal of Management*, 18(3), pp. 523–545. doi:10.1177/014920639201800306.

Burton, J., Story, V., Zolkiewski, J., Raddats, C., Baines, T.S. and Medway, D. (2016) 'Identifying Tensions in the Servitized Value Chain', *Research-*

*Technology Management*, 59(5), pp. 38–47.  
doi:10.1080/08956308.2016.1208042.

Burton, J., Story, V.M., Raddats, C. and Zolkiewski, J. (2017) ‘Overcoming the challenges that hinder new service development by manufacturers with diverse services strategies’, *International Journal of Production Economics*, 192(October 2017), pp. 29–39. doi:10.1016/j.ijpe.2017.01.013.

Calleja, P. and Llerena, F. (2020) ‘Consistency, weak fairness, and the Shapley value’, *Mathematical Social Sciences*, 105, pp. 28–33.  
doi:10.1016/j.mathsocsci.2020.04.001.

Cañibano, C., Encinar, M.-I. and Muñoz, F.-F. (2006) ‘Evolving capabilities and innovative intentionality: Some reflections on the role of intention within innovation processes’, *Innovation*, 8(4–5), pp. 310–321.  
doi:10.5172/impp.2006.8.4.310.

Carson, D., Gilmore, A., Perry, C. and Gronhaug, K. (2001) ‘Philosophy of research’, in *Qualitative Marketing Research*. London: SAGE Publications, Ltd.  
doi:10.4135/9781849209625.

Chatterjee, K. and Samuelson, W. (2014) *Game Theory and Business Applications*. 2nd edn. Boston: Springer.

Cook, K.S., Hardin, R. and Levi, M. (2009) *Cooperation without trust?* New York: Russell Sage Foundation.

Corley, K.G. and Gioia, D. a. (2004) ‘Identity Ambiguity and Change in the Wake of a Corporate Spin-off’, *Administrative Science Quarterly*, 49(2), pp. 173–208. doi:10.2307/4131471.

Creswell, J.W. (2010) ‘Mapping the Developing Landscape of Mixed Methods Research’, in *SAGE Handbook of Mixed Methods in Social & Behavioral Research*. 2nd edn. Thousand Oaks: SAGE Publications, Inc., pp. 45–68.  
doi:10.4135/9781506335193.n2.

Creswell, J.W. and Creswell, J.D. (2018) *Research design: qualitative, quantitative, and mixed methods approaches*. 5th edn. Los Angeles: SAGE.

Critcher, C. and Gladstone, B. (1998) ‘Utilizing the Delphi Technique in Policy Discussion: A Case Study of a Privatized Utility in Britain’, *Public Administration*, 76(3), pp. 431–449. doi:10.1111/1467-9299.00110.

Crowley, E., Burton, J. and Zolkiewski, J. (2018) ‘Servitization intent as a factor in the servitization process’, *Journal of Business and Industrial Marketing*, 33(8), pp. 1125–1140. doi:10.1108/JBIM-08-2016-0199.

- Czinkota, M.R. and Ronkainen, I.A. (1997) 'International Business and Trade in the Next Decade: Report from a Delphi Study', *Journal of International Business Studies*, 28(4), pp. 827–844. doi:10.1057/palgrave.jibs.8490121.
- Davies, A., Brady, T. and Hobday, M. (2006) 'Charting a Path Toward Integrated Solutions', *MIT Sloan Management Review*, 47(3), pp. 39–48.
- Deming, W.E. (2011) *The New Economics*. 2nd edn. Cambridge: MIT Press.
- Denzin, N.K. (1978) *The Research Act*. 1st edn. Chicago: Aldine.
- Deutsch, M. (1958) 'Trust and suspicion', *Journal of Conflict Resolution*, 2(4), pp. 265–279. doi:10.1177/002200275800200401.
- Diamond, I.R., Grant, R.C., Feldman, B.M., Pencharz, P.B., Ling, S.C., Moore, A.M. and Wales, P.W. (2014) 'Defining consensus: A systematic review recommends methodologic criteria for reporting of Delphi studies', *Journal of Clinical Epidemiology*, 67(4), pp. 401–409. doi:10.1016/j.jclinepi.2013.12.002.
- Dickens, G.R. (2004) 'Hydrocarbon-driven warming', *Nature*, 429(6991), pp. 513–515. doi:10.1038/429513a.
- van Dijk, R. and van Dick, R. (2009) 'Navigating Organizational Change: Change Leaders, Employee Resistance and Work-based Identities', *Journal of Change Management*, 9(2), pp. 143–163. doi:10.1080/14697010902879087.
- Dinges, V., Urmetzer, F., Martinez, V., Zaki, M. and Neely, A. (2015) *The Future of Servitization: Technologies that will make a difference*. Cambridge: University of Cambridge, p. 16. Available at: <https://cambridgeservicealliance.eng.cam.ac.uk/news/ServitizationTechnologies> (Accessed: 17 May 2022).
- Dixit, A.K. and Nalebuff, B.J. (2010) *The Art of Strategy: A Game Theorist's Guide to Success in Business and Life*. 1st edn. London: W. W. Norton & Company.
- Dmitrijeva, J., Schroeder, A., Ziaee Bigdeli, A. and Baines, T. (2019) 'Context matters: how internal and external factors impact servitization', *Production Planning & Control*, pp. 1–21. doi:10.1080/09537287.2019.1699195.
- Dubois, A. and Gadde, L.-E. (2002) 'Systematic combining: an abductive approach to case research', *Journal of Business Research*, 55(7), pp. 553–560. doi:10.1016/S0148-2963(00)00195-8.
- Dyer, J.H. and Nobeoka, K. (2000) 'Creating and managing a high-performance knowledge-sharing network: the Toyota case', *Strategic Management Journal*, 21(3), pp. 345–367. doi:10.1002/(SICI)1097-0266(200003)21:3<345::AID-SMJ96>3.0.CO;2-N.

- Easterby-Smith, M., Thorpe, R. and Jackson, P.R. (2012) *Management Research*. 4th edn. London: SAGE.
- Easton, G. (2010) 'Critical realism in case study research', *Industrial Marketing Management*, 39(1), pp. 118–128. doi:10.1016/j.indmarman.2008.06.004.
- Edwards, P.K., O'Mahoney, J. and Vincent, S. (eds) (2014) *Studying organizations using critical realism: a practical guide*. First edition. Oxford, United Kingdom: Oxford University Press.
- Elkind, E. and Rothe, J. (2016) 'Cooperative Game Theory', in *Economics and Computation: An Introduction to Algorithmic Game Theory, Computational Social Choice, and Fair Division*. Berlin: Springer, pp. 135–193. doi:10.1007/978-3-662-47904-9\_3.
- England, J. (2020) *Lower for Longer and the Risk of Oil and Gas Underinvestment*, Deloitte United States. Available at: <https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/lower-for-longer-risk-oil-gas-underinvestment.html> (Accessed: 2 March 2020).
- Eriksson, P.E., Patel, P.C., Sjödin, D.R., Frishammar, J. and Parida, V. (2016) 'Managing Interorganizational Innovation Projects: Mitigating the Negative Effects of Equivocality Through Knowledge Search Strategies', *Long Range Planning*, 49(6), pp. 691–705. doi:10.1016/j.lrp.2016.05.006.
- Evans, J.R. and Mathur, A. (2005) 'The value of online surveys', *Internet Research*, 15(2), pp. 195–219. doi:10.1108/10662240510590360.
- Fang, E. (Er), Palmatier, R.W. and Steenkamp, J.-B.E.M. (2008) 'Effect of Service Transition Strategies on Firm Value', *Journal of Marketing*, 72(5), pp. 1–14. doi:10.1509/jmkg.72.5.001.
- Farr, J.V. and Brazil, D.M. (2009) 'Leadership Skills Development for Engineers', *Engineering Management Journal*, 21(1), pp. 3–8. doi:10.1080/10429247.2009.11431792.
- Ferreira, F.N.H., Proença, J.F., Spencer, R. and Cova, B. (2013) 'The transition from products to solutions: External business model fit and dynamics', *Industrial Marketing Management*, 42(7), pp. 1093–1101. doi:10.1016/j.indmarman.2013.07.010.
- Ferri, C.P., Prince, M., Brayne, C., Brodaty, H., Fratiglioni, L., Ganguli, M., Hall, K., Hasegawa, K., Hendrie, H., Huang, Y., Jorm, A., Mathers, C., Menezes, P.R., Rimmer, E. and Sczufca, M. (2005) 'Global prevalence of dementia: a Delphi consensus study', *The Lancet*, 366(9503), pp. 2112–2117. doi:10.1016/S0140-6736(05)67889-0.



