The Productization of Services: a market-centred approach to shaping collaboration and innovation

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Abstract

The aim of this thesis is to explore how the productization of services is organised as a way of facilitating collaboration and arranging innovation. To achieve this the study is situated within the Business-to-Business (B2B) Marketing discipline and draws on the theoretical perspectives of Market Studies. The central theoretical focus of the thesis unfolds against three distinct but interrelated research questions: How is productization mobilised and exchanged by market actors? What effect does marketization have on market shaping practices? How does a firm's business model facilitate its ability to organise and capture value?

The case firm selected as the context of enquiry was a large Scottish public utility firm that delivered two key utility services to consumers and operates within a unique and complex regulatory framework. Adopting a pragmatic research philosophy based on abductive reasoning, a multi-method qualitative study was undertaken, and empirical data collected using a single case study approach.

The study theoretically contributes to Marketing Studies by unpacking the performativity of the marketing object, which is found to be purposefully, consistently and temporarily destabilised and re-stabilised by actors, as they undertake agentic calculations during the productization processes. Further, the findings advance business model theory by illustrating the plurality of co-existing business models within a single firm, which dynamically span boundaries. The findings show that co-existing business models were wrapped in a collaborative spatio-temporal nature, and that this is framed through the six-year regulatory investment periods enforced upon the large public utility firm by regulators. The findings further contribute that the use of market devices are fundamental in the ability to shape market practice, demonstrated as case actors struggle to singularize the device due to lack of sound calculative abilities, resulting in attempts of qualification, which adds to the theoretical view that market devices need to be refined and calibrated.

The main contribution of the thesis to practice demonstrates that organisations seeking to productize should fundamentally consider the context of the market, and industry that they exchange within. This thesis demonstrates that adopting a productized service offering will augment the knowledge and expertise required by the business to deliver value to its consumers and require restabilising of market practices.

Keywords

Productization of Services, Market Studies, Business Models, Collaboration and Innovation

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Grant Hemple

Declaration

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

Signature:

Printed name: James Grant Hemple

Research Outputs

Hemple, G., Finch, F., and Pasternak, O. (2015) Productization as a Service: Innovation through Standards in B2B Relationships. International Society for Professional Innovation Management (ISPIM) Innovation Conference 26th annual.

Hemple, G., Finch, F., and Pasternak, O. (2015) Managing conflict in business-to-business relationships through productization and standards.

Hemple, G., Finch, F., and Pasternak, O. (2016) Productization as a Service: Innovation through Standards in B2B Relationships. Lancaster University School of Management. The Centre for Marketing Analytics and Forecasting Research Presentation.

Pasternak, O., Finch, J., and Hemple, G. (2015) Business models guiding co-development. Industrial Marketing and Purchasing (IMP) 31st Annual Conference.

Chapter 1 Introduction

1.0 Introduction

The study is situated within the Business-to-Business Marketing discipline and underpinned by the Market Studies literature stream. This thesis is primarily concerned with examining the varying practices of an organisation and its actors. The area of interest is understanding the effect these practices have on collaboration and innovation.

The thesis builds towards the theoretical contribution of presenting productization as a marketing object. With productization acting materially with respect to a product, and its more widespread use, and socially as service, in offering additional value to users by being more useable. The performative power of the marketing object is destabilised and restabilised by actors resulting in the marketing object temporarily losing its 'made' status.

This chapter introduces the thesis and acts as an overview for the succeeding chapters. It firstly outlines the core theoretical tradition to which it contributes, market studies as outlined by an active and strong body of scholars (Araujo et al., 2010; Azimont and Araujo, 2007; Çalışkan and Callon., 2010; Callon, 1998a; Callon, 1998b; Callon 2007; Callon and Muniesa, 2005; Cochoy, 1998; D'Antone and Spencer, 2015; Finch and Geiger, 2010a; Finch and Geiger, 2011; Fligstein and Calder, 2015; Geiger et al., 2012; Kjellberg et al., 2012; Mason et al., 2017; Muniesa et al., 2007).

Then it moves on to establish the context for the research study. This section briefly defines the research aims, objectives and methodology employed in the study. Finally, a brief summary of each of the chapters of the thesis is detailed.

1.1 Theoretical Tradition of the Research

The importance of markets and understanding the associated processes and practices were highlighted by Geiger, Kjellberg and Spencer (2012, pp. 134) who forwarded 'an understanding of markets not as given, but as ongoing socio-technical enactments worthy of social scientific attention.' Market Studies has advocated for the 'reconnection of marketing to markets' (Araujo et al., 2010), with a renewed focus on marketing theory emanating from marketing practice. This theoretical attention has been crucial in advancing conceptualisations within the marketing discipline.

Scholars research has been published in journals such as: Industrial Marketing Management, Marketing Theory, Consumption Markets & Culture and Journal of Marketing Management. The Industrial Marketing and Purchasing (IMP) Group also supports scholars through its annual conference. Marketing theories and models have agential effects (Mason et al., 2015) and not only serve to change existing organisations, but that it also can help bring about particular organisational forms (Onyas and Ryan, 2015). Marketing theories help actors perform versions of markets (Araujo, 2007; Finch and Geiger, 2010a; Harrison and Kjellberg, 2010; Kjellberg and Helgesson, 2006; Reverdy, 2010). Market studies scholars have debated that markets require sets of devices to perform calculations in order to create stable exchanges (Araujo et al., 2010; Callon, 1998a; Callon and Muniesa, 2005; Kjellberg and Helgesson, 2006). Performativity draws attention to the ways in which actors shape markets (Kjellberg and Helgesson, 2006). D'Adderio (2008) view that market models and market practices are connected, as models are performed in practice.

1.2.1 Theoretical Framework of the thesis

Productization in the B2B marketing discipline exemplifies the common themes of B2B marketing: complex interactions, long term relationships, expertise and rational buying (Cooke, 1986). The success of productization is underpinned by one of marketing core functions, understanding the market and the customer (Flamholtz and Stanford, 2005). Therefore, this draws our attention to the importance of understanding how actors practices stabiles and shape exchanges. The ability of productization to do this has been rarely researched due to the phenomena's infancy and scarceness of research (Leoni, 2015). Andreini et al. (2015) argued that productization requires a shift from relationship intensive customer projects towards a more standardised offer where companies must recognise that it is internal process that should be standardised not the external relationship activities. Consequently, this viewpoint offers that actors need to reshape their practices in order to achieve this aim. Productization allies with professional services literature, where complex issues are solved for customers by utilising specialist expertise and knowledge (Gummesson, 1978; Jaakkola and Halinen, 2006). From a market studies perspective actors utilise various market devices (Callon and Muniesa, 2005; Cochoy, 2002; Muniesa et al., 2007), market objects (Brewer, 2017; Finch and Acha, 2008; Geiger and Finch, 2009) and marketing objects (Finch and Geiger, 2010a) to perform calculative activates to support knowledge and expertise.

Productization is presented as a process of offering product-like services to the market by joining and controlling the appropriate elements (Flamholtz, 1995; Harkonen et al., 2015; Jaakkola, 2011; Valminen and Toivonen, 2012; Harkonen et al., 2017). Part of this process involves the ability to design a product or service but also the ability to produce the product or service (Artz et al., 2010; Flamholtz and Randle, 2016; Suominen et al., 2009; Valminen and Toivonen, 2012). Service productization has been considered as a particular kind of service innovation (Valtakoski and Järvi, 2016), with service productization seeking to understand and specify services with a degree of systematisation (Jaakkola, 2011; Lehtonen et al., 2015). The main criticism of service productization surrounds the ability of the employees to perform during the service. Vaast and Levina (2006) argued that the productization process can be utilised to shape a collective understanding of the intended service within the organisation (Sundbo and Toivonen, 2011). Therefore, from a market studies perspective the importance of performativity in productization is underlined again.

Productization is viewed as the contrasting paradigm to servitization (Aurich et al., 2009; Durugbo and Riedel, 2013; Durugbo, 2014; Leoni, 2015). Services are performed and not produced and are intangible (Baines et al., 2009; Vandermerwe and Rada, 1988). Kowalkowski et al. (2017) argued that servitization is a transformational process of moving from a product-centric business model and logic to a service-centric approach. However, Spring and Araujo (2017) proffer the servitization literature has overlooked the enduring instability of products, referring to them as stable both physically and institutionally. Consequently, from a market studies position the shift towards servitization will impact upon the practices used by actors in order to exchange. Kowalkowski et al. (2017) refer to deservitization and Finne et al. (2013) found two cases of reversed servitization, firms moving back towards the product axis. The suggestion of reversed productization is absent from the current productization literature. Atler (2012) argues that as both paradigms are under researched and still developing it would be unwise to prioritise servitization in favour of productization. Both productization and servitization are processes that take different viewpoints. Productization seeks to add value making services more product like and servitization attempts to achieve the opposite, adding products to services as mean of stabilising exchange. Therefore, from a market studies perspective this require actors to augment their practices and attempt to destabilise and restabilise markets.

The present literature encompassing business models aligns with the theoretical underpins of market studies. Mason and Spring (2011) caution that we are just establishing our understanding and of the practices involved in business models and their agency in making

markets. With Storbacka and Nenonen (2011) adding that the performative power of a market actor is contingent upon on its network positioning, its business model, and the aptitude to demonstrate persuasive meanings concerning the market. Mason and Spring (2011) put forward the conception that business models are performative, this is based on the view that business models move beyond simply describing the proposed value creation and that they play a crucial role in creating it. Mason and Spring (2011) that the business models' ability to command, control and direct actors is framed and implanted in strategy documents, targets, presentations, and reports.

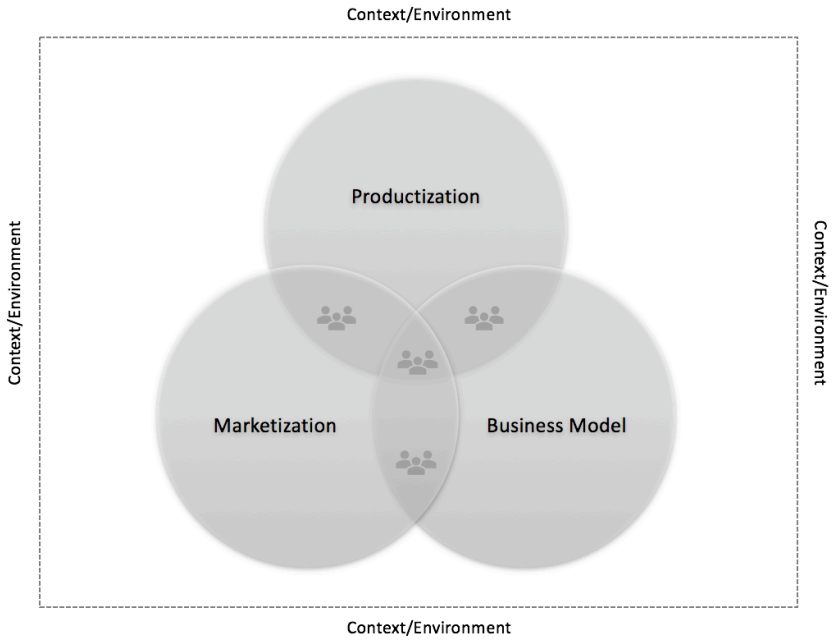
Furthermore, Björkdahl (2009) see the business model as a device that distributes resources as inputs and then transforms them across customers and markets into potential economic outputs. Doganova and Eyquem-Renault (2009) convey that business models can difficult to understand, explain, or even identify. It questions if business models are deliberately enigmatic and this is part of their charm. In acceptance of this Doganova and Eyquem-Renault (2009) assert that business models operate as calculative and narrative devices. Subsequently, from a market studies lens the discussion above strengthens the relationship concerning performativity and market devices in business models as being crucial to actors shaping market practices and gaining agency.

Mason and Spring (2011) argue that the practices undertaken by actors result in business models being produced and constantly materialising, using the word plastic to describe them as suggesting they are constantly being moulded and shaped over time depending on the needs of the environment (Mason and Chakrabarti, 2017). Extending this Doganova and Eyquem-Renault (2009) postulate that business models are performative and that they hold agency by framing the way the business is developed and grown. It puts forward the idea that a business model has significance within the environment that it functions within, extrapolating its performative nature elsewhere may not work. The circular relationship concerning cause and effect requires business models to be designed and redesigned with the practices that support them in mind (Mason and Chakrabarti, 2017). Ferreira et al. (2013) proffer that the business model is ever-evolving in order to maintain external fit and must be designed considering the interactions and relationships of between all actors. Therefore, building on the market studies literature, business models do not sit outside and watch the market rise, fall and evolve, they are an inherent part of that process (Callon, 1998a, 1998b; MacKenzie, 2006; Azimont and Araujo, 2010; Harrison and Kjellberg, 2010) has implications for business model theory.

1.2.1 Conceptual Framework

This thesis takes the three literature themes of productization, marketization and business models and combines them in a novel way to address the research aims and objectives set. Figure 1 displays the initial conceptual framework of the thesis that was developed at the end of the literature review and presents the three literature areas as distinct yet interconnected with each other. Common themes found in the market studies, productization and the business model literature position the importance of actors performing calculative practices in order to facilitate and undertake stable exchanges. The success of one theme requires the presence of the other two with no being particularly dominant over the other. The four overlapping spaces, signified by the icons at the centre of each, represents where significant collaboration and innovation takes places. In the conceptual framework Productization, Marketization and Business Models are bound by the context and environment of the firm.