- Finkel, M.L. (2018) 'The impact of oil sands on the environment and health', *Current Opinion in Environmental Science & Health*, 3, pp. 52–55. doi:10.1016/j.coesh.2018.05.002.
- Finne, M. and Holmström, J. (2013) 'A manufacturer moving upstream: triadic collaboration for service delivery', *Supply Chain Management: An International Journal*, 18(1), pp. 21–33. doi:10.1108/13598541311293159.
- Flick, U. (2009) *An Introduction to Qualitative Research*. 4th edn. Los Angeles: SAGE.
- Ford, D. and Redwood, M. (2005) 'Making sense of network dynamics through network pictures: A longitudinal case study', *Industrial Marketing Management*, 34(7), pp. 648–657. doi:10.1016/j.indmarman.2005.05.008.
- Gaiardelli, P., Resta, B., Martinez, V., Pinto, R. and Albores, P. (2014) 'A classification model for product-service offerings', *Journal of Cleaner Production*, 66, pp. 507–519. doi:10.1016/j.jclepro.2013.11.032.
- Galvin, R. (2015) 'How many interviews are enough? Do qualitative interviews in building energy consumption research produce reliable knowledge?', *Journal of Building Engineering*, 1, pp. 2–12. doi:10.1016/j.jobe.2014.12.001.
- Gao, L. (2019) 'Evolutionary game analysis of servitization transformation in manufacturing enterprises', in *2019 5th International Conference on Green Power, Materials and Manufacturing Technology and Applications (GPMMTA 2019)*, Taiyuan, China, pp. 1–6. doi:10.1063/1.5137849.
- Gearhart, S., Adegbola, O. and Huemmer, J. (2019) 'Where's the fracking bias?: Contested media frames and news reporting on shale gas in the United States', *Energy Research & Social Science*, 51(February), pp. 168–175. doi:10.1016/j.erss.2019.01.010.
- Gebauer, H., Fleisch, E. and Friedli, T. (2005) 'Overcoming the Service Paradox in Manufacturing Companies', *European Management Journal*, 23(1), pp. 14–26. doi:10.1016/j.emj.2004.12.006.
- Gebauer, H., Friedli, T. and Fleisch, E. (2006) 'Success factors for achieving high service revenues in manufacturing companies', *Benchmarking: An International Journal*, 13(3), pp. 374–386. doi:10.1108/14635770610668848.
- Gebauer, H. and Kowalkowski, C. (2012) 'Customer-focused and service-focused orientation in organizational structures', *Journal of Business & Industrial Marketing*, 27(7), pp. 527–537. doi:10.1108/08858621211257293.
- Gioia, D.A., Corley, K.G. and Hamilton, A.L. (2013) 'Seeking Qualitative Rigor in Inductive Research', *Organizational Research Methods*, 16(1), pp. 15–31. doi:10.1177/1094428112452151.

- Goodyear Total Mobility (2015) Goodyear. Available at: [https://www.goodyear.eu:443/uk\\_en/truck/services/goodyear-total-mobility.jsp](https://www.goodyear.eu:443/uk_en/truck/services/goodyear-total-mobility.jsp) (Accessed: 19 December 2020).
- Gordon, G.G. (1991) 'Industry Determinants of Organizational Culture', *The Academy of Management Review*, 16(2), pp. 396–415. doi:10.2307/258868.
- Gordon, W. (2011) 'Behavioural Economics and Qualitative Research – A Marriage Made in Heaven?', *International Journal of Market Research*, 53(2), pp. 171–185. doi:10.2501/IJMR-53-2-171-186.
- Greene, J.C., Caracelli, V.J. and Graham, W.F. (1989) 'Toward a Conceptual Framework for Mixed-Method Evaluation Designs', *Educational Evaluation and Policy Analysis*, 11(3), pp. 255–274. doi:10.3102/01623737011003255.
- Grix, J. (2002) 'Introducing Students to the Generic Terminology of Social Research', *Politics*, 22(3), pp. 175–186. doi:10.1111/1467-9256.00173.
- Guo, S.-L., Lumineau, F. and Lewicki, R.J. (2017) 'Revisiting the Foundations of Organizational Distrust', *Foundations and Trends in Management*, 1(1), pp. 1–88. doi:10.1561/34000000001.
- Håkansson, H. and Ford, D. (2002) 'How should companies interact in business networks?', *Journal of Business Research*, 55(2), pp. 133–139. doi:10.1016/S0148-2963(00)00148-X.
- Håkansson, H. and Snehota, I. (eds) (2017) *No business is an island: making sense of the interactive business world*. 1st edn. Bingley: Emerald Publishing.
- Hallowell, M.R. and Gambatese, J.A. (2010) 'Qualitative Research: Application of the Delphi Method to CEM Research', *Journal of Construction Engineering and Management*, 136(1), pp. 99–107. doi:10.1061/(ASCE)CO.1943-7862.0000137.
- Hammoudi, A. (2018) *Game theory approach to managerial strategies and value creation*. 1st edn. Hoboken: John Wiley and Sons Inc.
- Harrison, R.L., Reilly, T.M. and Creswell, J.W. (2020) 'Methodological Rigor in Mixed Methods: An Application in Management Studies', *Journal of Mixed Methods Research*, 14(4), pp. 473–495. doi:10.1177/1558689819900585.
- Hartwig, F.P., Smith, G.D., Schmidt, A.F., Sterne, J.A.C., Higgins, J.P.T. and Bowden, J. (2020) 'The median and the mode as robust meta-analysis estimators in the presence of small-study effects and outliers', *Research Synthesis Methods*, 11(3), pp. 397–412. doi:10.1002/jrsm.1402.
- Hasson, F., Keeney, S. and McKenna, H. (2000) 'Research guidelines for the Delphi survey technique', *Journal of Advanced Nursing*, 32(4), pp. 1008–1015. doi:10.1046/j.1365-2648.2000.t01-1-01567.x.

- Haveman, H.A. (1993) 'Follow the Leader: Mimetic Isomorphism and Entry Into New Markets', *Administrative Science Quarterly*, 38(4), pp. 593–627. doi:10.2307/2393338.
- Henneberg, S.C., Gruber, T. and Naudé, P. (2013) 'Services networks: Concept and research agenda', *Industrial Marketing Management*, 42(1), pp. 3–8. doi:10.1016/j.indmarman.2012.11.013.
- Hepsø, V. (2012) 'Doing Corporate Ethnography as an Insider (Employee)', in *Advancing Ethnography in Corporate Environments*. 1st edn. Walnut Creek: Taylor & Francis Group, pp. 151–174.
- Hezarkhani, B. (2017) 'Optimal design of uptime-guarantee contracts under IGFR valuations and convex costs', *European Journal of Operational Research*, 256(2), pp. 556–566. doi:10.1016/j.ejor.2016.06.032.
- History* (2021) *Innovation from day one*. Available at: <https://www.halliburton.com/en/about-us/history?node-id=hgeyxt5y> (Accessed: 28 November 2021).
- Homburg, C., Hoyer, W.D. and Fassnacht, M. (2002) 'Service Orientation of a Retailer's Business Strategy: Dimensions, Antecedents, and Performance Outcomes', *Journal of Marketing*, 66(4), pp. 86–101. doi:10.1509/jmkg.66.4.86.18511.
- Huikkola, T., Rabetino, R., Kohtamäki, M. and Gebauer, H. (2020) 'Firm boundaries in servitization: Interplay and repositioning practices', *Industrial Marketing Management*, 90, pp. 90–105. doi:10.1016/j.indmarman.2020.06.014.
- 'Inefficiency' (2022) *Cambridge Dictionary*. Available at: <https://dictionary.cambridge.org/dictionary/english/inefficiency> (Accessed: 16 May 2022).
- Iriarte, I., Hoveskog, M., Justel, D., Val, E. and Halila, F. (2018) 'Service design visualization tools for supporting servitization in a machine tool manufacturer', *Industrial Marketing Management*, 71, pp. 189–202. doi:10.1016/j.indmarman.2018.01.003.
- Jay, J. (2013) 'Navigating Paradox as a Mechanism of Change and Innovation in Hybrid Organizations', *Academy of Management Journal*, 56(1), pp. 137–159. doi:10.5465/amj.2010.0772.
- Johnson, J.L. (1976) 'A ten-year Delphi forecast in the electronics industry', *Industrial Marketing Management*, 5(1), pp. 45–55. doi:10.1016/0019-8501(76)90009-2.

Johnson, K.J. (2016) 'The dimensions and effects of excessive change', *Journal of Organizational Change Management*, 29(3), pp. 445–459. doi:10.1108/JOCM-11-2014-0215.

Johnson, K.J., Bareil, C., Giraud, L. and Autissier, D. (2016) 'Excessive change and coping in the working population', *Journal of Managerial Psychology*, 31(3), pp. 739–755. doi:10.1108/JMP-12-2014-0352.

Johnson, P. and Duberley, J. (2011) 'Pragmatism and Critical Realism - Transcending Descartes' Either/Or?', in *Understanding Management Research*. London: SAGE Publications Ltd, pp. 149–176. doi:10.4135/9780857020185.n7.

Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A. (2007) 'Toward a Definition of Mixed Methods Research', *Journal of Mixed Methods Research*, 1(2), pp. 112–133. doi:10.1177/1558689806298224.

Johnstone, S., Wilkinson, A. and Dainty, A. (2014) 'Reconceptualizing the Service Paradox in Engineering Companies: Is HR a Missing Link?', *IEEE Transactions on Engineering Management*, 61(2), pp. 275–284. doi:10.1109/TEM.2013.2289738.

Jones, G.R. (2013) *Organizational theory, design, and change*. 7th edn. Boston: Pearson.

Jones, G.R. and George, J.M. (2016) *Contemporary Management*. 9th edn. New York: McGraw-Hill.

Jones, J. (2020) *Oil & Gas Industry Trends, Market Volatility and Asset Values*. Available at: <https://www.gordonbrothers.com/insights/industry-insights/energy-oil-gas> (Accessed: 13 September 2020).

Jovanovic, M., Engwall, M. and Jerbrant, A. (2016) 'Matching Service Offerings and Product Operations: A Key to Servitization Success', *Research-Technology Management*, 59(3), pp. 29–36. doi:10.1080/08956308.2016.1161403.

Kamalaldin, A., Linde, L., Sjödin, D. and Parida, V. (2020) 'Transforming provider-customer relationships in digital servitization: A relational view on digitalization', *Industrial Marketing Management*, 89, pp. 306–325. doi:10.1016/j.indmarman.2020.02.004.

Kamp, B. and Parry, G. (2017) 'Servitization and advanced business services as levers for competitiveness', *Industrial Marketing Management*, 60, pp. 11–16. doi:10.1016/j.indmarman.2016.12.008.

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), pp. 169–180. doi:10.1016/j.jom.2013.02.001.