Figure 1: Conceptual Framework



1.2 Research rationale

The research context of this thesis is a large Scottish public utility firm. The importance of conducting this study and choice of case can be justified by numerous reasons.

Firstly, the decision to focus on the large public utility firm was influenced by several factors, including the researcher's personal interest in the utility industry. The researchers

work experience as a business-to-business marketing practitioner nurtured interest towards the public utility firm. In addition, the knowledge and expertise of the researcher to understand and interpret the complex and dynamic environment was increased.

The visceral desire of the researcher to conduct research in a field that focused on economic and social benefits was also a motivating factor. The large public utility firm had undergone a series of changes to its market environment, such as the introduction of the firms unique and complex regulatory framework. Which led the research to question how its market practices had been impacted. Furthermore, the large public utility firm operates within a highly skilled and pressurised environment, where risk and the concern for public health impact daily practice. Therefore, actors require specific and extensive knowledge and expertise to negotiate the market successfully. Finally, the large public utility firms position as a monopoly power interested the research to understand how this position of perceived strength was played out in the market via actors practices.

1.3 Thesis Aim and Research Questions

The aim of this thesis is to examine how the productization of services is organised as a way of facilitating collaboration and arranging innovation:

1. How is productization mobilised and exchanged by market actors?
2. What effect does marketization have on market shaping practices?
3. How does a firm's business model facilitate its ability to organise and capture value?

The construction of the literature review was purposefully designed to provide maximum investigation of the research aim and questions. It acted as a means to permit the filtering and examination of the research questions against robust and sound existing empirical research. The research questions have been dragged through the literature review, findings and discussion which has allowed the researcher to position what leftover as the contribution to theory is.

1.4 Research Approach

The thesis follows a pragmatic research philosophy with an abductive approach to reasoning. Adopting a single case study approach, the thesis selects a large public utility firm as its focal point. The research aim and questions are examined by multiple qualitative data collection techniques (observations, document analysis and semi-structured

interviews). Further detailed discussion of the justification for the primary research approach is presented in more depth in Chapter Five.

1.5 Thesis Outline

This thesis is presented in nine chapters.

Having introduced the theoretical context, tradition and aims in this Introductory Chapter, Chapter Two begins the review of the productization literature that is relevant to examining the research aim and questions. Then chapter two focuses the productization literature in the business-to-business context and identify research gaps and existing studies. Following this the chapter defines productization and the productization of service. Then the chapter studies the core Inbound and Outbound processes of productization. Next the chapter considers productizations' relationship with collaboration and conflict. After this the debate concerning standardisation and customisation is reviewed. The chapter then shifts focus to review the servitization directing efforts at defining servitization, its prominence and drivers. The chapter then examines the product-service continuum and investigates the relationship between productization and servitization. The chapter ends with a summary of the key points lifted from the literature review that work towards supporting the investigation of the first research question.

Chapter Three, introduces the marketization and market studies literature that is relevant to examining the research aim and questions. The chapter opens with defining marketization and understanding its current research landscape. The chapter then moves to understand the vast array of market shaping practices within the literature. The market shaping practices of market devices, market objects, marketing objects, performativity, calculation, qualification and calqulation are in turn scrutinised. The chapter ends with a conclusion of the key literature statements that work towards supporting the investigation of the second research question that was set.

Chapter Four studies the business model literature that is relevant to examining the research aim and questions. It begins by examining the various definition of business models and the current research landscape and gaps in theory. Next the chapter considers business model innovation and the key elements of it. The chapter then moves to examine the open innovation paradigm by defining it, noting its emergence and definitions. Following this the core process of open innovation are discussed. After this the chapter then asses the literature on collaboration considering its relationship with open innovation. Chapter four concludes

with a summary of the key literature themes extracted from the interview that work towards supporting the investigation of the third research question that was set.

Chapter Five introduces the methodology chapter of the thesis. It begins by reiterating the aims and research questions that were set in the introduction. The chapter then move to address the ontological debate before revealing the ontological position of the thesis. Next the chapter discusses the research philosophies and builds towards adopting a research philosophy of pragmatism. Following this the chapter assess the various research strategies available before offering that the thesis adopts a strategy of abductive reasoning. The then reviews the literature on case study approaches and justifies the selection of the case study method. After this qualitative research is examined as the appropriate method to satisfy the research aims and questions, and its criticisms are also considered. Following this discussion, the chapter assess the numerous qualitative data collection tools available. Subsequently, the chapter offers the main data collection tools as: observations, document analysis and semi-structured interviews.

Chapter five then shifts its focus to outline the research design of the thesis. The chapter open by examining the research context and introducing the case study. The chapter then moves to identify the sampling techniques available before justifying adopting a theoretical sampling approach. Following this the chapter discusses the details of the data collection methods used to gather empirical data. Next the chapter demonstrates its chosen method of data analysis. After this the chapter considers the researchers reflexivity. Then the chapter debate the methodological limitations of the research design and offers actions to less the effect of them. Chapter five concludes by summarising the key aspects of the chosen research methodology and research design and how they have the ability to answer the aims and research questions that were set.

Chapter Six, presents the first empirical chapter of the thesis with regards to productization. It aims to examine the findings with the sole purpose of answering the first research question that was set. The chapter utilises the data collection from observations, document analysis and semi-structured interviews to achieve this. Interwoven throughout the chapter is discussion that examines the findings in contrast to the literature themes identified in chapter two. The chapter concludes by summaries the key findings and their relationship with theory. Offering how the findings and discussion have satisfied the first research question that was set.

Chapter Seven offers the second empirical chapter of the thesis based in the marketization and market studies literature. The chapter begins by reiterating the research question that

was set in conjunction with literature themes that were identified in chapter three. The chapter then uses the empirical data to demonstrate the findings of the data collection. The finds are correlated with the key literature themes throughout the chapter. The chapter concludes by summaries the key finds of the data in relation to the marketization and market studies literature. The chapter ends with addressing how the findings relate to the key literature themes identified in chapter three and how these builds towards answering the second research question that was set.

Chapter Eight, puts forward the third and final empirical chapter of the thesis. It begins by using the empirical data to assess the identified business model literature in conjunction with the third and final research question that was set. The chapter guides through the findings and offers discussion of the data in line with the pertinent literature. Chapter eight concludes by summarising the key finds of the empirical data in relation to the literature. The chapter ensures that it answers the third and final research question that was set.

The thesis concludes with Chapter Nine. Chapter nine begins by introducing the final chapter and offers how it is organised. The chapter then moves to demonstrate the theoretical contributions of the thesis. It achieves this by firstly discussing how the thesis has attained its overall aim. Following this the chapter draws out the main theoretical contributions associated with the research themes identified. Next the chapter offers the practical contributions of the thesis. Then the chapter examines the limitations of the study of the study beyond purely methodological limitations. After this the chapter offers avenues for future research that considers the limitations of the research study. Chapter nine concludes the thesis with some closing remarks and researcher thoughts.

Chapter 2 Literature Review: Productization of Services

The purpose of this first literature review chapter is to discuss and examine the extant literature surrounding the emergent area of research on productization. This chapter positions the research aims and questions within the relevant theoretical landscape to ensure that they are sound and theoretically driven. The chapter is organised as follows: firstly, the context of productization as relevant within this thesis is outlined. Secondly, this chapter outlines seminal work within the area of productization and establishes emergent areas of research. Thirdly, the chapter reviews the definition, purpose and varying processes of productization. Fourthly, the chapter investigates service productization and productization relationship with servitization. The chapter concludes by synthesizing the key areas of research and with a summary of the key points for consideration within the thesis.

2.1 Productization in the B2B Context

The following literature review specifically focuses on productization in the context of business-to-business (B2B) products and services. Productization in the business-to-consumer (B2C) context is mostly concerned with wrapping a predictable offering in a fresh way or via different channel (Baines and Lightfoot, 2013). Such as the emergence of Netflix, DropBox and Spotify are the clear examples of B2C productization. Productization in the B2B marketing landscape exemplifies the common themes of B2B marketing: complex interactions, long term relationships, expertise and rational buying (Cooke, 1986).

2.1.2 Productization and Services Research

Academic research in the area of services marketing emerged due to the belief that the theorisation in traditional marketing management did not fit with services industry, which can be characterized as ambiguous and perishable in the nature of exchange (Shostack, 1977; Berry and Parasuraman, 1993). Without explicitly using the term productization, Vandermerwe and Rada (1988, pp. 136), stated service firms started utilising product to enhance and supply service. Additionally, Vandermerwe and Rada (1988) commented that this allowed service firms to control the design specification used to create and supply services. Valminen and Toivonen (2010) state examples of productization research can be found in the work of Huczynski (1993) and Heusinkveld and Benders (2005), who analysed the change in perspective of management knowledge into a marketable service within consultancy practice. Again, the term productization was not explicitly used when Baines et al. (2007, pp 4) stated:

> "…the evolution of the services component to include a product or a new service component marketed as a product."

Geum, Lee, Kang and Park (2011) recognise the central tenant, that a product alone cannot support the contemporary vibrant service environment and differentiated customer needs. Therefore, it emerges that productization has been utilised and studied within the service or software industries (Simula, Lehtimäki and Salo, 2008).

Recently the scope of research of productization has been expanded: Artz et al. (2010) expand on productization in the software product management domain, Jaakkola (2011) examined productization in small professional service firms, Valminen and Toivonen (2012) investigated productization in small knowledge-intensive business service companies, Andreini et al. (2015) studied productization in a corporate bank and Wibowo et al. (2016) investigated the aero-engine maintenance repair and overhaul sector. This stream of research has been furthered by Valtakoski and Järvi (2016) who argue that productization in service innovation is key to success in the knowledge-intensive business services.

2.1.3 Productization emerges as under-researched

The belief that productization is under research is underpinned by a strong body of research. Simula et al. (2008) called for further studies utilising case studies and building theories to enhance practitioner and academic understanding of productization. Suominen et al. (2009) argue that in scientific literature there have been a few attempts to define the concept. Jaakkola (2011) states service productization is an under-researched academic area despite being widely acknowledged among marketing practitioners. Skålén and Hackley (2011) claimed their empirical study was one of the first to investigate a prominent literature theme. Whilst, Harkonen et al. (2015) further add weight to the under-researched claims within the conceptualisation of productization, by recognising that the academic field is still in the nascent stages of investigating productization, and that significant work remains to understand with more depth the different facets surrounding the concept. Andreini et al. (2015) note that in comparison to servitization, the effects of productization on buyer-seller relationships has been under-researched. The under-researched nature of productization is illuminated by Leoni (2015) who reveals that the only one unsuccessful case of productization has been identified by Davies et al. (2007). Leoni (2015) demonstrates the phenomena's infancy and the scarcity of research.

2.2 Defining Productization and Service Productization

In exploring the emergent area of research surrounding productization, it is possible to start to identify the purpose of productization as a concept and how it is has been utilised in the literature thus far. Turning firstly to Harkonen et al. (2015, pp 69) who state:

> "A product can be tangible or intangible or constitute both elements. Traditionally, a product is understood as a manufactured material artefact. However, a service can also be a "product" that is provided to take care of a customer's needs without transferring the ownership of a tangible asset. Service has the nature of being abstract and intangible. A product can also be software-based, consisting of computer programs, procedures, associated documentation and data for delivery to users. Software also has the nature of being intangible. A product is the suitable combination of tangible and intangible elements that constitute an offering that can be sold to customers to satisfy their needs."

The above extract clearly identifies the fluid and complex nature of defining contemporary products, and services, and alludes to the possible hybridity. In the early work of Pyron et al. (1999) explore that all the activity undertaken as a firm priority to having a commercially ready product, can be classified as productization. This assertion, although concise, started to focus theoretical attention on the role productization plays in the development stage. Productization seeks to make services more product like in their nature (Simula et al., 2008; Skålén and Hackley, 2011; Chattopadhyay, 2012; Valminen and Taivonen, 2012; and Nagy, 2013). Harkonen et al. (2015) state it is the process of translating, combining and forming a suitable mix of both the tangible and intangible elements into a product, is referred to as productization. From this literature, the understanding of making a service consistent is identified. As such, the work of Simula et al. (2008) contend that productization attempts to transform intangible services, into a more product-like, defined set of deliverables. This is extended with Harkonen et al. (2015) who argue that finding an appropriate combination of tangible and intangible elements is required with productization. From a development perspective, Rautiainen et al. (2003) caution that productization extends beyond just developing new products. Similarly, Simula et al. (2008) argue that is key to deliver real value to customers through complimentary tasks and activities which a focus on productization encapsulates. Flamholtz and Randle (2016) add to this perspective stating that productization should incorporate the current needs and the future wants of existing and potential customers.

Productization is therefore identified as a systemised method (Chattopadhyay, 2012; Valminen and Taivonen, 2012; and Nagy, 2013), which can be a standardized repeatable process (Suominen et al., 2009; Harkonen et al., 2015, pp. 70-71). Andrein et al. (2015)

note that the standardization is of the production and delivery processes of services. Hietala et al. (2004) carefully use the word 'elements of the offering,' with Lassila et al. (2006) further commenting the degree of standardization is important. For Ojanen et al. (2007) standardizing the parts of a service that are not unique and re-using them in new service projects is central. As such if a firm or organization in general is to repeat services or activities, it is commercially advantageous if they do not need to re-design and re-think the output, and the delivery process every time from scratch (Simula, et al., 2008). In principle, this means that some form of rationalization is needed before the output of creation and delivery process will produce an unambiguously defined offering (Simula et al., 2008). The key idea within this is therefore to devise repeatable i.e. standardized output that enables scalability. From a management perspective, the situation is slightly easier with physical products as they are tangible by definition. However, the manufacturer still needs to spend time to modify the product into a shape that is easy to understand and use from customers' point of view (Simula et al., 2008).

It can be suggested that productization requires a shift from relationship intensive customer projects, towards a more standardized offer (Andreini et al., 2015) aimed at international mass markets (Myers et al., 2002). Andreini et al. (2015) propose that due to this, companies must recognise that it is internal process, that should be standardized, not the external relationship activities. Therefore, standardization functions as a tool to allow efficient service output and production (Bask, Tinnilä and Rajahonka, 2010). The very foundational understanding of productization is created by thoroughly enhancing and upgrading the emerged idea (Suominen et al., 2009). In contrast, rationalisation does not mean that all work should be standardized, and creativity impinged upon. Simula et al. (2008) argue that it enhances innovative thinking, as routine and mundane task are reduced through using existing templates, platforms and modules. Therefore, productization facilitates a discipline and ensures employees investigate new solutions that aid the customer and a manufacturer (Simula et al., 2008). Simula et al. (2008) cite the example, that routine engineering work from scratch, usually incurs extra costs, and Skålén and Hackley (2011) argue that this allows firms to stop wasting resources by 'attempting to reinvent the wheel'. When examining productization in knowledge intensive businesses, Valminen and Toivonen (2012) found that customer-orientation was still a problem to those who required the transfer of professional knowledge to customers.

The starting point of productization is produced information. This does not exclude reuse of earlier information but has a definite focus on new exploratory technology (Suominen,

Kantola, and Tuominen, 2009). Leoni (2015) argues the firm's ability to accumulate and evaluate knowledge is improved, and from this the ability to delegate work is increased. Valtakoski and Järvi (2016) state this is achieved by the elicitation and codification of the employees' knowledge. Thus, productization can be used to represent in a tangible way the expertise of the firm to its customers.

Productization takes the emerged idea (Suominen et al., 2009) with the goal of packaging the offering, technology or service, so that a customer can understand the content of it in advance (Simula et al. 2008). It therefore acts as a stabilising activity that permits exchange to occur as it is seen as a commercial good or service viable in the market (Suominen et al. 2009). Harkonen et al. (2015, pp. 70-71) explain the value of this is that is produces a commercial readiness enabling selling, delivering, using and invoicing. Therefore, a key understanding is drawn to the idea that productization permits exchange and stability, this is added to by Leoni (2015) who states that it makes pricing easier, with Valminen and Toivonen (2012) stating that it permits different pricing mechanisms to be set with value propositions being actively defined. This occurs as the customer believes the expected service quality is stabilized and can assess its value (de Brentani, 1991; Valminen and Toivonen, 2012). This is considered a central challenge for service firms (Edvardsson and Olsson, 1996). The intangibility of services creates uncertainty and fear from the customer's perspective (Mitchell, 1994). Jaakkola (2011) adds that that is particularly pertinent with regards to productization processes. Productization aligns with professional services literature, where complex issues are solved for customers by utilising specialist expertise and knowledge (Gummesson, 1978; Jaakkola and Halinen, 2006). Velamuri, Neyer and Moeslein (2011) view productization as like 'hybrid value creation', arguing that its key strength is in the ability to align the value creation of both products and services, which represent accordingly tangible and intangible elements.

The productization process involves not only the ability to design a product or service (defined here to also include services) but also the ability to produce the product or service. For a service firm, the ability to produce a product, involves the firm's service delivery system as the mechanism through which services are provided to customers (Flamholtz and Randle, 2016). As such Baines et al. (2007) view productization as an evolution of the service component. In this understanding a product or a new service component is included in an already existing service component. These together are marketed as a new product. Tiensuu (2005) has also used the term productization in the service domain, whereby productization is as an innovation process, where ideas are transferred to the form of

sellable product concepts. This is added to by Suominen et al. (2009) who emphasize that productization does not form the whole innovation process.

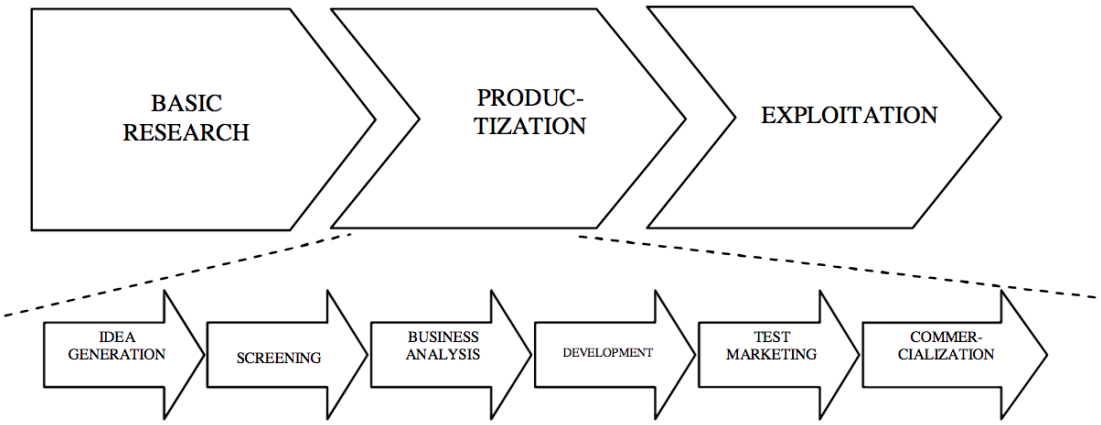
Simula et al. (2008) found that the productization level increases as the maturity of offering raises. This also removes abstraction level and the outcome of productization, being it service or a product, will be easier to communicate to an end customer. This finding agrees with Sharma (1997) who state that the outcomes and even service itself, can be challenging for customers to comprehend and assess due to a lack of knowledge and expertise. Simula et al. (2008) argue that productization as a process, adds value as a dynamic capability by exploiting company specific cross-functional resources at an early stage to the new product development project.

Flamholtz and Stanford (2005) express that productization is relevant for firms of varying size (small to large) and of age (fledgling to established). The success of productization is underpinned by one of marketing core functions, understanding the market and the customer (Flamholtz and Stanford, 2005). Productization will create increased demand for a firm's products or services and stretch resources (Flamholtz, 1995). Flamholtz and Stanford (2005) further assert the importance of productization by stating it is the second task a firm should undertake (after identifying the market segment and niche). This view aligns with Bask et al. (2010) who found that a match exists between service strategy, business models, and operational level business processes.

2.3 Productization in practice

Jaakkola (2011) state that there are three key practices to successfully productize. Firstly, specifying and standardizing the service offering is required. Secondly, tangibilizing and concretizing the service offering and professional expertise. Finally, systemizing and standardizing processes and methods. Jaakkola (2011) assert that instead of denying standardization, firms should attempt to find an optimal balance between customization and standardization. Suominen et al. (2009) put forward a process for productization in the context of new product development (NPD), that adds to that of Jaakkola (2011) and compliments Flamholtz (1995), and Flamholtz and Aksehirli (2000). In Figure 2 below Suominen et al. (2009) view the innovation pipeline as a standardized process which is separated into three domains.

Figure 2: Process for productization in NPD



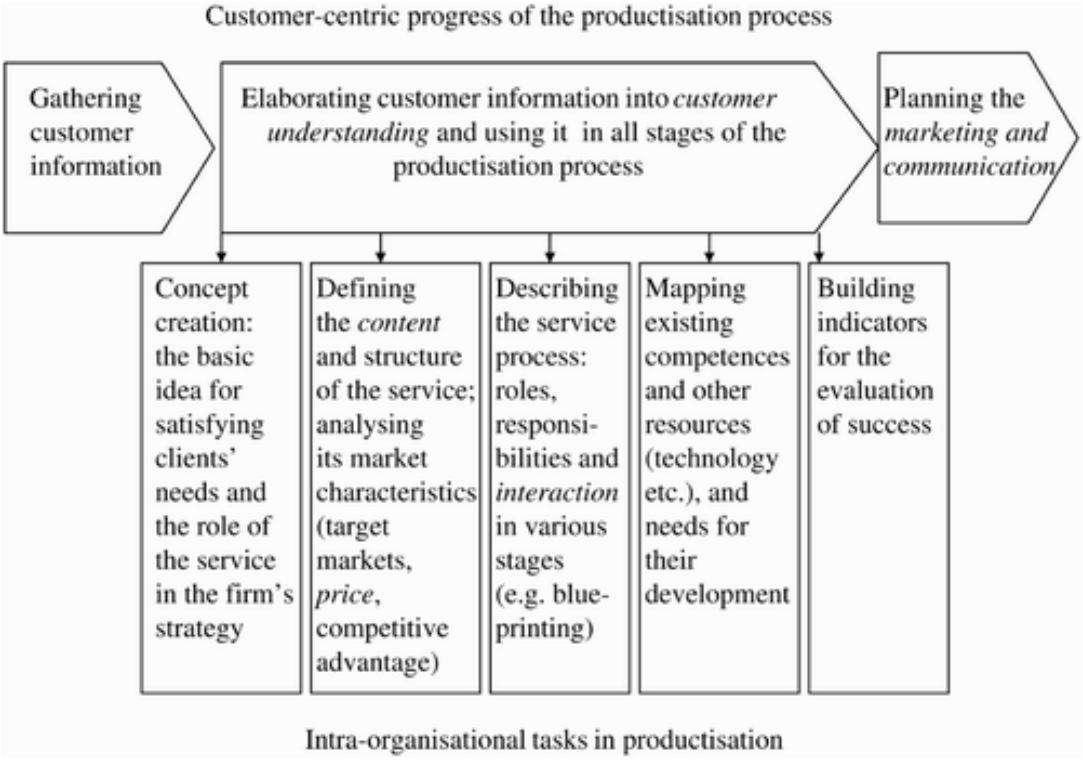
Source: Suominen et al. (2009, pp. 12)

Here productization is seen from a processual perspective (Flamholtz, 1995; Flamholtz and Aksehirli, 2000; Suominen et al., 2009), that includes new product development (Rautiainen et al., 2003; Suominen et al., 2009). Tiensuu (2005) believe productization has a key part in the innovation process. However, Suominen et al. (2009) highlight that it does not form the entire innovation process.

2.3.1 Productization framework

In figure 3, Valminen and Toivonen (2012) suggest a customer centric framework for productization in the context of knowledge intensive business services. To begin, it is essential to clarify the productization process being undertaken and the service that will be the end-point of the process. Additionally, Valminen and Toivonen (2012) emphasises the importance of establishing a customer orientation and well defined intra-organisational jobs.

Figure 3: Productization framework combining the customer-centric perspective



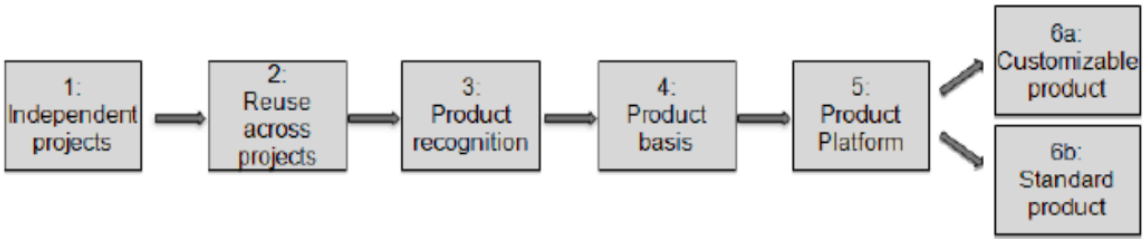
Source: adapted from Valminen and Toivonen (2012)

Valminen and Toivonen (2012) note that although most the time and work is undertaken internally by the organisation, it is vital that detailed customer information is understood. The top three stages of the productization process are explicitly customer and externally focused and concerned. The internal stages of the productization process are attempting to define and create the elements of that intended service. Valminen and Toivonen (2012) found that the final stage of the internal tasks, building the indicators for the evaluation of success, was important. They proposed measures such as: turnover growth, number of new customers and number of new markets. Harkonen et al. (2015) support this view by adding that productization supports diversification through an enhanced awareness and deepened knowledge of efforts that can be integrated to add value.

2.3.2 Productization process and product software

Artz et al. (2010) offer a productization process containing of six key stages. They argue this process highlights the transformation of customer-specific software into product software. Artz et al. (2010) state that the process assumes the organisation wants to transition from the customer-specific to product software and that external motivations, customer and marketing forces, are not considered.