- Keeney, S., Hasson, F. and McKenna, H. (2011) *The Delphi Technique in Nursing and Health Research*. Oxford: Wiley-Blackwell. doi:10.1002/9781444392029.
- Kemp, A.G. and Stephen, L. (1999) 'Risk:reward sharing contracts in the oil industry: the effects of bonus:penalty schemes', *Energy Policy*, 27(2), pp. 111–120. doi:10.1016/S0301-4215(98)00069-X.
- Kennedy, H.P. (2004) 'Enhancing Delphi research: methods and results', *Journal of Advanced Nursing*, 45(5), pp. 504–511. doi:10.1046/j.1365-2648.2003.02933.x.
- Kesicki, F. (2010) 'The third oil price surge - What's different this time?', *Energy Policy*, 38(3), pp. 1596–1606. doi:10.1016/j.enpol.2009.11.044.
- Kezar, A. and Maxey, D. (2016) 'The Delphi technique: an untapped approach of participatory research', *International Journal of Social Research Methodology*, 19(2), pp. 143–160. doi:10.1080/13645579.2014.936737.
- Kim, S. and Toya, K. (2019) 'Leadership style required for the transition to servitization in Japan', *Journal of Manufacturing Technology Management*, 30(2), pp. 335–352. doi:10.1108/JMTM-02-2018-0034.
- King, N. and Brooks, J. (2018) 'Thematic Analysis in Organisational Research', in *The SAGE Handbook of Qualitative Business and Management Research Methods: Methods and Challenges*. London: SAGE Publications Ltd, pp. 219–236. doi:10.4135/9781526430236.n14.
- King, Nigel. and Horrocks, C. (2010) *Interviews in qualitative research*. 2nd edn. Los Angeles: Sage Publications Ltd.
- Kohtamäki, M., Baines, T., Rabetino, R. and Bigdeli, A.Z. (2018) *Practices and Tools for Servitization*. Cham: Springer International Publishing. doi:10.1007/978-3-319-76517-4.
- Kohtamäki, M., Baines, T., Rabetino, R., Bigdeli, A.Z., Kowalkowski, C., Oliva, R. and Parida, V. (eds) (2021) *The Palgrave Handbook of Servitization*. Cham: Springer International Publishing. doi:10.1007/978-3-030-75771-7.
- Kohtamäki, M., Einola, S. and Rabetino, R. (2020) 'Exploring servitization through the paradox lens: Coping practices in servitization', *International Journal of Production Economics*, 226, p. 107619. doi:10.1016/j.ijpe.2020.107619.
- Kohtamäki, M., Parida, V., Oghazi, P., Gebauer, H. and Baines, T. (2019) 'Digital servitization business models in ecosystems: A theory of the firm', *Journal of Business Research*, 104, pp. 380–392. doi:10.1016/j.jbusres.2019.06.027.

- Koivisto, J. and Hamari, J. (2019) 'The rise of motivational information systems: A review of gamification research', *International Journal of Information Management*, 45, pp. 191–210. doi:10.1016/j.ijinfomgt.2018.10.013.
- Kowalkowski, C., Gebauer, H., Kamp, B. and Parry, G. (2017) 'Servitization and deservitization: Overview, concepts, and definitions', *Industrial Marketing Management*, 60, pp. 4–10. doi:10.1016/j.indmarman.2016.12.007.
- Kowalkowski, C. and Kindström, D. (2013) 'Servitization in manufacturing firms: a business model perspective.', in *Spring Servitization Conference*.
- 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*, 45(1), pp. 59–69. doi:10.1016/j.indmarman.2015.02.016.
- Kramer, R.M. (1999) 'Trust and Distrust in Organizations: Emerging Perspectives, Enduring Questions', *Annual Review of Psychology*, 50(1), pp. 569–598. doi:10.1146/annurev.psych.50.1.569.
- Kremer, D., Seregini, M., Canepa, A., Zanetti, C. and Gusmeroli, S. (2016) 'The Focus-activity Framework for Evaluating PSS Cooperation Readiness of Manufacturing Firms', *Procedia CIRP*, 47, pp. 132–137. doi:10.1016/j.procir.2016.03.234.
- Kreye, M. and Lewis, M.A. (2015) 'Servitization and service recovery: Can you be too close for comfort?', in *22nd EurOMA Conference*. Denmark: European Operations Management Association, p. 11.
- Kumar, R. and Markeset, T. (2007) 'Development of performance-based service strategies for the oil and gas industry: a case study', *Journal of Business & Industrial Marketing*, 22(4), pp. 272–280. doi:10.1108/08858620710754531.
- Lafuente, E., Vaillant, Y. and Vendrell-Herrero, F. (2017) 'Territorial servitization: Exploring the virtuous circle connecting knowledge-intensive services and new manufacturing businesses', *International Journal of Production Economics*, 192, pp. 19–28. doi:10.1016/j.ijpe.2016.12.006.
- Lee, Jeongyoon and Lee, Junesoo (2018) 'When you trust and distrust the other side: The roles of asymmetric power in a policy network', *Academy of Management Proceedings*, 2018(1), p. 11026. doi:10.5465/AMBPP.2018.199.
- Lee, S., Yoo, S. and Kim, D. (2016) 'When is servitization a profitable competitive strategy?', *International Journal of Production Economics*, 173, pp. 43–53. doi:10.1016/j.ijpe.2015.12.003.
- Lenka, S., Parida, V., Sjödin, D.R. and Wincent, J. (2018a) 'Exploring the microfoundations of servitization: How individual actions overcome

organizational resistance', *Journal of Business Research*, 88, pp. 328–336. doi:10.1016/j.jbusres.2017.11.021.

Lenka, S., Parida, V., Sjödin, D.R. and Wincent, J. (2018b) 'Towards a multi-level servitization framework', *International Journal of Operations & Production Management*, 38(3), pp. 810–827. doi:10.1108/IJOPM-09-2016-0542.

Lewicki, R., Elgoibar, P. and Euwema, M. (2016) 'The Tree of Trust: Building and Repairing Trust in Organizations', in *Building Trust and Constructive Conflict Management in Organizations*. Cham: Springer International Publishing, pp. 93–117. doi:10.1007/978-3-319-31475-4\_6.

Lewicki, R.J., McAllister, D.J. and Bies, R.J. (1998) 'Trust and Distrust: New Relationships and Realities', *The Academy of Management Review*, 23(3), pp. 438–458. doi:10.2307/259288.

Lewin, K. (1942) 'Field theory and learning.', in *The forty-first yearbook of the National Society for the Study of Education: Part II, The psychology of learning*. Chicago: University of Chicago Press, pp. 215–242. doi:10.1037/11335-006.

Lewin, K. (1947) 'Frontiers in Group Dynamics', *Human Relations*, 1(2), pp. 143–153. doi:10.1177/001872674700100201.

Lexutt, E. (2020) 'Different roads to servitization success – A configurational analysis of financial and non-financial service performance', *Industrial Marketing Management*, 84(June), pp. 105–125. doi:10.1016/j.indmarman.2019.06.004.

Lima, B.B. de, Câmara, S.F., Mota, T.L.N. da G., Silva, A.L. e and Padilha, P. (2018) 'Management of Innovation Networks: a choice for collaboration considering the game theory', *Business and Management Studies*, 4(2), p. 24. doi:10.11114/bms.v4i2.3003.

Linstone, H.A. and Turoff, M. (1975) *The Delphi Method - Techniques and Applications*. London: Addison-Wesley.

Liu, C., Zhang, G. and Gao, P. (2020) 'A Meta-Analysis of the Relationship Between Servitization and Firm Performance', in *Proceedings of the Fifth International Conference on Economic and Business Management (FEBM 2020)*. Fifth International Conference on Economic and Business Management (FEBM 2020), Sanya, China: Atlantis Press. doi:10.2991/aebmr.k.201211.077.

Loo, R. (2002) 'The Delphi method: a powerful tool for strategic management', *Policing: An International Journal of Police Strategies & Management*, 25(4), pp. 762–769. doi:10.1108/13639510210450677.

- Lorusso, M. and Pieroni, L. (2018) 'Causes and consequences of oil price shocks on the UK economy', *Economic Modelling*, 72(February), pp. 223–236. doi:10.1016/j.econmod.2018.01.018.
- Ludwig, B.G. (1994) *Internationalizing Extension: An exploration of the characteristics evident in a state university Extension system that achieves internationalization*. Unpublished doctoral dissertation. Ohio State University. Available at: [https://etd.ohiolink.edu/!etd.send\\_file?accession=osul487849377294225&disposition=inline](https://etd.ohiolink.edu/!etd.send_file?accession=osul487849377294225&disposition=inline).
- Luhmann, N. (1979) *Trust and power*. Chichester: Wiley.
- Lusch, R.F. and Nambisan, S. (2015) 'Service Innovation: A Service-Dominant Logic Perspective', *MIS Quarterly*, 39(1), pp. 155–175. doi:10.25300/MISQ/2015/39.1.07.
- Lütjen, H., Tietze, F. and Schultz, C. (2017) 'Service transitions of product-centric firms: An explorative study of service transition stages and barriers in Germany's energy market', *International Journal of Production Economics*, 192, pp. 106–119. doi:10.1016/j.ijpe.2017.03.021.
- Ma, R., Feng, C. and Jiang, L. (2020) 'Evolutionary Game Analysis of Service Outsourcing Strategy for Manufacturing Enterprises Based on Servitization', in *LISS2019*. Singapore: Springer, pp. 257–272. doi:10.1007/978-981-15-5682-1\_19.
- MacDuffie, J.P. (2011) 'Inter-organizational trust and the dynamics of distrust', *Journal of International Business Studies*, 42(1), pp. 35–47. doi:10.1057/jibs.2010.54.
- Maheepala, S.D.S.R., Warnakulasooriya, B.N.F. and Weerakoon Banda, Y.K. (2018) 'Measuring Servitization', in *Practices and Tools for Servitization*. Cham: Springer International Publishing, pp. 41–58. doi:10.1007/978-3-319-76517-4\_3.
- Makkonen, M., Pätäri, S., Jantunen, A. and Viljainen, S. (2012) 'Competition in the European electricity markets – outcomes of a Delphi study', *Energy Policy*, 44, pp. 431–440. doi:10.1016/j.enpol.2012.02.014.
- Marshall, S.L. and While, A.E. (1994) 'Interviewing respondents who have English as a second language: challenges encountered and suggestions for other researchers', *Journal of Advanced Nursing*, 19(3), pp. 566–571. doi:10.1111/j.1365-2648.1994.tb01122.x.
- Martinez, V., Bastl, M., Kingston, J. and Evans, S. (2010) 'Challenges in transforming manufacturing organisations into product-service providers', *Journal of Manufacturing Technology Management*, 21(4), pp. 449–469. doi:10.1108/17410381011046571.