Figure 4: Productization Process



Source: adapted from Artz et al. (2010)

For Artz et al. (2010) the process is presented as linear with organisations completing each stage sequentially. Drawing attention to specific stage, stages one through to three, builds on the previous discussion surrounding productization. Whereas stage six requires the organisation to decide if they offer a customised software product or a standard software product. The decision made at stage six is dependent on marketing decisions such as product market, concepts, benefits, positioning, requirements, features, specifications, delivery channel, marketing, selling, and packaging (Hietala et al., 2004; Artz et al., 2010). Artz et al. (2010) argue that the need for two decisions in stage six is because a completely standardized solution will rarely meet the needs of the customer. The implications for selecting a customizable product is that it will require additional resources to deliver (Hich et al. 1999). This compliments Ojala and Tyrväinen (2006) who state that customised products offer low productization opportunities and mass-marketing products contain higher levels of productization.

2.4 Service Productization

The literature review thus far has presented productization and the various underpinning processes. The following sections will build on this initial understanding and discuss the specific concept of service productization.

2.4.1 Growth in services

The growth and significance of services is well established in the literature and is argued by researchers (Bitner and Brown, 2008; Ritala et al., 2011) within the services domain, as replacing physical products (Grönroos, 2000; Edvardsson, et al., 2005). It is widely argued that all organisations need to partake in service innovation to satisfy customer demands and remain viable (Berry et al., 2006; Johnson et al., 2000). The current and predicted growth in services has caused academics to question the nature of services research (Ostrom et al.,

2010) and the affect this has on co-creating value around complex exchanges (Bettencourt et al., 2002). As such Tether and Hipp (2002) argue that the maturity of services can be related to the increased knowledge and expertise in contemporary service production.

2.4.2 Service Productization

Service productization has been considered as a particular kind of service innovation (Valtakoski and Järvi, 2016), with service productization seeking to understand and specify services with a degree of systematisation (Jaakkola, 2011; Lehtonen et al., 2015). Underpinned by Chattopadhyay (2012, pp. 198) who state:

> "Service companies attempt productization of service for improving competitiveness and performance. Defining, systematizing and concretizing a service make its production more profitable and efficient."

The literature frequently discusses service productization as a generic process of offering product-like services to the market by joining and controlling the appropriate elements (Flamholtz, 1995; Harkonen et al., 2015; Jaakkola, 2011; Valminen and Toivonen, 2012; Harkonen et al., 2017). Harkonen et al. (2015) adds to this by stating that productization of services domain contributes towards the development of services and their commercialisation. Andreini et al. (2015) advance this view by stating that the key element of service productization is the relationship, and management of that relationship, with customers. The focus on relationships allows firms to manage any concerns from customers with regards to the perceived inflexibility of the productization process (Hellström et al., 2016), permitting easier exchange through demonstrating value (Simula et al., 2008; Harkonen et al., 2017).

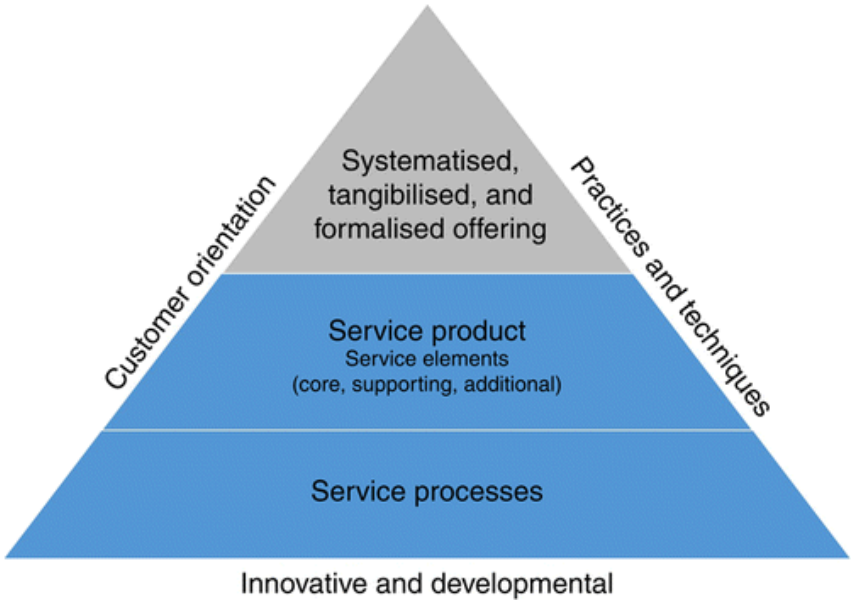
Most service innovation processes require a degree of productization to structure the innovation before implementation within the firm (Menor et al., 2002; Stevens and Dimitriadis, 2005). Productizing attempts to improve the implementation of the service (Menor et al., 2002) and accelerate the diffusion of the productized service throughout the firm (Den Hertog et al., 2010; Winter and Szulanski, 2001). Additionally, productization improves the efficiency of the service (Jaakkola, 2011) and makes the service simpler for the customer to understand and utilise (Valminen and Toivonen, 2012). When the productization process is concisely expressed, the value attributed to the service is stable (Leoni, 2015). As such Valtakoski and Järvi (2016) argue that service productization is more internally focused, which excludes the ability to apply external measures of success.

An effectively productized service can then be replicated and offered to other customers by the firm (Den Hertog et al., 2010; Winter and Szulanski, 2001). Therefore, Valtakoski and Järvi (2016) state that service productization success is measured by internal goals which include the completion of the basic objectives for productization (Jaakkola, 2011). Harkonen et al. (2015, pp. 71) note that productization in the context of services:

> "…addresses the objects of exchange that are typically abstract and intangible and has a specific role in clarifying the service offering, creating replicability and enhancing understanding of the offering."

In figure 5 below Harkonen et al. (2017) propose the nature of service productization. Their empirical analysis highlights that the service product and the service processes, are the focal point of service productization. The firm's practices and techniques (such as blueprints, modularisation, pilots) and customer centric approach, is required to support the development towards a systemised, tangible and formalised offering (Harkonen et al., 2017).

Figure 5: The nature of service productization



Source: adapted from Harkonen et al., 2017

Harkonen et al. (2017) add to Ritala et al. (2011) who argue that revisiting, reassessing and attempting to standardise service processes and outputs is essential for service productization. Ritala et al (2011) introduce the importance of modularising as part of the service productization offering. Modularising involves standardizing individual parts that form a complete structure when combined. Modularisation is seen to provide three benefits

to companies: firstly, it cost-effectively increases the range of products to the customer (Starr, 1965; Ulrich and Eppinger, 2000). It does not limit the firms achieve economies of scale and the ability to offer customised offerings through modules (Starr, 1965; Spring and Araujo, 2017). Secondly, modularisation creates strategic flexibility as the firm can react to active competitive environments as it is easier to replace modules across various products (Worren et al., 2002). Thirdly, modularisation allows tasks to be completed in parallel as the firm can focus on the development of independent modules, which limits task difficulty and enhances the ability to complete tasks (Sanchez and Mahoney, 1996). Modularisation allows the firm to explore customers' willingness and ability to adopt new solutions and safeguard the existing core product (Salonen et al., 2017). Therefore, Persson and Åhlström (2006) suggest managers must find a suitable degree of modularity, which balances the different functional requirements and coordinates the modularisation process across the firm.

From a management perspective, when seeking to further productize and there is only a rudimentary vision of the full solution available, modularising allows firms to present a partial and exchangeable solution to customers and plan for when the complete solution emerges (Ritala et al., 2011). Spring and Araujo (2017) state that modularising underpins the ability to configure and re-configure products accepting flexibility in product specification. Spring and Araujo (2017) endorse the strength of modularising by stating that the pre-produced package of resources and features offered by modularising is as stable, as any other product offered in the traditional sense. Ritala et al. (2011) had argued that service productization is applicable in knowledge intensive services due to the vast levels of diversity. This allows the firm to see and create, the service offer from the perspective of the customer and the firm.

Harkonen et al. (2017) posit that ‘piloting’ can be utilised to garner comment from the productized service. This stage permits the firm to learn from the initial productized offering by adapting where required. Additionally, piloting can provide the firm with additional opportunity to promote success to other customers. Harkonen et al. (2017) state that there is a lack of research into how service productization and modularization have been utilised.

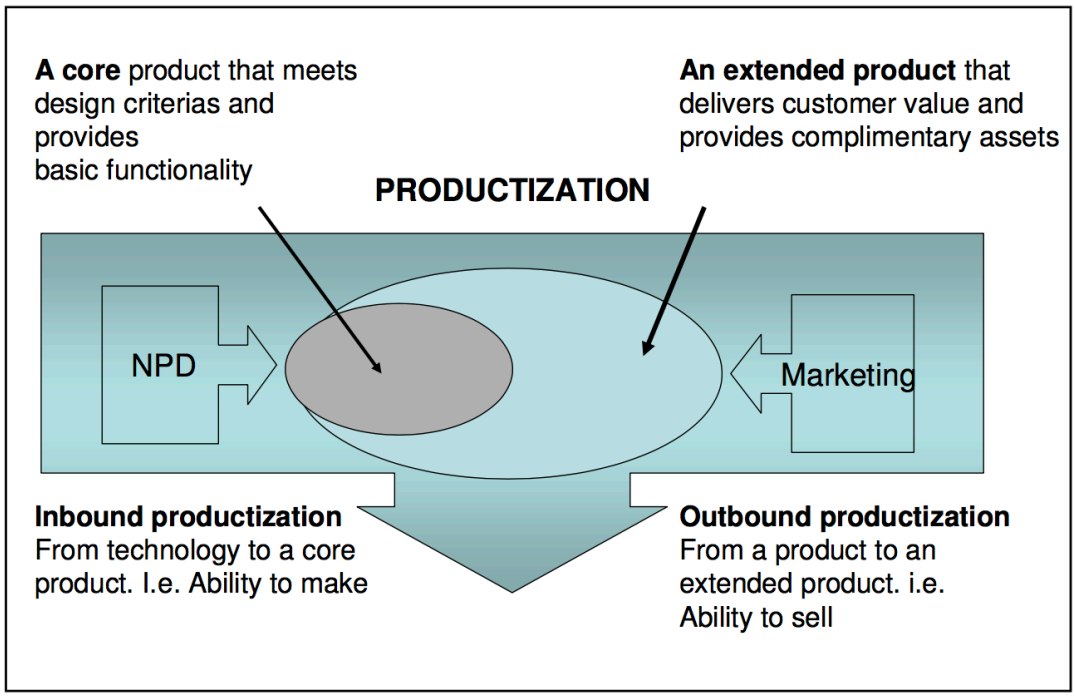
The main criticism of service productization surrounds the ability of the employees to perform during the service. Vaast and Levina (2006) argue that it can limit an employee’s ability to improvise and prevent their ability to act in the moment to satisfy the customer’s

needs. Valtakoski and Järvi (2016) argue that employee involvement and business unit collaboration, in the context of knowledge intensive business services firms, is more challenging than current service innovation literature insinuates.

2.5 Inbound and Outbound Productization

Simula et al. (2008) propose the conceptual framework for productization that differentiates between inbound and outbound activities. It attempts to emphasise the relationship between new product development and marketing, with productization being viewed as a unique way to connect both (Simula et al., 2008). Simula et al. (2008) see inbound and outbound productization as a mechanism that puts the product as the focus. The conceptual framework is demonstrated below in Figure 6.

Figure 6: Conceptual illustration of productization



Source: adapted Simula et al. (2008)

It should be considered that inbound productization for one firm, could be outbound productization for another firm.

2.5.1 Inbound Productization

As previously discussed, productization seeks to systemise and standardise offerings to facilitate exchange (Flamholtz, 1995). However, in terms of inbound productization, Simula et al. (2008) assert that tasks vary from and within projects, and the challenge is finding a suitable balance when standardising and customising.

Simula et al. (2008) use the example of prototyping to explore inbound productization, commenting that although the prototype highlights functionality and viability to the customer, at this stage the customer may still not be willing to commit financially to purchasing. This requires the firm to invest significant resource into bringing the prototype to technical readiness and viewing it as a core product. It is due to this length and focus of resource, that development is seen as the key element of inbound productization, as it relies heavily on engineering expertise and jobs (Simula et al., 2008).

The development stage is it is key to engage engineers in technical tasks that stimulate their desire to provide technical solutions based on their expertise, once this is achieved engineer's focus should be realigned (Simula et al., 2008). The level of rigour at the developmental stage of inbound productization permits the firm to present a final product as prototypes, although at times necessary, may not also be feasible and cannot be used solely to exchange (Simula et al., 2008). Therefore, the key objective of inbound productization is to deliver a final product in a manner that can be easily repeated. Ideally, firms should seek to deliver a portfolio of products underpinned by the values of mass customisation (Simula et al., 2008).

2.5.2 Outbound Productization

Simula et al. (2008) state that outbound productization is concerned with the marketing of the product, it stabilises the offering and provides visibility. This allows firms to more clearly demonstrate the value of the product to customers (Simula et al., 2008). Simula et al. (2008) propose that so much resource is directed towards the inbound (development) stage that the applying the correct amount of attention to the outbound stage is often neglected, suggesting it causes a firm to over-engineer. Simula et al. (2008, pp 9) state:

> "No matter how sophisticated the core product is from the engineering point of view, it may still lack many of the assets that should be in a place with the final offering make."

The above quotation highlights the importance considering the outbound productization stage from the beginning. It suggests that by being focused on engineering rigour, elements of the final product offering may not be in place. The engineer focus fixates on purely what are seen as engineer or emerges as development tasks. They fail to focus on creating a complete product that is consistent and exchangeable (Simula et al, 2008).

Simula et al. (2008) introduce the understanding of the extended product as part of the outbound productization process. The initial completed core product is set and capable of being sold and produced. The offering is clear to the customer and they understand how it can be exploited. At this stage, it is the extended product that can be utilised to communicate the longer-term worth and effectiveness of the product (Simula et al, 2008). As customers can compare, and contrast with rival offerings via pilot tests and benchmarking capabilities.

Simula et al. (2008) simply refer to inbound productization as the ability to make, and outbound productization as the ability to sell. Table 1 below summarises this argument and the key engineering tasks associated with inbound productization and the marketing focused tasks of outbound productization.

Table 1: Inbound and Outbound Productization

Inbound Productization (Engineering focused)	Outbound Productization (Marketing Focused)
• Final design specifications • Material selection and sourcing • Production tools (moulds, jigs) • Assembly instructions • Manufacturing ramp-up • Product data management • Testing process and quality control • Certifications and accreditations	• Branding and naming • Warranties and technical support • User guides and documentation • Advertisements, brochures and white papers • Customer testimonials • Contracts and/or licence terms • Sales channels and commissions • Sales tools and pricelists • Logistics and packaging

Source: adapted from (Simula Lehtimäki and Salo, 2008)

2.6 Productization, collaboration and conflict

From the various frameworks and processes discussed in the literature thus far, collaboration can be identified as a consistent theme of productization. Sundbo and Toivonen (2011) suggest that productization contributes to internal organizational learning. Outlining that firstly, the productization process can be utilised to shape a collective understanding of the intended service within the organisation. Sundbo and Toivonen (2011) state this holistic view is formed via multiple staff members creating value in cross departmental groups. Although seen as time-consuming compared to simply allocating tasks to staff members with the required expertise (Sundbo and Toivonen, 2011), the resulting

productized service serves as a mechanism for employees to collate feedback from customers, providing a deeper understanding of the service and the possibilities to enhance and refine it (Sundbo and Toivonen, 2011). However, Sundbo and Toivonen (2011) further emphasise the importance and challenge of collecting and disseminating the daily information captured from customers.

Adding to this, Valtakoski and Järvi (2016) found that employee involvement and cross-unit collaboration were not adequate precursors for effective productization. Effective service productization was achieved when project objectives were in sync with the employees. Promoting trust between the project teams facilitated employees sharing knowledge. Valtakoski and Järvi (2016) argue for sharing to occur between units as a common language is required to manage conflict between units. This view agrees with Stevens and Dimitriadis (2004) who found that a common language increases the efficiency and effectives of cross unit collaboration. Crossan et al. (1999) argue that a common language contributes to a sense of shared understanding. Dougherty (2004) underpins this by recognising that a collective vocabulary acts as a boundary object in enabling cross-unit collaboration.

Managing conflict in productization requires the varying objectives and goals of each team to be discussed and agreed, when required, by the productizing team (Valtakoski and Järvi, 2016). Jehn et al. (1999) accept that some conflict can spark innovation, however, recognise that too much is counterproductive. Lehtonen et al. (2015) found that productization encourages reflexivity in service development but may reduce it in service operations. If productization disagrees with the organisation's cultural norms and values, it enhances the structural reflexivity of employees (Lehtonen et al., 2015). Productization elevates an organisation's unity through control and assimilation (Lehtonen et al., 2015). At the individual employee level productization can permit a greater transparency of work and can create independence via the spread and growth of knowledge and expertise (Lehtonen et al., 2015).

2.7 Standardisation and customisation

Sundbo (2002) states that the dichotomy between standardisation and customisation of services has long existed between marketing theory literature and practice. Economic theory accentuates output gains as the authoritative measure of economic activity (Sundbo, 2002), therefore, firms have been unrepentant in attempting to decrease costs via standardization to achieve the required economies of scale (Jiaoa et al, 2003). Standardization has been considered as the mechanism for controlling the enhanced costs in service delivery (Gadrey,

1996). Levitt's (1983) seminal work presented a view that the development of global markets for standardized consumer products which was previously unpredicted in terms of size and importance. Levitt (1983) saw customisation at a market segment level, where success in the global environment, in the form homogenisation of demand, required sales in similar market segments, providing the required economies of scale. However, service research such as Normann (1991) and Grönroos (1990) have demonstrated that the quality of service given to an individual customer is the requirement for service actives to succeed. This success is achieved through customisation of the offering (Lovelock, 1984; Czepiel Solomon and Surpenant, 1985; Eiglier and Langeard, 1988; Bateson 1989; Brown et al., 1991; Schlesinger and Heskett 1992). Sundbo (2002) put forward the argument that unique service production, that has that special customer interaction, customisation is still advantageous, especially in fledgling markets which are not focused purely on price competition of standard products. Anderson et al. (1997) found that the connections concerning fluctuations in customer satisfaction and the fluctuations in productivity, is viewed as positive for goods. However, they found that the negative is true for services. Focusing on standardized products alone could potentially satisfy the customer need, customisation would be required to achieve (Sundbo, 2002). Jiaoa et al. (2003) found that in Design for Mass Customization (DFMC), the key was in extending the traditionally recognised boundaries concerning product design and sales and marketing functions. Further, Sundbo (2002) argue that customer participation in the service offerings development is a central part of creating the offering, this action binds together services, and customisation. This is further demonstrated by Liechty et al.'s (2001) findings, where web-based information service firms blended mass customization by providing customers with a selection of choices to configure their own products and services.

Table 2 overviews Sundbo's (2002) summary of the four types of service firm based on orientation and dynamics.

Table 2: Four types of service firm based on orientation and dynamics

	Product Orientated	Customer Encounter Orientated
High Dynamic	Modulised Production	Customised Production
Low Dynamic	Standardised mass production	Artisan production

Source: adapted from Sundbo (2002)

Sundbo (2002) called for further research surrounding the productization process including standardisation, modularisation and customisation. Highlighting the key challenge is the integration of the two opposing views of service production.

2.8 Servitization

The chapter has so far examined productization and its various elements. This section will now introduce and discuss servitization, which is viewed as the opposite of productization (Leoni 2015; Kuijken et al., 2017). Kuijken et al. (2017) recognise that servitization has been more widely studied by research in comparison to productization.

2.8.1 Services in manufacturing

Vandermerwe and Rada's (1998) conceptual research noted that the importance of services is undeniable, with managers required to integrate services into the firm. It is extensively demonstrated that manufacturing firms are increasingly shifting towards services (Davies et al., 2006; Evanschitzky et al., 2011; Ulaga and Reinartz, 2011; Turunena and Finne, 2014). Services are seen as a critical element of competitive strategy (Ahamed et al., 2013). This has encouraged researchers to examine product-service differentiation and configuration, customer value and relationships and competitive strategy (Lightfoot et al., 2013). Furthermore, Davies et al. (2006) add that this has led manufacturing firms to blur the boundaries between products and services. Baines et al. (2009) underpin this by stating that it is overly simplistic to define services as merely the opposite of a product. Vandermerwe and Rada (1998, pp 315-316) outline that this shift has happened in stages: Stage I: Goods or Services, Stage 2: Goods + Services, Stage 3: Goods + Services + Support + Knowledge + Self Service.

2.8.2 Defining Servitization

Demonstrating the development of this specific area of research, in their seminal research Vandermerwe and Rada (1988, pp. 314) defined servitization as:

> "the increased offering of fuller market packages or 'bundles' of customer focussed combinations of goods, services, support, self-service and knowledge in order to add value to core product offerings."

Vandermerwe and Rada (1988, pp 315) further took the position that "services are performed and not produced and are essentially intangible." This is a widely-cited

definition, and Baines et al. (2009) state that there is agreement of the importance of this central understanding. Kastalli and Van Looy (2013) contribute that servitization should be considered throughout the product lifecycle. With Kowalkowski et al. (2017) stating that servitization is a transformational process of moving from a product-centric business model and logic, to a service-centric approach. This greatly impacts the servitizing firm to redefine its mission, overhaul routines and practice and cultural values (Kindström and Kowalkowski, 2014).

2.8.3 Servitization drivers

Turunena and Finne (2014) identify the key drivers for this is in the emergence of economic competition from Asia and the Middle East. Porter and Ketels (2003) state that in response to this manufacturing companies have sought not to compete specially on price. This has been achieved by a greater focus on the customers' needs and satisfying those needs via innovative products and services (Turunena and Finne, 2014). Baines et al. (2017) comment that further research surrounding servitization transformation and deployment is required due to the critical change in capabilities of manufacturing firms. The literature has identified three general motives behind servitization as consolidated in table 3 below.

Table 3: Motives of servitization

Driver	Detail	Source(s)
Economic	Need for greater profit margins and steadiness of income. Resilience of services to economic cycles.	(Gebauer & Friedli, 2005; Wise & Baumgartner, 1999) (Oliva & Kallenberg, 2003).
User needs	customers increasingly demand a variety of services	(Vandermerwe and Rada, 1988)
Competition	Competitive motives. services are difficult to imitate due to their invisible and labour-dependent nature. Services reduce the need to compete based on cost.	(Gebauer and Friedli, 2005; Oliva and Kallenberg, 2003). (Neely, 2008) (Turunena and Finne, 2014)

2.8.4 Servitization challenges

Turunena and Finne (2014) state that servitization has been seen as a feasible strategy for every manufacturer notwithstanding the operational setting and that an understanding of the transformational dynamics which is lacking. The literature has highlighted that there are

several key challenges associated with the adopting a servitization strategy. As such, servitization requires a substantial cultural and corporate shift for a firm (Vandermerwe and Rada, 1988; Wise and Baumgartner, 1999; Oliva and Kallenberg, 2003; Brax, 2005; Slack, 2005). The new culture must be nourished to achieve the required change (Gebauer et al., 2005; Gebauer and Friedli, 2005). Wilkinson et al. (2009) comment on the need to modify and enhance traditional operating models. However, at the same time firms must not forget traditional manufacturing values such as efficiency and economies of scale (Gebauer et al., 2005). Viljakainen and Toivonen's (2014) empirical study of magazine publishers adopting successful servitization strategies, found the importance of firms transitioning from their traditional mind-set, and the accepted the value of the change (Viljakainen and Toivonen, 2014).

Servitization requires firms to development dynamic capabilities, specifically in the initial stages of service development (Kanninen et al., 2017; Spring and Araujo, 2017). Kanninen et al. (2017) affirm that these key dynamic capabilities include: identifying opportunities (sensing), allocating resources to the identified opportunities (seizing) and bringing into line the required assets (reconfiguration). Sousa and da Silveira (2017) add that these findings are one of the first to demonstrate a relationship between servitization strategies, capabilities and maturity. Spring and Araujo (2017) suggest that the change in dynamic capabilities has seen the focus on products neglected, as firms and researchers focus on services. In viewing products as an unstable element which are not always positioned to facilitate the delivery of a service, however, they are viewed as recognisable and simple to manage (Spring and Araujo, 2017). Significant in the underpinning of the thesis, is Spring and Araujo's (2017) argument that the servitization literature has disregarded the enduring instability of products, referring to them as stable both physically and institutionally. Spring and Araujo (2017) use the product biography perspective to examine products in relation to services, to other products, and in processes of production, re-production, valuation, exchange and use. They apply the lens of the circular economy to question the established servitization viewpoint. Spring and Araujo (2017) find that a product biography perspective can bring attention to the contextual and institutional stabilisation of products.

Further, Neely (2008) examined the link between firm size and servitization of manufacturing firms, concluding that larger firms (quantity of employees and revenue) engage in servitization strategies more than smaller firms. Böhm et al. (2017) continue this line of enquiry by investigating servitization adoption dependent on the firm's financial position. Financially stable firms should utilise customers as a source of

knowledge. However, firms with unstable finances should develop stronger links with their supply chain (Böhm et al., 2017). Kastalli and Van Looy (2013, pp. 24) continue the financial case for servitization by indicating:

> "…that product sales and service sales complement each other and that the customer proximity of service offerings reinforces the positive feedback from services to product sales."

However, Neely (2008) states that a servitization paradox has materialised, highlighting that firms who deploy servitization strategies grow their revenue but not profit. Baines and Lightfoot (2013) examined B2B manufacturing firms in the delivery of servitization, with regards to advanced services, finding different technologies and practices. These included: facilities and their location, micro-vertical integration and supplier relationships, information and communication technologies (ICTs), performance measurement and value demonstration, people deployment and their skills, and business processes and customer relationships (Baines and Lightfoot, 2013, pp 13).

The role of the employee in service delivery has been well established in academic research to date (Zeithaml et al., 1985; Parasuraman, 1988; Bitner, 1990; Lewis and Entwhistle, 1990). In their recent work Kowalkowski et al. (2017) have argued that a better understanding of people and their management in service growth is required. Through the servitization lens Baines et al. (2013) reaffirm the importance of people. Baines et al. (2013) position that the delivery of an advanced service is positively impacted by front office staff who are relatable and supportive in their behaviour. Figure 7 below highlights the desired behaviours of staff (Baines et al., 2013, pp 640).