- Martínez-Ferrero, J. and García-Sánchez, I.-M. (2017) 'Coercive, normative and mimetic isomorphism as determinants of the voluntary assurance of sustainability reports', *International Business Review*, 26(1), pp. 102–118. doi:10.1016/j.ibusrev.2016.05.009.
- McCormack, M.P., Thomas, J.M. and Mackie, K. (2014) 'Maximising Enhanced Oil Recovery Opportunities in UKCS Through Collaboration', in *Abu Dhabi International Petroleum Exhibition and Conference. Abu Dhabi International Petroleum Exhibition and Conference*, Abu Dhabi, UAE: Society of Petroleum Engineers. doi:10.2118/172017-MS.
- Miles, M.B., Huberman, A.M. and Saldaña, J. (2020) *Qualitative Data Analysis: A Methods Sourcebook*. 4th edn. Los Angeles: SAGE.
- Miller, G.E. (2004) 'Frontier Masculinity in the Oil Industry: The Experience of Women Engineers', *Gender, Work & Organization*, 11(1), pp. 47–73. doi:10.1111/j.1468-0432.2004.00220.x.
- Mission, Vision, Values* (2020) Halliburton. Available at: <https://www.halliburton.com/en-US/about-us/corporate-profile/mission-vision-values.html?node-id=ijzrw073> (Accessed: 5 November 2020).
- Mitchell, V.W. (1991) 'The delphi technique: an exposition and application', *Technology Analysis & Strategic Management*, 3(4), pp. 333–358. doi:10.1080/09537329108524065.
- Mont, O. (2004) 'Institutionalisation of sustainable consumption patterns based on shared use', *Ecological Economics*, 50(1–2), pp. 135–153. doi:10.1016/j.ecolecon.2004.03.030.
- Morgan, F., Deeter-Schmelz, D. and Moberg, C.R. (2007) 'Branding implications of partner firm-focal firm relationships in business-to-business service networks', *Journal of Business & Industrial Marketing*. Edited by M. Beverland, 22(6), pp. 372–382. doi:10.1108/08858620710780136.
- Morgan, R.M. and Hunt, S.D. (1994) 'The Commitment-Trust Theory of Relationship Marketing', *Journal of Marketing*, 58(3), pp. 20–38. doi:10.2307/1252308.
- Muecke, M. (1994) 'On the Evaluation of Ethnographies', in *Critical issues in qualitative research methods*. Thousand Oaks: Sage Publications, pp. 186–209.
- Mullen, P.M. (2003) 'Delphi: myths and reality', *Journal of Health Organization and Management*, 17(1), pp. 37–52. doi:10.1108/14777260310469319.
- Murphy, M.K., Black, N.A., Lamping, D.L., McKee, C.M., Sanderson, C.F., Askham, J. and Marteau, T. (1998) 'Consensus development methods, and

- their use in clinical guideline development.’, *Health technology assessment*, 2(3), pp. 1–88. doi:10.3310/hta2030.
- Nash, J. (1951) ‘Non-Cooperative Games’, *The Annals of Mathematics*, 54(2), p. 286. doi:10.2307/1969529.
- Neely, A. (2008) ‘Exploring the financial consequences of the servitization of manufacturing’, *Operations Management Research*, 1(2), pp. 103–118. doi:10.1007/s12063-009-0015-5.
- Neff, A.A., Hamel, F., Herz, T.P., Uebernickel, F., Brenner, W. and vom Brocke, J. (2014) ‘Developing a maturity model for service systems in heavy equipment manufacturing enterprises’, *Information & Management*, 51(7), pp. 895–911. doi:10.1016/j.im.2014.05.001.
- Neyland, D. (2008) *Organizational ethnography*. 1st edn. Los Angeles: Sage.
- Ng, I., Parry, G., Smith, L., Maull, R. and Briscoe, G. (2012) ‘Transitioning from a goods-dominant to a service-dominant logic: Visualising the value proposition of Rolls-Royce’, *Journal of Service Management*, 23(3), pp. 416–439. doi:10.1108/09564231211248480.
- Nguyen, T.Q.T. (2015) ‘Conducting semi-structured interviews with the Vietnamese’, *Qualitative Research Journal*, 15(1), pp. 35–46. doi:http://dx.doi.org/10.1108/QRJ-04-2014-0012.
- Nudurupati, S.S., Bititci, U.S., Kumar, V. and Chan, F.T.S. (2011) ‘State of the art literature review on performance measurement’, *Computers & Industrial Engineering*, 60(2), pp. 279–290. doi:10.1016/j.cie.2010.11.010.
- Oberle, L.J. (2020) *Servitization of Industrial Enterprises through Acquisitions: A Success Story*. Wiesbaden: Springer Fachmedien Wiesbaden. doi:10.1007/978-3-658-28870-9.
- Ogbeifun, E., Mbohwa, C. and Pretorius, J.-H.C. (2017) ‘Achieving consensus devoid of complicity: adopting the Delphi technique’, *International Journal of Productivity and Performance Management*, 66(6), pp. 766–779. doi:10.1108/IJPPM-08-2015-0112.
- Okoli, C. and Pawlowski, S.D. (2004) ‘The Delphi method as a research tool: An example, design considerations and applications’, *Information and Management*, 42(1), pp. 15–29. doi:10.1016/j.im.2003.11.002.
- Oliva, R. and Kallenberg, R. (2003) ‘Managing the transition from products to services’, *International Journal of Service Industry Management*, 14(2), pp. 160–172. doi:10.1108/09564230310474138.

- Opresnik, D. and Taisch, M. (2015) 'The value of Big Data in servitization', *International Journal of Production Economics*, 165, pp. 174–184. doi:10.1016/j.ijpe.2014.12.036.
- O'Reilly, K. (2009a) 'Insider ethnographies', in *Key Concepts in Ethnography*. London: SAGE Publications Ltd, pp. 110–118. doi:10.4135/9781446268308.n20.
- O'Reilly, K. (2009b) 'Introduction', in *Key Concepts in Ethnography*. London: SAGE Publications Ltd, pp. 1–4. doi:10.4135/9781446268308.
- Palo, T., Åkesson, M. and Löfberg, N. (2019) 'Servitization as business model contestation: A practice approach', *Journal of Business Research*, 104, pp. 486–496. doi:10.1016/j.jbusres.2018.10.037.
- Parra, F. (2004) *Oil Politics - A Modern History of Petroleum*. New York: L. B. Tauris & Co. Ltd. doi:10.2307/41323035.
- Paz-Soldan, V.A., Jr, R.C.R., Morrison, A.C., Stoddard, S.T., Kitron, U., Scott, T.W., Elder, J.P., Halsey, E.S., Kochel, T.J., Astete, H. and Vazquez-Prokopec, G.M. (2014) 'Strengths and Weaknesses of Global Positioning System (GPS) Data-Loggers and Semi-structured Interviews for Capturing Fine-scale Human Mobility: Findings from Iquitos, Peru', *PLOS Neglected Tropical Diseases*, 8(6), p. e2888. doi:10.1371/journal.pntd.0002888.
- Peillon, S. and Dubruc, N. (2019) 'Barriers to digital servitization in French manufacturing SMEs', *Procedia CIRP*, 83, pp. 146–150. doi:10.1016/j.procir.2019.04.008.
- Peleckis, K. (2015) 'The Use of Game Theory for Making Rational Decisions in Business Negotiations: A Conceptual Model', *Entrepreneurial Business and Economics Review*, 3(4), pp. 105–121. doi:10.15678/EBER.2015.030407.
- Peleg, B. and Sudhölter, P. (2007) *Introduction to the Theory of Cooperative Games*. 2nd edn. Berlin: Springer. doi:10.1007/978-3-540-72945-7.
- Pereira, V.R., Kreye, M.E. and Carvalho, M.M. de (2019) 'Customer-pulled and provider-pushed pathways for product-service system', *Journal of Manufacturing Technology Management*, 39(12), pp. 75–93. doi:10.1108/JMTM-07-2018-0209.
- Pettigrew, A., Ferlie, E. and McKee, L. (1992) 'Shaping strategic change - The case of the NHS in the 1980s', *Public Money & Management*, 12(3), pp. 27–31. doi:10.1080/09540969209387719.
- Polova, O. and Thomas, C. (2020) 'How to perform collaborative servitization innovation projects: the role of servitization maturity', *Industrial Marketing Management*, 90, pp. 231–251. doi:10.1016/j.indmarman.2020.06.005.

Rabetino, R., Harmsen, W., Kohtamäki, M. and Sihvonen, J. (2018) 'Structuring servitization-related research', *International Journal of Operations & Production Management*, 38(2), pp. 350–371. doi:10.1108/IJOPM-03-2017-0175.

Raddats, C. and Burton, J. (2011) 'Strategy and structure configurations for services within product-centric businesses', *Journal of Service Management*, 22(4), pp. 522–539. doi:10.1108/09564231111155105.

Raddats, C., Burton, J. and Ashman, R. (2015) 'Resource configurations for services success in manufacturing companies', *Journal of Service Management*, 26(1), pp. 97–116. doi:10.1108/JOSM-12-2012-0278.