Figure 7: Behaviours and supporting skill-sets of workers delivering advanced services

Desired behaviour	Supportive skill-set	Description of skill-set
Prepared to vary working hours or task to match customer demand	Flexibility	Ability to modify working routine in order to comply with customer requirements
Readily have meaningful conversations with customers Forging strong people/team relationships with other staff within the front-office	Relationship building	Ability to develop and sustain close customer trust, and similar relationships with other staff internal to the manufacturer
Appreciating the consequences of an equipment failure on the customers of our customer Talking to people, engaging people, and understand where they are coming from	Service-centricity	An empathy with customer's problems and delivering against these; capable of putting themselves in the customer's shoes
Demonstrating belief in the manufacturer, its products and services Only making commitments that can be fully delivered	Authenticity	Genuinely committed to delivering a successful outcome for the customer; prepared to tell the customer the truth
Being able to understand the consequences of an electrical sub-system failure on a machine	Technically adept	Understanding of the principal operation and sub-systems of products and equipment
Appreciating when the customer's anxiety is with the situation although it may come across as more personal: being able to sleep at night!	Resilience	Capable of dealing with the personal stress incurred by working at the frontline with the customer

Source: adapted from Baines et al. (2013, pp 640)

Vandermerwe and Rada (1998) assert that the paradigm shift towards servitization was facilitated by customers. Therefore, due to this market push it should not be considered out of place with any other approaches' corporate strategy (Vandermerwe and Rada, 1998). Servitization research has benefitted from the current focus of research on service-dominant logic, which sees co-creation of value between the provider and the customer as the core phenomenon of service (Vargo and Lusch, 2004, 2008; Smith et al., 2014). Kastalli and Van Looy (2013) comment that a key feature of servitization strategies is a strong customer centricity and demonstrate that servitization can generate value on both the level of the product and the customer. Servitization has sought to move beyond providing products, to a wider more bespoke solution to customers (Kastalli and Van Looy, 2013), even if this requires the combination of products from other sellers (Miller et al., 2002; Davies, 2004). Rabetino et al. (2015) found that early adopters of servitization deliver services that are principally concerned with product support. Rabetino et al. (2015) concluded that transactional services (e.g. after-sales services care and repair services) remain the most important. Rabetino et al. (2015) conceptualise a life-cycle service offering that considers the varying needs from product purchase planning to product disposal. Kamp and Parry (2017) recognise that practices and actors are the focus point if analysed. The dynamic nature and fluidity of servitization in practice requires research to be agile (Kamp and Parry, 2017).

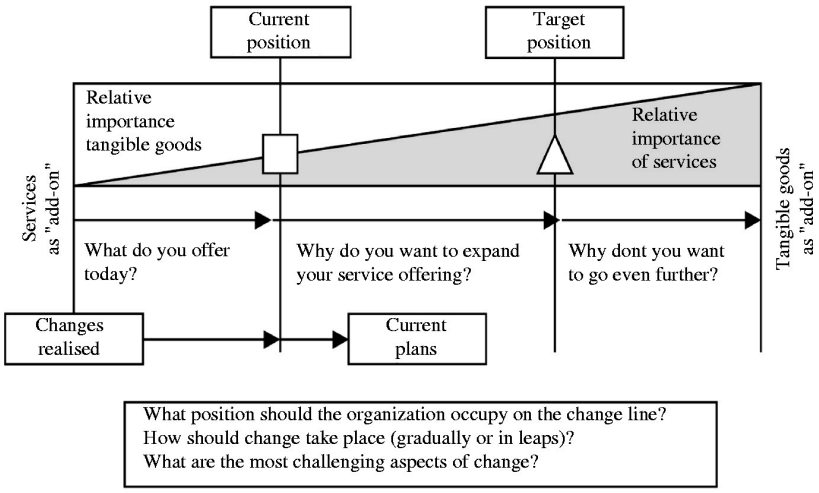
2.9 The Product-Service Continuum

In considering the product-service continuum, Kowalkowski et al. (2015) state that becoming an availability provider sees equipment providers grow from rudimentary, to more advanced services, finally becoming availability providers. The first step in this trajectory is combining products and services which had been previously sold separately. This requires supplier relations focused on exploiting efficiency opportunities presented by supply-chain knowledge and information-sharing (Kowalkowski et al., 2013; Shi et al., 2017). Extensive service level agreements (maintenance, repair and overhaul services) are a found to be utilised frequently (Kowalkowski et al., 2015). Suppliers increasingly offer process-oriented services such as training and process analysis to compete. The intention of the supplier was to become availability providers, although some do not move past selling basic service level agreements. They only become availability providers to a few complex and challenging customers.

Kowalkowski et al. (2015) state that becoming a performance provider involves being an extremely cohesive system supplier that offers advanced solutions to strategic customer problems. The fundamental difference between availability and performance providers is that compensation becomes linked to the customers' value-in-use and business objectives to an even greater extent than before. Shi et al. (2017) argue this requires manufacturing firms to educate customers about performance contracts. Customer concerns are usually manifested by the fear of relying on one provider, and not spreading the risk, and achieving value for money (Brax, 2005; Baines and Lightfoot, 2013). As management fears losing customers to competitors and therefore can become unwilling to share knowledge and operations with them (Gebauer et al., 2013; Gebauer and Friedli; 2005).

The service growth trajectory is very different from service expansion, since it advances from the customized, operational solutions that many of the system suppliers have been offering for a long time, in some cases for several decades (Kowalkowski et al., 2015). The firm at the focal point of the network must mobilize various actors to provide a platform of competencies contributing to a solution (Gebauer et al., 2013). These trajectories and the three-system supplier roles are depicted in figure 8:

Figure 8: The Product–service continuum



Source: adapted from Oliva and Kallenberg (2003, pp 162)

Further Baines et al. (2009) underpin the perspective of the product–service continuum acknowledging there as several ways to servitize. Accepting that some manufacturing firms are only seeking to products with services, whereas service firms rely on services as their main offering.

Gebauer et al. (2007) examined the importance of the varying service strategies in conjunction with the external environment of B2B manufacturing firms and concluded that an appropriate alignment must be found between the external environment, service strategy and factors of organizational design. Gebauer (2008) developed this line of enquiry further by suggesting four environment strategy fits and the corresponding service strategies as depicted in table 4 below.

Table 4: Four Service Strategies

Strategy	Strategy Focus
After-sales service providers (ASPs)	Cost leadership and guarantee correct performance of the product.
Customer support providers (CSPs)	Create a unique value proposal by investing in a robust product and service differentiation.
Outsourcing partners (OPs)	Connect cost leadership with service and product differentiation to offer competitive pricing of operational services. Should undertake the operating risk and complete responsibility for customer's operating processes.
Development partners (DPs)	Deliver research and development services to generate direct customer benefits from their development competencies.

Source: adapted from Gebauer (2008, pp 287-288)

Gebauer et al. (2008) added that the level of service infusion should be purposefully outlined by the firm and intended as a dynamic process that would move the product-service continuum towards a service dominance.

Servitization has been demonstrated as a linear process (Oliva and Kallenberg, 2003; Baines at al., 2009; Kowalkowski et al., 2015). However, Turunen (2011) and Finne et al. (2013) question the dominant focus of firms moving forward and unidirectional towards service focused stance. Kowalkowski et al. (2017) refer to deservitization and Finne et al. (2013) found two cases of reversed servitization, whereby firms move back towards the product axis. The first case saw the firm affected by changing product technology, as the firm was focused on service, they did not retain the previous capability in the product space. The firm's service strategy was now focused on delivering spare parts to customers. The second case highlighted that changes in regulation made the firm refocus from a service-based, to product-based business model. Due to unfair methods of competition and monopolisation, the firm was required to open-up its key patents for competitors to use for free, which affected half of the firm's earnings (Finne et al., 2013). This regulation forced the firm to open-up the after-sales service market for competition, and also to broaden their offering toward selling pure products. Finne et al. (2013) add weight to Gebauer et al. (2007) and Gebauer (2008), who argued the importance of environmental factors. Additionally, Turunena and Finne (2014) found that certain environmental conditions can cause manufacturers to exit the service market and concentrate on manufacturing. Turunena and Finne (2014) stated that servitization is under-researched with regards to how organisational environments impact upon the transition of manufacturers from product sales towards service provision.

Kowalkowski et al. (2015) offer further criticism of the service continuum and the unidirectional researching of it, arguing that is multifaceted and more complex than portrayed to date in marketing literature. Kowalkowski et al. (2015) challenge this literature by presenting three service growth trajectories: becoming an availability provider; a performance provider; and an industrializer (see table 5).

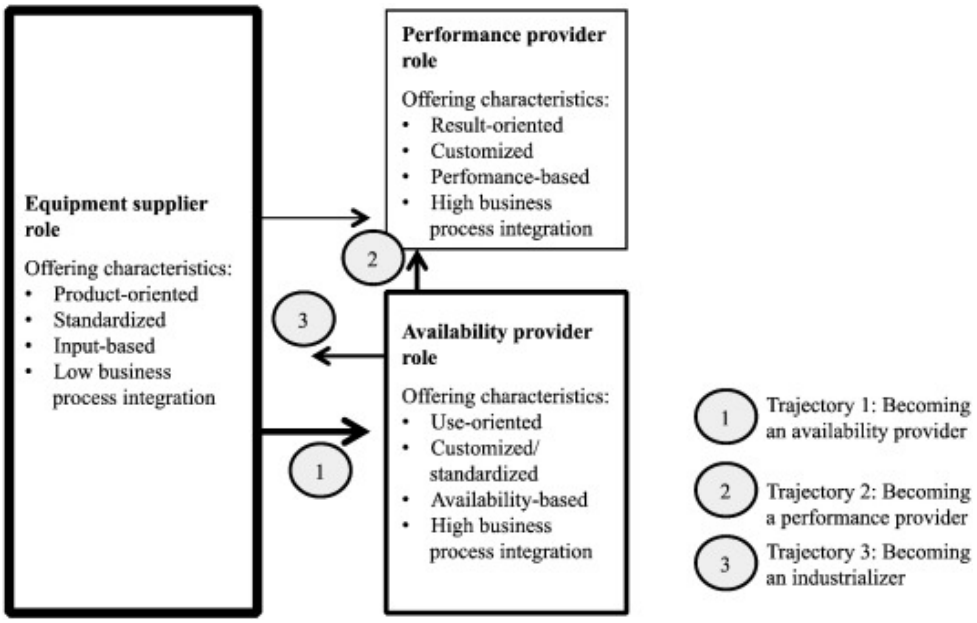
Table 5: Summary of three service growth trajectories

Trajectories	Drivers of the trajectory	Facilitating the trajectory
becoming an availability provider	Business growth, customer loyalty, stable revenue streams	Separate service units, top management focus, customer maturity, automation opportunities enabling process control
becoming a performance provider	Customer demand means of differentiating, potential to build strategic partnerships, customer lock-in	Long-term customer relationships, mutual interests to share 'pains and gains', risk mitigation capability, automation opportunities enabling process control
becoming an industrializer	Economies of scale, utilization of in-house knowledge and resources, potential to address a larger customer base	Long-term service experience, profound customer knowledge, product and process data, organizational learning, modularization competence

Source: adapted from Kowalkowski et al. (2015)

Kowalkowski et al. (2015) ague that becoming a becoming an 'industrializer' requires an expansion from basic to more advanced solutions were evident in our firms, several cases also revealed standardization challenges and opportunities. It requires supply chain relations that are flexible, horizontally integrated service network (Shi et al., 2017). This service growth trajectory is very different from service expansion since it advances from the customized, operational solutions that many of the system suppliers have been offering for a long time, in some cases for several decades (Kowalkowski et al., 2015). The firm at the focal point of the network mobilizes various actors to provide a platform of competencies contributing to a solution (Gebauer et al., 2013). These trajectories and the three system supplier roles are depicted in figure 9 below.

Figure 9: System supplier roles and service growth trajectories



Source: Kowalkowski et al. (2015, pp 65)

2.10 Types of servitization models

From reviewing the existing research, Brax and Visintin (2017), identify three types of servitization models: end-state, gradual and as depicted in table 6. below. Research that does not focus on the transformational process are referred to as end-state and are found to be the highest frequency of firms offering servitization (Brax and Visintin, 2017). The gradual model is segmented between an explicit and implicit approach. The explicit and gradual approach sees firms clearly develop, demonstrate and explain their measured servitization process (Brax and Visintin, 2017). However, the implicit approach does not fully unravel the details via stages and steps (Brax and Visintin, 2017). Firms deploying a calculated and a sudden shift along the product-service continuum, were seen as interrupting the challenge of servitizing (Brax, 2005). The more gradual approaches still portray servitization as a continuum, as they seek to recognise those events that permit servitization before and after the fact (Brax and Visintin, 2017).

Brax and Visintin (2017) assert that the stepwise approaches (or a series of distinct stages) can fluctuate between: normative, descriptive, or prescriptive. They specifically seek to increase servitization dependent on the stage of the continuum. Stepwise models analyse the continuum further and ascertain ongoing stages of increasing servitization (Brax and Visintin, 2017). Additionally, stepwise approaches to servitization identify specific steps or

tasks required for transformation towards servitization (Brax and Visintin, 2017), see table 6.

Table 6: Summary types of servitization

Types	Detail
End-state	Focus on the 'servitized' or service-dominant value constellations and organizational settings that follow the transition or transformation process.
Gradual	Explicit gradual approach - explicate their view of servitization as a gradual process. Implicit gradual approach - describe how servitization gradually 'unfolds' but do not articulate clear stages or steps.
Stepwise	May be based on empirical research or conceptual work, and their style may vary between normative, descriptive, or prescriptive.

Source: adapted from Brax and Visintin (2017, pp 20-21)

2.11 Productization and Servitization

Service management has increased in significance (Sheth and Sharma, 2008) and is currently seeking to unite services and products to deliver a complete experience to customers (Kuczmarski and Johnston, 2005). Kim (2009) states productization and servitization are currently the two key focuses in services research. Productization is viewed as the contrasting paradigm to servitization (Aurich et al., 2009; Durugbo and Riedel, 2013; Durugbo, 2014; Leoni, 2015). Jung and Nam (2009) further comment that service research is focused on the joining of services and products instead of investigating the integration. Designers of products and services must expand their expertise, to encapsulate both, as it is no longer considered advantageous to be an expert at one over the other (Jung and Nam, 2009). Jung and Nam (2009, pp. 5) explain:

> "Product-servitization seeks to add more services to existing products. Service-productization seeks to stabilize services in the form of a product."

Kuijken et al. (2017) found that when product elements were added to low-valued service customers' willingness to pay increased. Atler (2012) argues that as both paradigms are under-researched and still developing it would be unwise to prioritise servitization in favour of productization. As such it would be beneficial to consider the design proportions with products and/or services than the difference.

2.12 Summary of Chapter Two Literature

The purpose of this section is to succulently summaries the productization literature review and draw out the important parts that build towards informing the conceptual framework presented at the end of Chapter four.

Productization seeks to make services more product like in their nature (Simula et al., 2008; Skålén and Hackley, 2011; Chattopadhyay, 2012; Valminen and Taivonen, 2012; and Nagy, 2013). Harkonen et al. (2015) state it is the process of translating, combining and forming a suitable mix of both the tangible and intangible elements into a product, is referred to as productization. This is extended with Harkonen et al. (2015) who argue that finding an appropriate combination of tangible and intangible elements is required with productization. Flamholtz and Randle (2016) add to this perspective stating that productization should incorporate the current needs and the future wants of existing and potential customers. Productization has been identified as a systemised (Chattopadhyay, 2012; Valminen and Taivonen, 2012; and Nagy, 2013), internal process (Andreini et al., 2015), which can be a standardized repeatable process where appropriate (Sundbo, 2002; Hietala et al., 2004; Lassila et al., 2006; Suominen et al., 2009; Andrein et al., 2015; Harkonen et al., 2015).

Four key important aspects of the productization literature that inform the conceptual framework are highlighted below.

Firstly, Servitization, was viewed as the opposite of productization (Leoni 2015; Kuijken et al., 2017). Kuijken et al. (2017) recognise that servitization has been more widely studied by research in comparison to productization. Vandermerwe and Rada's (1998) conceptual research noted that the importance of services is undeniable, with managers required to integrate services into the firm. It is extensively demonstrated that manufacturing firms are increasingly shifting towards services (Davies et al., 2006; Evanschitzky et al., 2011; Ulaga and Reinartz, 2011; Turunena and Finne, 2014). Services are seen as a critical element of competitive strategy (Ahamed et al., 2013). This has encouraged researchers to examine product-service differentiation and configuration, customer value and relationships and competitive strategy (Lightfoot et al., 2013). Spring and Araujo (2017) argue that the servitization literature has disregarded the enduring instability of products, referring to them as stable both physically and institutionally. The key assumption of the servitization literature is that firms are seeking to develop services to support, augment and differentiate their offerings. This is exemplified by the view that servitization is a linear process (Oliva and Kallenberg, 2003; Baines at al., 2009; Kowalkowski et al., 2015). However, Turunen

(2011) and Finne et al. (2013) question the dominant focus of firms moving forward and unidirectional towards service focused stance. Kowalkowski et al. (2017) refer to deservitization and Finne et al. (2013) found two cases of reversed servitization, whereby firms move back towards the product axis. This thesis places attention on the productization process, it seeks to examine the existence of the productization process being used in service firms. It considers how productizing is used internally to support the delivery of services.

Secondly, the following discussion informs the conceptualisation of productization by examining how firms successfully productize. Jaakkola (2011) state that there are three key practices in order to successfully productize. Firstly, specifying and standardizing the service offering is required. Secondly, tangibilizing and concretizing the service offering and professional expertise. Finally, systemizing and standardizing processes and methods. Jaakkola (2011) assert that instead of denying standardization, firms should attempt to find an optimal balance between customization and standardization. Valminen and Toivonen (2012) note that although the majority of the time and work is undertaken internally by the organisation it is vital that detailed customer information is understood. The top three stages of the productization process are explicitly customer and externally focused and concerned. The internal stages of the productization process are attempting to define and create the elements of that intended service. The literature frequently discusses service productization as a generic process of offering product-like services to the market by joining and controlling the appropriate elements (Flamholtz, 1995; Harkonen et al., 2015; Jaakkola, 2011; Valminen and Toivonen, 2012; Harkonen et al., 2017). Harkonen et al. (2015) adds to this by stating that productization of services domain contributes towards the development of services and their commercialisation. Andreini et al. (2015) advance this view by stating that the key element of service productization is the relationship, and management of that relationship, with customers. The focus on relationships allows firms to manage any concerns from customers with regards to the perceived inflexibility of the productization process (Hellström et al., 2016), permitting easier exchange through demonstrating value (Simula et al., 2008; Harkonen et al., 2017).

Thirdly, the ability to stabilise knowledge and allow complex exchanges to be made is a key part of the conceptual framework developed. Simula et al. (2008) propose the conceptual framework for productization that differentiates between inbound and outbound activities. It attempts to emphasise the relationship between new product development and marketing, with productization being viewed as a unique way to connect both (Simula et al., 2008).

Simula et al. (2008) see inbound (making things) and outbound (selling things) productization as a mechanism that puts the product as the focus. Leoni (2015) argues the firm's ability to accumulate and evaluate knowledge is improved, and from this the ability to delegate work is increased. Valtakoski and Järvi (2016) state this is achieved by the elicitation and codification of the employees' knowledge. Thus, productization can be used to represent in a tangible way the expertise of the firm to its customers. Productization aligns with professional services literature, where complex issues are solved for customers by utilising specialist expertise and knowledge (Gummesson, 1978; Jaakkola and Halinen, 2006). Velamuri, Neyer and Moeslein (2011) view productization as similar to 'hybrid value creation', arguing that its key strength is in the ability to align the value creation of both products and services, which represent accordingly tangible and intangible elements.

Finally, the thesis brings forward the notion that employees play a key role in the ability to perform the productization process. The main criticism of service productization surrounds the ability of the employees to perform during the service. Vaast and Levina (2006) argue that it can limit an employee's ability to improvise and prevent their ability to act in the moment to satisfy the customer's needs. Valtakoski and Järvi (2016) argue that employee involvement and business unit collaboration, in the context of knowledge intensive business services firms, is more challenging than current service innovation literature insinuates. From the various frameworks and processes discussed in the literature, collaboration can be identified as a consistent theme of productization. Sundbo and Toivonen (2011) suggest that productization contributes to internal organizational learning. Outlining that firstly, the productization process can be utilised to shape a collective understanding of the intended service within the organisation (Sundbo and Toivonen, 2011). Adding to this, Valtakoski and Järvi (2016) found that employee involvement and cross-unit collaboration were not adequate precursors for effective productization. Effective service productization was achieved when project objectives were in sync with the employees. Promoting trust between the project teams facilitated employees sharing knowledge. Jehn et al. (1999) accept that some conflict can spark innovation, however, recognise that too much is counterproductive.

The subsequent chapter introduces the literature review on marketization and market studies.

Chapter 3 Literature Review: Marketization and Market Shaping

Chapter three reviews the current literature surrounding Market Studies including marketization and market shaping. The chapter aims to introduce the scholarly area of Market Studies and introduces relevant understandings of marketization in relation to the thesis aim and research questions. Key within this strand of literature is a common understanding of markets and understanding the processes and practices which influence their emergence, maintenance, and innovation opportunities. Contained within this market-centric perspective is a central understanding that markets have multiple versions which are influenced and shaped by market practices; secondly that market actors organise processes and shape markets which in turn shape market practices; and finally, that markets are continually changing and adapting. Thus, the chapter is organised as follows: firstly, an introduction to Market Studies and marketization is provided, before moving into a closer examination of market shaping activities, market devices, market objects, the role of performativity and calculative possibilities. The chapter concludes with a summary of the pertinent literature themes. Figure 10 below highlights the chapter structure.

Figure 10: Structure of Chapter Two Literature

3.1 Markets and Market(ing)

The study of markets within contemporary marketing literature has been considerably under-researched (Araujo et al., 2008; Vargo, 2007; Venkatesh et al., 2006; Kjellberg et al., 2012). There is an established body of researchers who have called for greater emphasis of markets and marketing (Håkansson et al., 2004; Lusch and Vargo, 2006; Sheth and Sisodia, 2006; Araujo et al., 2008). Market Studies has emerged as an area of research focused on the theorisation of the macro or societal level systems which configure markets and aim to identify actors who structure and shape a market (Araujo, 2007). Market Studies takes its interdisciplinary influence from a wide set of theories: including science and technology studies (STS), economics, psychology and sociology. The importance of markets and understanding the associated processes and practices highlighted by Geiger, Kjellberg and Spencer (2012, pp. 134), who forward "an understanding of markets not as given, but as ongoing socio-technical enactments worthy of social scientific attention." Market Studies

has advocated for the 'reconnection of marketing to markets' (Araujo et al., 2010), with a renewed focus on marketing theory emanating from marketing practice with a market-centric perspective (Spencer and Cova, 2012). This theoretical attention has been crucial in advancing conceptualisations within the marketing discipline.

Markets are routinely viewed as 'given', and little attention is paid as to how they are formed or changed over time (Buzzell, 1999). Venkatesh et al. (2006, pp. 253) state that the term market has not been employed with much significance and thoroughness within the marketing tradition. As such, it becomes important firstly to clarify and define the conceptualisation of a market. Markets are seen to go beyond what can be considered the simplistic notion of exchange relationships between buyer and seller (Lawlor and Kavanagh, 2015). As Araujo et al. (2010, pp. 5) state:

> "…markets are plastic phenomena that emerge from organising, a process which the marketing discipline play a role in among others."

Building upon Alderson's (1957) idea of plasticity, the above quotation highlights the complexity of markets by identifying marketing is just one element, suggesting other disciplines provide expertise and knowledge in the formation of a market. The use of the word plastic suggests that markets can be flexible and malleable. Kjellberg et al. (2012) developed this understanding, expanding that markets are fluid and are always being made by constant market practices. Araujo et al. (2010, pp. 6) further added:

> "Markets are not spontaneous, self-organizing collections of dyadic exchanges portrayed in marketing textbooks."

This statement is underpinned by the theoretical attention of Market Studies researchers who view markets as assembled, positioned by phenomena, that are affected by the practices of actors, underpinned by actors' knowledge and experiences (Araujo et al., 2008; Azimont and Araujo, 2007; Callon, et al., 2007; Fligstein, 1996; Harrison and Kjellberg, 2010; Diaz Ruiz and Holmlund, 2017). Vargo and Lusch (2004) add that markets are in the process of 'becoming', which requires the market to take on multiple incarnations based on the practices of the actors involved. Markets are also seen to be socially constructed, with recurrent exchanges happening between buyers and sellers (Fligstein and Calder, 2015). These exchanges are directed by formal and informal rules that manage competitors, suppliers, manufacturers and consumers/customers (Fligstein and Calder, 2015). An important assertion within the Market Studies literature, is the proposal that markets are not unprompted (Callon, 1998b). Examining the pervasiveness of markets and their dominance in society, Callon's (2007) research has been fundamental to the advancement of the

literature, in the suggestion that there was an emergent difficulty in framing a market which included and encompassed all the associated concerns that had mobilised a variety of actors. Callon (1998b) suggests that markets are formed via an array of practices that utilise and enhance the knowledge and expertise of those involved. The critique of marketing practitioners is often at the micro level and seen as reactive approach to markets with Araujo et al. (2010) and Schau et al. (2009) expand this by commenting on the micro level practices between actors that are designed to create shared value. With Nenonen et al. (2014) stating that to appropriately understand the intricacies of markets marketing practitioners and academics must diversify from the established linear and development stage models of markets.

Economists frequently reference 'exchange' when discussing markets (Loasby, 1999), however, despite marketing scholars embedding exchange as an underpinning aspect of marketing theory, a disconnect has emerged from the discussion of the market, as central to understanding marketing (Araujo, 1999; Houston, 1994). In bridging these gaps, it can be considered that an exchange is an event and something that occurs (Araujo, 2007), however conflating markets with simply exchange is an ontological mistake (Loasby, 1999). Instead, the market can be viewed as a setting where groups of people act to achieve an outcome (Marshall, 1919).