Raddats, C., Burton, J., Zolkiewski, J. and Story, V. (2018) 'Overcoming the Challenges of Servitisation: Aligning Responses to Service Strategy', in *Practices and Tools for Servitization*. Cham: Springer International Publishing, pp. 171–184. doi:10.1007/978-3-319-76517-4\_9.

Raddats, C. and Kowalkowski, C. (2014) 'A Reconceptualization of Manufacturers' Service Strategies', *Journal of Business-to-Business Marketing*, 21(1), pp. 19–34. doi:10.1080/1051712X.2013.857500.

Raddats, C., Kowalkowski, C., Benedettini, O., Burton, J. and Gebauer, H. (2019) 'Servitization: A contemporary thematic review of four major research streams', *Industrial Marketing Management*, 83, pp. 207–223. doi:10.1016/j.indmarman.2019.03.015.

Raddats, C., Zolkiewski, J., Story, V.M., Burton, J., Baines, T. and Ziaee Bigdeli, A. (2017) 'Interactively developed capabilities: evidence from dyadic servitization relationships', *International Journal of Operations & Production Management*, 37(3), pp. 382–400. doi:10.1108/IJOPM-08-2015-0512.

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*, 20(3), pp. 258–276. doi:10.1111/j.1748-8583.2009.00124.x.

Ramirez, M.I., Arevalo, A.P., Sotomayor, S. and Bailon-Moscoco, N. (2017) 'Contamination by oil crude extraction – Refinement and their effects on human health', *Environmental Pollution*, 231, pp. 415–425. doi:10.1016/j.envpol.2017.08.017.

Raszewski, S. (ed.) (2018) *The International Political Economy of Oil and Gas*. Cham: Springer International Publishing. doi:10.1007/978-3-319-62557-7.

Reim, W., Sjödin, D.R. and Parida, V. (2019) 'Servitization of global service network actors – A contingency framework for matching challenges and strategies in service transition', *Journal of Business Research*, 104, pp. 461–471. doi:10.1016/j.jbusres.2019.01.032.

- Ritchie, J., Lewis, J., McNaughton Nicholls, C. and Ormston, R. (eds) (2014) *Qualitative research practice: a guide for social science students and researchers*. 2nd edn. Los Angeles: Sage.
- Robson, C. and McCartan, K. (2016) *Real world research: a resource for users of social research methods in applied settings*. 4th edn. Hoboken: Wiley.
- Romain, A. and Julie, G. (2016) 'On the use of Intangible Assets Management in PSS Projects', *Procedia CIRP*, 47, pp. 472–477. doi:10.1016/j.procir.2016.03.115.
- Ross, D. (2019) 'Game Theory', *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University. Available at: <https://plato.stanford.edu/archives/spr2019/entries/game-theory/> (Accessed: 17 September 2019).
- Rotter, J.B. (1967) 'A new scale for the measurement of interpersonal trust', *Journal of Personality*, 35(4), pp. 651–665. doi:10.1111/j.1467-6494.1967.tb01454.x.
- Rowe, G. and Wright, G. (1999) 'The Delphi technique as a forecasting tool: issues and analysis', *International Journal of Forecasting*, 15(4), pp. 353–375. doi:10.1016/S0169-2070(99)00018-7.
- Rowland, D. and Higgs, M. (2012) *Sustaining Change: Leadership That Works*. 1st edn. Chichester: Jossey-Bass. doi:10.1002/9781119206330.
- Rudy, S.F. (1996) 'A review of Delphi surveys conducted to establish research priorities by specialty nursing organizations from 1985 to 1995', *ORL-head and neck nursing: official journal of the Society of Otorhinolaryngology and Head-Neck Nurses*, 14(2), pp. 16–24.
- Ruggie, J.G. (1993) 'Territoriality and beyond: problematizing modernity in international relations', *International Organization*, 47(1), pp. 139–174. doi:10.1017/S0020818300004732.
- Ruiz-Alba, J.L., Soares, A., Rodríguez-Molina, M.A. and Frías-Jamilena, D.M. (2019) 'Servitization strategies from customers' perspective: the moderating role of co-creation', *Journal of Business & Industrial Marketing*, 34(3), pp. 628–642. doi:10.1108/JBIM-02-2017-0028.
- Ryan, L. (2014) "If You Can't Measure It, You Can't Manage It": Not True', *Forbes*, February. Available at: <https://www.forbes.com/sites/lizryan/2014/02/10/if-you-cant-measure-it-you-cant-manage-it-is-bs/#2e13740a7b8b> (Accessed: 16 September 2019).
- Salacuse, J.W. (1998) 'Ten Ways that Culture Affects Negotiating Style: Some Survey Results', *Negotiation Journal*, 14(3), pp. 221–240. doi:10.1023/A:1024638709978.

Salonen, A., Saglam, O. and Hacklin, F. (2017) 'Servitization as reinforcement, not transformation', *Journal of Service Management*, 28(4), pp. 662–686. doi:10.1108/JOSM-05-2016-0121.

Scharlemann, J.P.W., Eckel, C.C., Kacelnik, A. and Wilson, R.K. (2001) 'The value of a smile: Game theory with a human face', *Journal of Economic Psychology*, 22(5), pp. 617–640. doi:10.1016/S0167-4870(01)00059-9.

Scheer, L. (2012) 'Trust, Distrust and Confidence in B2B Relationships', in *Handbook of Business-to-Business Marketing*. Cheltenham: Edward Elgar Publishing, pp. 332–347. doi:10.4337/9781781002445.

Scheibe, M., Skutsch, M.M., Schofer, J., Turoff, M. and Linstone, H. (2011) 'Experiments in Delphi Methodology', *The Delphi Method: Techniques and Applications*, pp. 257–281.

Schein, E.H. (2010) *Organizational Culture and Leadership*. 4th edn. San Francisco: Jossey-Bass.

Searle, J.R. (1999) *Intentionality, an essay in the philosophy of mind*. Cambridge: Cambridge University Press. Available at: <http://site.ebrary.com/id/10897805> (Accessed: 30 December 2020).

'Servitization in Oil & Gas and Why You Should Care' (2018) *Oil & Gas Journal* [Preprint]. Available at: <https://www.ogj.com/home/article/17297878/servitization-in-oil-gas-and-why-you-should-care> (Accessed: 17 May 2022).

Shapley, L.S. (1953) 'A value for n-person games', in *Contributions to the Theory of Games II*. 1st edn. Princeton: Princeton University Press, pp. 307–317.

Shi, V.G., Baldwin, J., Ridgway, K. and Scott, R. (2013) 'Gamification for servitization a conceptual paper', *Frameworks and Analysis*, p. 114.

Sklyar, A., Kowalkowski, C., Tronvoll, B. and Sörhammar, D. (2019) 'Organizing for digital servitization: A service ecosystem perspective', *Journal of Business Research*, 104, pp. 450–460. doi:10.1016/j.jbusres.2019.02.012.

Skulmoski, G. and Hartman, F. (2002) 'The Delphi method: Researching what does not exist (yet)', in *IRNOP V Conference. Proceedings of the International Research Network on organization by projects*, Renesse.

Skulmoski, G., Hartman, F. and Krahn, J. (2007) 'The Delphi Method for Graduate Research', *Journal of Information Technology Education: Research*, 6, pp. 001–021. doi:10.28945/199.

Smith, L., Maull, R. and Ng, I. (2014) 'Servitization and operations management: a service dominant-logic approach', *International Journal of*

*Operations & Production Management*, 34(2), pp. 242–269. doi:10.1108/IJOPM-02-2011-0053.

Smith, W.K. (2014) 'Dynamic Decision Making: A Model of Senior Leaders Managing Strategic Paradoxes', *The Academy of Management Journal*, 57(6), pp. 1592–1623.

Smith, W.K. and Lewis, M.W. (2011) 'Toward a Theory of Paradox: A Dynamic equilibrium Model of Organizing', *Academy of Management Review*, 36(2), pp. 381–403. doi:10.5465/amr.2009.0223.

Song, W. and Sakao, T. (2016) 'Service conflict identification and resolution for design of product–service offerings', *Computers & Industrial Engineering*, 98, pp. 91–101. doi:10.1016/j.cie.2016.05.019.

Spring, M., Hughes, A., Mason, K. and McCaffrey, P. (2017) 'Creating the competitive edge: A new relationship between operations management and industrial policy', *Journal of Operations Management*, 49–51, pp. 6–19. doi:10.1016/j.jom.2016.12.003.

Steckler, A. and Goodman, R.M. (1989) 'How to Institutionalize Health Promotion Programs', *American Journal of Health Promotion*, 3(4), pp. 34–43. doi:10.4278/0890-1171-3.4.34.

Story, V., Zolkiewski, J., Verleye, K., Nazifi, A., Hannibal, C., Grimes, A. and Abboud, L. (2020) 'Stepping out of the shadows: Supporting actors' strategies for managing end-user experiences in service ecosystems', *Journal of Business Research*, 116, pp. 401–411. doi:10.1016/j.jbusres.2020.04.029.

Story, V.M., Raddats, C., Burton, J., Zolkiewski, J. and Baines, T. (2017) 'Capabilities for advanced services: A multi-actor perspective', *Industrial Marketing Management*, 60(May), pp. 54–68. doi:10.1016/j.indmarman.2016.04.015.

Strähle, O., Füllemann, M. and Bendig, O. (2012) *Service now! Time to wake up the sleeping giant*. Munich: Bain & Company, pp. 1–35. Available at: [www.bain.de](http://www.bain.de) (Accessed: 19 September 2019).

Sumsion, T. (1998) 'The Delphi Technique: An Adaptive Research Tool', *British Journal of Occupational Therapy*, 61(4), pp. 153–156. doi:10.1177/030802269806100403.

Süße, T. and Wilkens, U. (2014) 'Preparing Individuals for the Demands of PSS Work Environments through a Game-based Community Approach – Design and Evaluation of a Learning Scenario', *Procedia CIRP*, 16, pp. 271–276. doi:10.1016/j.procir.2014.02.014.

Tadelis, S. (2013) *Game Theory: An Introduction*. 1st edn. Oxford: Princeton University Press.

- Terry, D.J. and Callan, V.J. (1997) 'Employee adjustment to large-scale organisational change', *Australian Psychologist*, 32(3), pp. 203–210. doi:10.1080/00050069708257382.
- Tetzlaff, J.M., Moher, D. and Chan, A.-W. (2012) 'Developing a guideline for clinical trial protocol content: Delphi consensus survey', *Trials*, 13(1), p. 176. doi:10.1186/1745-6215-13-176.
- Thangaratinam, S. and Redman, C.W. (2005) 'The Delphi technique', *The Obstetrician & Gynaecologist*, 7(2), pp. 120–125. doi:10.1576/toag.7.2.120.27071.
- Thomas, G. (2013) *How to do your Research Project*. 2nd edn. London: Sage Publications Ltd.
- Tian, L. (2005) 'Inferences on the common coefficient of variation', *Statistics in Medicine*, 24(14), pp. 2213–2220. doi:10.1002/sim.2088.
- Timmermans, S. and Tavory, I. (2007) 'Advancing Ethnographic Research through Grounded Theory Practice', in *The SAGE Handbook of Grounded Theory*. London: SAGE Publications Ltd, pp. 493–512. doi:10.4135/9781848607941.n23.
- Tongur, S. and Engwall, M. (2014) 'The business model dilemma of technology shifts', *Technovation*, 34(9), pp. 525–535. doi:10.1016/j.technovation.2014.02.006.
- Tronvoll, B., Sklyar, A., Sörhammar, D. and Kowalkowski, C. (2020) 'Transformational shifts through digital servitization', *Industrial Marketing Management*, 89, pp. 293–305. doi:10.1016/j.indmarman.2020.02.005.
- Tukker, A. (2004) 'Eight types of product–service system: eight ways to sustainability? Experiences from SusProNet', *Business Strategy and the Environment*, 13(4), pp. 246–260. doi:10.1002/bse.414.
- Tura, N., Keränen, J. and Patala, S. (2018) 'The darker side of sustainability: Tensions from sustainable business practices in business networks', *Industrial Marketing Management*, (July 2016), pp. 1–11. doi:10.1016/j.indmarman.2018.09.002.
- Turoff, M. (1970) 'The design of a policy Delphi', *Technological Forecasting and Social Change*, 2(2), pp. 149–171. doi:10.1016/0040-1625(70)90161-7.
- Ulaga, W. and Loveland, J.M. (2014) 'Transitioning from product to service-led growth in manufacturing firms: Emergent challenges in selecting and managing the industrial sales force', *Industrial Marketing Management*, 43(1), pp. 113–125. doi:10.1016/j.indmarman.2013.08.006.



- Uлага, W. and Reinartz, W.J. (2011) 'Hybrid Offerings: How Manufacturing Firms Combine Goods and Services Successfully', *Journal of Marketing*, 75(6), pp. 5–23. doi:10.1509/jmkg.75.6.5.
- Valtakoski, A. (2017) 'Explaining servitization failure and deservitization: A knowledge-based perspective', *Industrial Marketing Management*, 60, pp. 138–150. doi:10.1016/j.indmarman.2016.04.009.
- Vandermerwe, S. and Rada, J. (1988) 'Servitization of business: Adding value by adding services', *European Management Journal*, 6(4), pp. 314–324. doi:10.1016/0263-2373(88)90033-3.
- Vendrell-Herrero, F., Parry, G., Bustinza, O.F. and O'Regan, N. (2014) 'Servitization as a Driver for Organizational Change', *Strategic Change*, 23(5–6), pp. 279–285. doi:10.1002/jsc.1976.
- Vendrell-Herrero, F. and Wilson, J.R. (2017) 'Servitization for territorial competitiveness: taxonomy and research agenda', *Competitiveness Review*, 27(1), pp. 2–11. doi:10.1108/CR-02-2016-0005.
- Vischer, J.C. (2007) 'The Concept of Workplace Performance and its Value to Managers', *California Management Review*, 49(2), pp. 62–79. doi:10.2307/41166383.
- Visnjic, I. and Looy, B.V. (2013) 'Successfully Implementing a Service Business Model in a Manufacturing Firm', *Cambridge ServiceAlliance*, p. 37.
- Visnjic, I., Wiengarten, F. and Neely, A. (2016) 'Only the Brave: Product Innovation, Service Business Model Innovation, and Their Impact on Performance', *Journal of Product Innovation Management*, 33(1), pp. 36–52. doi:10.1111/jpim.12254.
- Vlaar, P.W.L., Van den Bosch, F.A.J. and Volberda, H.W. (2007) 'On the Evolution of Trust, Distrust, and Formal Coordination and Control in Interorganizational Relationships: Toward an Integrative Framework', *Group & Organization Management*, 32(4), pp. 407–428. doi:10.1177/1059601106294215.
- Wagstaff, S., Burton, J. and Zolkiewski, J. (2019a) 'A Delphi Study to Explore Tensions and Territoriality Within Servitizing Oil and Gas Organisations', in *DBA Conference. 2019 DBA Conference*, Manchester, UK, pp. 1–21.
- Wagstaff, S., Burton, J. and Zolkiewski, J. (2019b) 'A Delphi Study to Explore Tensions and Territoriality Within Servitizing Oil and Gas Organisations', in *IMP-2019 Conference. 35th IMP-conference*, Paris, France, pp. 1–18. Available at: <https://www.impgroup.org/uploads/papers/11129.pdf> (Accessed: 16 February 2021).

- Wagstaff, S., Burton, J. and Zolkiewski, J. (2020a) 'Servitization as a Game-Changer in the Oil Industry', in *DBA Conference. 2020 DBA Conference*, Manchester, UK, pp. 1–12.
- Wagstaff, S., Burton, J. and Zolkiewski, J. (2020b) 'Servitization as a Game-Changer in the Oil Industry', in *Proceedings of the Spring Servitization Conference. Advanced Services for Sustainability and Growth (Spring Servitization Conference)*, Birmingham, UK: Aston University, pp. 29–37. Available at: [https://publications.aston.ac.uk/id/eprint/42299/1/SSC2020\\_Proceedings.\\_2\\_.pdf](https://publications.aston.ac.uk/id/eprint/42299/1/SSC2020_Proceedings._2_.pdf) (Accessed: 23 February 2021).
- Wagstaff, S., Burton, J. and Zolkiewski, J. (2020c) 'Tensions and territoriality: the dark side of servitization', *Journal of Business & Industrial Marketing* [Preprint]. doi:10.1108/JBIM-01-2020-0067.
- Wagstaff, S., Burton, J. and Zolkiewski, Judy (2021a) 'Should we cooperate? Game theory insights for servitization', *Journal of Service Management*, 32(5), pp. 835–859. doi:10.1108/JOSM-11-2020-0430.
- Wagstaff, S., Burton, J. and Zolkiewski, Judith (2021) 'Tensions and territoriality: the dark side of servitization', *Journal of Business & Industrial Marketing*, 36(10), pp. 1755–1766. doi:10.1108/JBIM-01-2020-0067.
- Wagstaff, S., Burton, J. and Zolkiewski, Judy (2021b) 'Trust, Distrust and the Servitization Paradox', in *Manchester Doctoral Conference*, Manchester, UK.
- Walker, A. and Selfe, J. (1996) 'The Delphi method: a useful tool for the allied health researcher', *British Journal of Therapy and Rehabilitation*, 3(12), pp. 677–681. doi:10.12968/bjtr.1996.3.12.14731.
- Wang, W., Lai, K.-H. and Shou, Y. (2018) 'The impact of servitization on firm performance: a meta-analysis', *International Journal of Operations & Production Management*, 38(7), pp. 1562–1588. doi:10.1108/IJOPM-04-2017-0204.
- Weaver, K. (2018) 'Pragmatic Paradigm', in *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*. Thousand Oaks: SAGE Publications, Inc. doi:10.4135/9781506326139.n534.
- Weeks, R. and Benade, S. (2015) 'The development of a generic servitization systems framework', *Technology in Society*, 43, pp. 97–104. doi:10.1016/j.techsoc.2015.09.003.
- Weinstein, J. and Ventres, W. (2000) 'Mini-ethnography: meaningful exploration made easy', *Family Medicine*, 32(9), pp. 600–602.
- Welbers, K., Konijn, E.A., Burgers, C., de Vaate, A.B., Eden, A. and Brugman, B.C. (2019) 'Gamification as a tool for engaging student learning: A field

experiment with a gamified app', *E-Learning and Digital Media*, 16(2), pp. 92–109. doi:10.1177/2042753018818342.

Welch, M. and Jackson, P.R. (2007) 'Rethinking internal communication: a stakeholder approach', *Corporate Communications: An International Journal*, 12(2), pp. 177–198. doi:10.1108/13563280710744847.

*Who We Are* (2020) Schlumberger. Available at: <https://www.slb.com/who-we-are> (Accessed: 11 April 2020).

Williams, N. and Kumar, D. (2021) 'Even without Keystone XL, U.S. set for record Canadian oil imports', *Reuters*, 23 January. Available at: <https://www.reuters.com/article/us-usa-biden-keystone-oil-idUSKBN29RIRB> (Accessed: 18 February 2021).

Wilson, C. (2014) 'Semi-Structured Interviews', in *Interview Techniques for UX Practitioners*. 1st edn. Amsterdam: Elsevier, pp. 23–41. doi:10.1016/B978-0-12-410393-1.00002-8.

Windahl, C. and Lakemond, N. (2010) 'Integrated solutions from a service-centered perspective: Applicability and limitations in the capital goods industry', *Industrial Marketing Management*, 39(8), pp. 1278–1290. doi:10.1016/j.indmarman.2010.03.001.

Winter, E. (2002) 'The shapley value', in *Handbook of Game Theory with Economic Applications*. London: Elsevier, pp. 2025–2054. doi:10.1016/S1574-0005(02)03016-3.

Wise, R. and Baumgartner, P. (1999) 'Go Downstream: The New Profit Imperative in Manufacturing.', *Harvard Business Review*, 77(5), pp. 133–141. doi:10.1080/00343404.2018.1524134.

Wolcott, H.F. (1990) 'Making a Study "More Ethnographic"', *Journal of Contemporary Ethnography*, 19(1), pp. 44–72. doi:10.1177/089124190019001003.

*World Health Organization* (2020) *Coronavirus disease (COVID-19)*. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (Accessed: 20 December 2020).

Worldsen, H. (2017) *Servitization: How it's Fueling Change in the Oil and Gas Industry*. IFS, p. 6. Available at: [http://www.ifsworld.com/us/sitecore/media-library/assets/2017/02/17/servitization-in-oil-and-gas-white-paper/?\\_ga=2.244065029.1087165704.1652757033-1144552584.1652757033](http://www.ifsworld.com/us/sitecore/media-library/assets/2017/02/17/servitization-in-oil-and-gas-white-paper/?_ga=2.244065029.1087165704.1652757033-1144552584.1652757033) (Accessed: 17 May 2022).

Worrell, J.L., Di Gangi, P.M. and Bush, A.A. (2013) 'Exploring the use of the Delphi method in accounting information systems research', *International*

*Journal of Accounting Information Systems*, 14(3), pp. 193–208.  
doi:10.1016/j.accinf.2012.03.003.

Yergin, D. (1991) *The prize: the epic quest for oil, money, and power*. New York: Simon & Schuster.

Zhang, W. and Banerji, S. (2017) 'Challenges of servitization: A systematic literature review', *Industrial Marketing Management*, 65, pp. 217–227.  
doi:10.1016/j.indmarman.2017.06.003.

Zhong, H. (2014) 'Game analysis of product-service integration', *Journal of Industrial Engineering and Management*, 7(5), pp. 1447–1467.  
doi:10.3926/jiem.1221.

Zitha, P., Felder, R., Zornes, D., Brown, K. and Mohanty, K. (2008) 'Increasing Hydrocarbon Recovery Factors', *Society of Petroleum Engineers*, 41(22), pp. 1–9.  
doi:10.1080/15567036.2019.1576073.

Zolkiewski, J., Burton, J. and Stratoudaki, S. (2008) 'The delicate power balance in advertising agency-client relationships: partnership or battleground? The case of the Greek advertising market', *Journal of Customer Behaviour*, 7(4), pp. 315–332. doi:10.1362/147539208X386851.

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# Tensions and territoriality: the dark side of servitization

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## Abstract

**Purpose** – This paper focusses on the darker side of the dynamics of servitization by exploring the tensions and territoriality that emerge between manufacturers and customers during the servitization process in the oil industry.

**Design/methodology/approach** – The Delphi method is used to explore the perspectives of three management tiers in oil organisations and the manufacturers who work with them. The views of these managers were synthesized over three iterations: semi-structured interviews, a questionnaire and resolution/explanation, where consensus was not obtained.

**Findings** – The findings of the study highlight perceptions of change, resulting tensions and territoriality and the impact of management commitment, resources and strategy. They reveal significant differences between customers and their suppliers and different management levels and highlight territorial behaviour and the negative impact this has on buyer supplier relationships during the implementation of servitization.

**Research limitations/implications** – Further research is required to explore why there is a variation in understanding and commitment at different managerial levels and the causes of tensions and territoriality.

**Practical implications** – Servitization is not a “quick fix” and management support is essential. A fundamental element of this planning is to anticipate and plan for tensions and territoriality caused by the disruption servitization creates.

**Originality/value** – The research provides empirical evidence of tensions and territoriality relating to servitization that potentially can damage supplier–buyer relationships and suggest that there is a darker side to servitization. It also shows that differences in strategic intent across organizations and between different managerial layers impedes to servitization efforts.

**Keywords** Servitization, Buyer–seller relationships, Delphi method, Tension, Territoriality, Oil gas industry

**Paper type** Research paper

## Introduction

Servitization attracts considerable attention from a multidisciplinary base (Baines *et al.*, 2017; Raddats *et al.*, 2019). Generally, servitization is regarded as the process a manufacturing organisation undergoes to increase their competitive advantage by developing the services they offer to their customers (Baines *et al.*, 2009; Kowalkowski *et al.*, 2017) and is generally accepted as having positive outcomes for all parties involved. However, there is a stream of research that argues that servitization tends to be poorly executed and the potential gains are seldom fully realised (Brax, 2005; Valtakoski, 2017) with territorial tensions being evident (Burton *et al.*, 2016). Servitization often necessitates change (Bigdeli *et al.*, 2015; Visnjic *et al.*, 2016); it has been suggested that change theory can add important insight to servitization theory (Kim and Toya, 2019) and increase understanding of the process (Ziaee Bigdeli *et al.*, 2017). Additionally, current literature tends to focus almost exclusively on the perspective of the manufacturer to drive servitization and neglects customer contributions to the process (Pereira *et al.*, 2019). Hence, the objective of this paper is to investigate how manufacturers and

customers deal with change and related tensions and territoriality in a servitization context.

The oil and gas industry provides a rich research context because, despite the recognition that oil and gas companies such as Shell and BP have vast service expertise (Neely, 2008), it has received limited attention in servitization research [an exception being Bandinelli and Gamberi (2011)]. The Delphi Method has been adopted to explore servitization, change and territoriality in this industry as it is particularly well suited to investigating servitization in complex business relationships such as those in the oil and gas industry (Baines and Shi, 2015). Our findings provide insight into the darker side of the dynamics of servitization from the perspectives of both customers and manufacturers and demonstrate that it is not perceived in the same way by both parties or seen as mutually beneficial. We also look at servitization from three management perspectives; first-line managers who supervise only employees, middle managers who supervise first-line managers and top managers who supervise middle managers (Jones and George, 2016). Additionally, we show differences in the attitudes to the process between customers and manufacturers and confirm that it is a non-linear process.

From this we identify the following contributions. Firstly, we provide empirical evidence of the tensions and territoriality that emerge as a result of the changes that manifest from

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# Should we cooperate? Game theory insights for servitization

Should we cooperate?

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## Abstract

**Purpose** – An abundance of literature suggests that organisations adopting a cooperative approach achieve greater rewards than those that act in opposition or isolation. An emerging body of work also highlights the multiple actors involved in servitization. Despite this, in some contexts the benefits of servitization are not apparent. This paper examines business relationships in the oil industry and how they affect levels of servitization.

**Design/methodology/approach** – A mixed method study employing qualitative and quantitative methods was used to fully explore the context. In the quantitative phase, 48 oil industry specialists responded to a scenario based on game theory. This aimed to determine if the relationships between their respective organisations are cooperative or adversarial. Abduction drove a second qualitative phase. This consisted of a series of semi-structured interviews used to explore the servitization level and influence of servitization on relationships and vice versa.

**Findings** – The statistical results suggest that all parties used adversarial strategies despite the publicised intent to work cooperatively. The interviews suggested that increasing (decreasing) servitization could increase (decrease) cooperation and, in turn, value co-creation but revealed nuances to this effect. It also adds to our understanding of the darker side of servitization by illustrating the impact of mimetic isomorphism.

**Originality/value** – The findings add to understanding of the complex dynamics around servitization by showing that it is only at advanced levels of servitization that cooperative behaviour is observed, and base and intermediate levels result in non-cooperative behaviour and thus illustrate the importance of adopting a multi-actor lens to explore servitization.

**Keywords** Servitization dynamics, Game theory, Oil industry, Business relationships, Mixed methods

**Paper type** Research paper

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## 1. Introduction

The extant literature tends to focus on success stories, for example IBM, Rolls Royce and Xerox (Ng *et al.*, 2012) and suggests a steady progression from supply of base services through intermediate, to provision of advanced services (Baines and Lightfoot, 2013). However, there is growing recognition that not all organizations follow a smooth transition journey, with reports of a service paradox (Gebauer *et al.*, 2005), service failure and deservitization (Kowalkowski *et al.*, 2017; Valtakoski, 2017). Researchers are beginning to explore why this is so. Factors such as tensions (Burton *et al.*, 2016), servitization intent (Crowley *et al.*, 2018), the challenges of developing appropriate service strategies, (Raddats and Kowalkowski, 2014; Raddats *et al.*, 2018) and the paradoxical nature of servitization (Kohtamaki *et al.*, 2020) illustrate the complexities of the challenges facing an organization that embarks on a servitization journey.

Hence, this research uses a relational lens to explore servitization that has not progressed to an advanced level and to understand what prevents servitization from being perceived as beneficial by both parties. Thus, we have identified a context where progression to advanced services has not been fully realized. Moving to a multi-actor perspective necessitates recognition of the complex network of relationships any organization is embedded in

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## Appendix 3 Paper 1 Interview Guide

### Questions:

- 1) Demographics - to be completed before/during/after interview
  - a) Would you consider yourself to work for an operator or a service company?
  - b) Have you always worked for an operator/service company?
  - c) How much experience do you have in your current company?
  - d) How much experience do you have in the oil and gas industry?
  - e) What is your level of management/supervision?
  - f) How many staff work under you?
  - g) What is your age?
  - h) What gender do you most identify with?
  
- 2) How servitized is your organization?
  - a) Briefly describe what your company does
  - b) (Explain the concept of servitization to interviewee- if required)
  - c) How servitized is your organization?
    - i) How would you measure this (revenue/sales etc..)
    - ii) Are any departments or areas more/less servitized than others?
    - iii) Where do you think your organization is in comparison to your clients/contractors/peers?
  - d) Do you think your organization is increasing, decreasing or maintaining its level of servitization?
    - i) What do you see as the challenges?
    - ii) Is the change internally or (specific) customer focused – what is the motivation?
  - e) Do you agree with the strategy? Why/why not?
  
- 3) Change
  - a) How often does your organization change its way of working?
  - b) Is the business model changing?
  - c) How open are you to changing processes and systems?
  
- 4) Do tensions and territoriality exist?
  - a) (Explain the concept of tension and territoriality to interviewee- if required)
  - b) Do you have any experience where changes have caused tension within your organization on a personal and/or departmental level? Please provide example(s)
    - i) Do you think this could have impacted your customers/contractors?
  - c) Do you have any experience where changes from your customers or clients have caused tension within your organization on a personal and/or departmental level? Please provide example(s)
  - d) Do you have any experience where changes have caused territoriality within your organization on a personal and/or departmental level? Please provide example(s)



- i) Do you think this could have impacted your customers/contractors?
  - e) Do you have any experience where changes from your customers or clients have caused territoriality within your organization on a personal and/or departmental level? Please provide example(s)
  - f) With the above in mind, do you think that the tensions and territoriality may have impacted the co-operative value creating relationship with your customers or contractors?
  - g) What is in place to deal with these problems? Are they sufficient?
- 5) Management support for the servitization process
- a) Is there a clear strategy for a servitization process?
  - b) What time-scale have management given to complete the servitization process?
  - c) What resources have been made available to support the servitization process?
  - d) In your experience how committed is top/middle/first-line management to the change?
    - i) What are 'the changes'?
    - ii) What are the effects of the change process?
    - iii) What are the process of changing the business?
  - e) How long do you expect the changes to last?
- 6) Pain worth the gain?
- a) What do see as the positive outcomes of servitization for:
    - i) You?
    - ii) Your department?
    - iii) Your company?
    - iv) Your customers/clients?
    - v) The industry?
  - b) What do see as the negative outcomes of servitization for:
    - i) You?
    - ii) Your department?
    - iii) Your company?
    - iv) Your customers/clients?
    - v) The industry?
- 7) Specific to oil and gas?
- a) In terms of servitization, do you think the oil and gas industry is different from other industries?
  - b) Why or why not?
- 8) Is there anything else you would like to add?

## Appendix 4 Paper 2 Test and Interview Guide

### Test 1 (low reward)

#### Existing Tool:

- Rental rate for tool = \$50k per day
- Rig rate = \$300k per day
- Job duration = 10 days
- Revenue from tool to service company =  $\$50k \times 10 = \$500k$
- Rig cost to Operator =  $\$300k \times 10 = \$3,000k$

#### Summary:

- Service company revenue = +\$500k
- Total operator cost = -\$3,500k

#### New Tool:

- Rental rate for tool = \$50k per day
- Rig rate = \$300k per day
- New job duration = 9 days
- Revenue from tool to service company =  $\$50k \times 9 = \$450k$
- Rig cost to Operator =  $\$300k \times 9 = \$2,700k$

#### Summary:

- Service company revenue = +\$450k (-\$50K)
- Total operator cost = -\$3,150k (+\$350k)

#### Question:

- 1) What percentage, if any, of the saving (\$350k) SHOULD the service company get? ..... %
- 2) What is the likelihood (%) that an operator would split the saving in a 'real world' situation? .....% and what would the share be in a 'real world' situation? .....%
- 3) If you were the service company in this scenario, and based on your answers above, would you propose using the new tool or continue using the existing tool? .....

**Test 1 (high reward)**

**Existing Tool:**

- Rental rate for tool = \$25k per day
- Rig rate = \$1,000k per day
- Job duration = 10 days
- Revenue from tool to service company =  $\$25k \times 10 = \$250k$
- Rig cost to Operator =  $\$1,000k \times 10 = \$10,000k$

**Summary:**

- Service company revenue = +\$250k
- Total operator cost = -\$10,250k

**New Tool:**

- Rental rate for tool = \$25k per day
- Rig rate = \$1,000k per day
- New job duration = 9 days
- Revenue from tool to service company =  $\$25k \times 9 = \$225k$
- Rig cost to Operator =  $\$1,000k \times 9 = \$9,000k$

**Summary:**

- Service company revenue = +\$225k (-\$25K)
- Total operator cost = -\$9,225k (+\$1,025k)

**Question:**

- 1) What percentage, if any, of the saving (\$1,025k) SHOULD the service company get? ..... %
- 2) What is the likelihood (%) that an operator would split the saving in a 'real world' situation? .....% and what would the share be in a 'real world' situation? .....%
- 3) If you were the service company in this scenario, and based on your answers above, would you propose using the new tool or continue using the existing tool? .....

## Level of Servitization

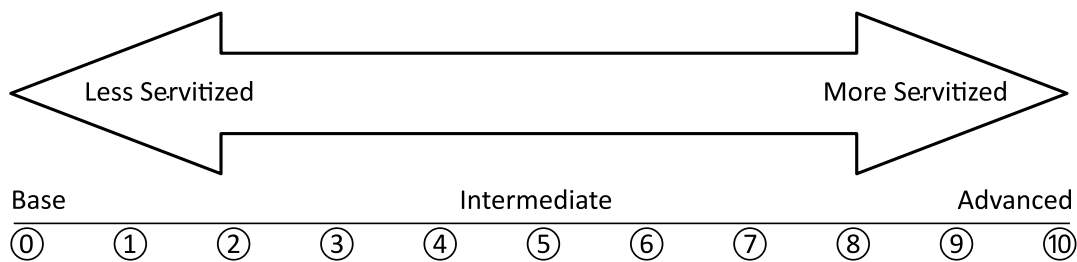


Figure 17: Servitization Scale 0-10

Servitization has been described as: “a transformation journey — it involves firms ... developing the capabilities they need to provide services and solutions that supplement their traditional product offerings.”

Examples:

Type	Defined by	Organizational stretch	Examples of services offered
Base services	An outcome focused on product provision	Based on the execution of production competence (i.e. we know how to build it)	Product/equipment provision, spare part provision, warranty
Intermediate services	An outcome focused on maintenance of product condition	Based on exploitation of production competences to also maintain the condition of products (i.e. because we know how to build it, we know how to repair it)	Scheduled maintenance, technical help desk, repair, overhaul, delivery to site, installation, operator training, operator certification, condition monitoring, in-field service
Advanced services	An outcome focused on capability delivered through performance of the product	Based on translation of production competences to also manage the product's performance (i.e. because we know how to build it, we know how to keep it operational)	Customer support agreement, risk and reward sharing contract, revenue-through-use contract, rental agreement

Table 16: Categorisation of product services, adapted from Baines and Lightfoot (2013, p. 66)

Questions (continued)

- 4) Where is your organization on the 'Level of Servitization' chart above (0–10): .....
- 5) If your organization became more servitized do you think this would change your answers to questions 2–3?..... If so how?
- 6) If your organization became less servitized do you think this would change your answers to questions 2–3?..... If so how?

## *Papers 2 Interview Guide*

- 1) Demographics: to be completed before, during or after the interview
  - a) Would you consider yourself to currently work for an operator or a service company?
  - b) If you have worked for both operators and service companies, what is the split?
  - c) Have you always worked for an operator or service company?
  - d) How much experience do you have in your current company?
  - e) How much experience do you have in the oil and gas industry?
  - f) What is your level of management or supervision?
  - g) How many staff work under you?
  - h) What is your age?
  - i) What gender do you most identify with?
  
- 2) Nash Equilibrium
  - Position of equilibrium
    - a) Do you think that people or organizations miss 'win-win' opportunities, like the previous example?
      - i) Do you have any examples?
    - b) In business dealings, how often do we miss the 'win-win' opportunity?
      - i) How aware do you think people are that this happens?
    - c) Do you think that the relationship between operators and service companies is adversarial?
      - i) Is this a good thing?
      - ii) How does this influence the probability of a 'win-win'?
      - iii) Do you think that companies with a higher level of servitization are more, or less, likely to have an adversarial relationship?
    - d) Who holds the power in the relationship, and do you think this influences the chances of a win-win outcome?
  
  - Antecedent factors
    - a) What factors do you think causes people or organizations behave in this way, i.e. not play for the win-win?
    - b) What are the differences between your best and worst business relationships?
      - i) Could you describe the better relationships as more, or less, servitized than the worst? Or is this not a factor?
      - ii) Would you say that better relationships are more likely to have a win-win outcome?
    - c) Do you think that it is better to have a 'win-win', or is a win-lose acceptable?
      - i) Do you think that it is in your interest for your business partner to make a profit?
      - ii) Do you think that others agree with you?
    - d) Do you think today's business environment influences the probability of a 'win-win'?

- e) What motivates people or organizations to a 'win-win'4?
    - i) Are there any barriers stopping us doing this?
- 3) Servitization as a solution
- A More Servitized Relationship Increase the Likelihood of a 'win-win'
    - a) Do you think that organizations that have 'Advanced' servitization relationships are more likely to have a 'win-win' outcome in their business relationship? (more = more)
      - i) Can you give any examples?
    - b) Do you think that organizations with 'Base Level' servitization relationships are less likely to have a 'win-win' outcome in their business relationship? (less = less)
      - i) Can you give any examples?
- 4) A More Servitized Relationship Decrease the Likelihood of a 'win-win'
- a) Do you think that organizations that have 'Base Level' servitization relationships are more likely to have a 'win-win' outcome in their business relationship? (less = more)
    - i) Can you give any examples?
    - b) Do you think that organizations with 'Advanced' servitization relationships are less likely to have a 'win-win' outcome in their business relationship? (more = less)
      - i) Can you give any examples?
- 5) A More Servitized Relationship Has no Influence on the Likelihood of a win-win
- a) How likely do you think it is that servitization has, or will have, no influence on win-win business outcomes?
    - i) Can you explain why you think this is, or is not, the case?

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