In sum, Market Studies provides understanding into the complexities of a market-based understanding, as the market cannot be considered a neutral concept, and insights into the varying knowledge, interests and values of the actors who bring a market into being (Araujo, 2007).

3.2 Introduction to Marketization

In examining how markets emerge, draws attention to the process of marketization, which Callon (2015) describes as the thinking about the architecture of markets and the means of outlining the distinct elements of a market. At this point it becomes helpful to further clarify a definition in the conceptualisation of marketization. Findlay et al. (2017) assert that research is often concerned with markets and not marketization, which requires further critical social theorisation. Caliskan and Callon (2010, pp. 3) note, marketization is the:

> ''…entirety of efforts aimed at describing, analysing and making intelligible the shape, constitution and dynamics of a market socio-technical arrangement."

Callon (2016, pp. 34) developed this by affirming:

> "Thinking about marketization amounts to thinking about the architecture of markets and the organization of competition, that is, the mechanisms whereby goods are designed, the formatting of bilateral transactions, and the singularization that they imply. Political and moral reflection is at the heart of markets and not pushed out to their fringes."

The above definition highlights that the market is seen as encapsulating the organising, the conceptualisation, the creation and the exchange of goods and services. Araujo and Pels (2015) argue that marketization as the use of market exchange, enables social and economic factors to be harmonised underpinned by the conviction that markets are the most effective way of organizing the development, manufacture and exchange of goods and services. It has been critiqued that overly focusing on exchange, neglects all the elements that come prior to making a stable exchange possible, organisational tasks such as development, innovation and manufacturing (Fine, 2002). In recognition of this this Mason et al. (2017) state exchange is only one part of the marketization process. Mason et al. (2017, pp.2) highlight the importance of understanding that in marketization productive work takes place continually to 'constitute, innovate and reconfigure market systems.' This builds on Callon (2016) who comments that without innovation, there is no transaction and consequently no market activity, as successful transactions require a certain configuring of the traded good. Araujo and Pels (2015) argue that the use of market exchange, as the principal mode of the coordination of socio-economic life, is based on the belief that markets are an inherently superior way of organizing the conception, production and exchange of goods.

From a market studies perspective, marketization attempts to reconstruct the market make-up, buoyed by market devices and market objects with the interwoven actions of actors (Doganova and Karnøe, 2015; Kjellberg et al., 2015; Onyas and Ryan, 2015). Findlay et al. (2017) specify that marketization refers to the process of creating new markets for products, which were previously shielded from market exchange and price mechanisms. Çalışkan and Callon (2010, pp. 384) comment that to undertake this transformation, markets and actors need to refine and develop:

> "…market rules and conventions, and valuation methods and practices through the introduction, presentation and circulation of new forms of scientific, technical and market knowledge."

In examining how markets emerge, the marketization process has emerged within the literature as central to the market functioning (Callon, 2016). Callon (2016, pp. 17) questions the role of markets in modern societies, as not all problems in social life can be condensed in individual preferences and choices, which has often been the critique of marketing (Morgan 2003; Shankar et al. 2006). Furthermore, some are expressing the fear that such marketization may result in a 'manufacturing of consent' (Chomsky, 1989). The focus on marketization highlights an underpinning rationale that in contemporary society a market infrastructure is widely viewed as the most efficient mechanism of organising (Araujo and Pels, 2015). Firat and Venkatesh (1993, pp. 239) argue:

> "Whatever the consequence, it is clear that marketing is taking the centre stage in all institutions of western society, and the market is becoming the dominant, if not the only, mediator and locus of legitimation. Consequently, for the individual consumer (or citizen, now meaning one and the same), life is increasingly experienced solely through the market."

Callon (2016, pp. 33) states that marketization allows:

> "individuals to escape the tyranny and liberticidal constraints of social life. Others maintain that by extending the reign of merchandise, marketization leads, on the contrary, to the programmed disappearance of community life and solidarity behaviours; on the one hand, freedom, on the other, injustice and inequalities."

To further the above discussion of relevance for this thesis, marketization is conceptualised as a process (Araujo and Pels, 2015; Callon, 2016; Mason et al., 2017; Findlay et al., 2017), that organises (Çalışkan and Callon., 2010; Araujo and Pels, 2015; Mason et al., 2017), goods and services into the market (Araujo and Pels, 2015).

3.2.1 Marketization and Marketing

Araujo and Pels (2015) add to the discussion that the occurrence of marketization needs marketing to reassess its relationship to markets, as marketing is concerned with the generic rather than purely economic exchange (Bagozzi 1975; Shaw and Jones 2005). Despite placing markets at the centre of marketing theory, Diaz Ruiz (2016) asserts that there have been insufficient attempts at studying the intricacies of a market; fundamentally what it is and how it works (Helmsley-Brown et al., 2006; Diaz Ruiz, 2016). Araujo and Kjellberg (2009, pp. 196) argue that there is no firm set of practices that we can unmistakably call marketing. While marketing focuses on the exchange element of marketization, it blocks its ability to interject and contribute to the marketization debate (Araujo and Pels, 2015).

Araujo (2007) comments that economic sociology has moved away from 'homoeconomicus' (depicting consumers as rational, logical and self-interested) to a focus on how market exchange is formalised and drawn from social relations.

Recently, Özgün et al. (2017) argue that critical lines of enquire with regards to marketization focus on the commodity and overextension of marketing practices and methods. Atik and Fırat (2013) suggest that conceding the social foundations of marketing will enhance marketing's ability be proactive to evolution. Mattsson (2003) states that the market is underpinned by socially created control of economic activities. In so far as how the social order (systems of linked social structures, institutions, relations, ethics, customs, values and practices) is recognised, altered and calmed is an essential part of social ordering. Drawing attention to those actors who conduct exchanges as marketing practices, that in turn impacts social ordering (Mattsson, 2003). Markets and marketing practices engage actors who are not involved in market exchange, non-involvement can still impact exchange through government policy creators and organisations who shape market and marketing customs (Mattsson, 2003). Özgün et al. (2017) state that with marketization there is an issue about the invasion of individuals' private lives and personal relations by practices and dynamics that belong to capitalist business interactions.
In contrast, Quelch and Jocz (2007, pp. 15) assert marketization as a positive, as it provides consumers with: (1) free and fair transactions; (2) control and choice over offerings (choice); (3) active participation in shaping the marketplace; (4) informed understanding; (5) nearly universal inclusion; (6) the ability to satisfy needs, wants and preferences.

3.2.2 Marketization and the current research landscape

Marketization has been researched from both a B2C and B2B perspective, with Bengtsson et al. (2005) study demonstrating tattoo artist's willingness to engage in the service of providing consumers with tattoos of brands, despite the negative perception of such tattooing. Further, Hackley et al. (2012) analysed the success of The X Factor (TV Talent Show) as an example of the marketization of existential liminality. Kozinets (2002) Burning Man's research suggested although participants support the market, they effectively create a momentary hyper-community from which to practice differing social senses. There has also been considerable research into the marketization of education (Whitty and Power, 2000; Bartlett et al., 2002; Natale and Doran, 2012), and UK health services (Zolkiewski, 2004).

Considering the United Kingdom as a context, the public sector underwent significant restructuring in the 1990s, as a result the government was brought into the market and the

market was brought into the government (Wistow et al., 1996). This restructuring saw public utilities, telecommunications and electricity become privatised (Le Grand, 1991). Araujo and Pels (2015) question if and how marketing should engage with marketization, concluding that a more systematic evaluation of how marketing practices impact society is required. To date, there are few empirical studies that investigate the practices of market practitioners (Simakova and Neyland, 2008; Geiger and Finch, 2009; Jacobi et al.,2015; Diaz Ruiz and Holmlund, 2017). This adds weight to Araujo et al. (2008) previous call advocating a need for a practice-based approach to markets and marketing, and considering the societal impacts (Wilkie, 2007). Further, Kjellberg et al. (2012, pp. 221) pose the question as to how markets and marketization are affected by multiple contexts and (conflicting) market views.

3.3 Market shaping practices

Although the term practice is frequently deployed to denote what marketing practitioners do (Brodie et al., 1997; Coviello et al., 2002), Kjellberg and Helgesson (2006) argue that current marketing practices do not allow us to sufficiently depict current market practices. Lindeman (2012) argues that markets evolve because of value based change efforts and that an increase in research that demonstrates how markets are maintaining or supporting themselves. Understanding the values of the markets and actors will impact the shaping of the market. Blanchet and Depeyre (2016) believe that markets are places of diverging practices that create disagreements around their organisation. Market practices therefore are considered as bringing together a variety of market actors acting in accordance with different market representations and engaging in divergent market practices, each trying to shape the market in a different fashion (Azimont and Araujo, 2007). Kjellberg and Helgesson (2007, pp. 141) define market practice as:

> "…activities that contribute to constitute markets and includes efforts to shape as well as operate in markets."

Similarly, Araujo et al. (2008, pp. 8) define market practices as:

> "…the bundles of practices including material arrangements that contribute to perform markets."

Araujo's (2008) definition is concise but purposefully wide-ranging as it recognises the dynamic fluidity of markets. Hagberg and Kjellberg (2010) stress that the study of market practices is important for two key reasons. Firstly, the increased focus can provide an

escape from the deep-rooted standpoint regarding the gap between marketing principles and marketing practice. Secondly, it allows a comparison between how marketing is and should be performed with the caveat that the current understanding of marketing practitioners allow us to capture the relevant practices. Hagberg and Kjellberg (2010) reflect on their definition by noting the importance of who performs marketing, stating the need for a conceptual tool for identifying marketing practices (Hagberg and Kjellberg, 2010). This is underpinned by the belief that markets are always in the making and are subject to the actions of market practices (Kjellberg et al., 2012). The interplay between market practices indicates the dynamic of that market (Lindeman, 2012). It supports the view that markets are not fully stabilised and that they are fashioned by several calculative agencies (Callon and Muniesa, 2005; Kjellberg and Helgesson, 2006, 2007a). In addition to this Schatzki (2001) who identifies the importance of recognising practices as materially enabled sets of human activities structured round shared practical understandings, Kjellberg and Helgesson (2006) sustain that markets encompass multiple and often conflicting efforts to shape them. More recently Mattsson (2016) questions how policy and market practices are interwoven and how they impact the possible sustainability market.

Social practices are considered to be ordered across space and time, with individual actors defined in the social sciences (Giddens, 1984). Peñaloza and Venkatesh (2006) argued for a paradigm shift from the focus on marketing techniques and concepts, to markets as a social construction. Building upon Vargo and Lusch (2004a, 2004b) emphasising the significance of investigating markets and market development as social constructions that are subjectively defined by market actors (Storbacka and Nenonen, 2012) and stabilised by interacting actors (Rosa et al., 1999). Table 8 below summaries the six pillars proposed by Peñaloza and Venkatesh (2006).

Table 7: Summary of six pillars supporting markets as a social construction

Pillars	Details
The nature of value creation	Value in use and value in exchange (Firat and Dholakia, 1998).
Value in meanings	Value creation is recast to include meanings and values in exchange and use, amending the value equation. Value and meanings co-produced by marketers and consumers. Differentiate between meanings and values, they change over time (Arnould and Thompson, 2005; Baudrillard, 1988; Bourdieu, 1984).
Overcoming the limitations of the marketer perspective	More conscientiously consumer subjectivity and agency
From subject/object relations to subject/subject relations	Reformulating the nature of relationships between consumers and marketers from individuals to social beings inhabiting communities.
From individual to social units of analysis	Cultural differences in the form of subcultures within nations and international differences between nations in level of development. Focus on transpositions of agents, practices, needs and values accomplished via day-to-day practices and beliefs that legitimize and reproduce the marketing world view.
A self-reflective marketing practice: attention to market development	Importance of marketer reflexivity. Advancing knowledge of how markets develop, and as the means to better understanding marketers' activities and inter-relations with consumers as individuals and in groups.

Source: adapted from: Peñaloza and Venkatesh (2006, pp. 314)

The role actors play in markets is identified as crucial, as politics happen and develop within markets and not simply outside of them (Cochoy 2012), in this view markets are seen as creating the social, instead of deconstructing it (Geiger et al., 2015). Easton and Araujo (1994) view that all exchanges transpire within a social and time-based setting. Sheth (1992) argues that market practices vary with profit and non-profit organisations and across nations where the importance of politics and employment laws will affect practices. Araujo et al. (2008), in Table 8, offer a conceptual distinction between market making practices and marketing practices.

Table 8: Market making practices and marketing practices

Market-making practices	Marketing practices
Activities that shape the overall market structure	Firm-based activities aimed at developing an actor's position within a structure

Source: adapted from Araujo et al. (2008)

In defining market practices, efforts to shape the market, and to operate the market, should be considered, this includes the intentional and unintentional interactions concerning practices (Araujo et al., 2008). Storbacka and Nenonen (2015) assert that firms seeking to drive the development of markets, need to move beyond the belief that markets are assumed and accept that markets are plastic. They call for firms to learn with the market and not

learn about the market, this is achieved through their learning cycle of: origination, mobilization, and stabilization. This draws further consideration as to market practices.

Kjellberg and Helgesson (2006) forward three interwoven classes of practices, displayed in Table 9, whereby different actors may shape markets at the level of exchange, normalizing or representational practices.

Table 9: Classifications of market practices

Classification	Explanation
Exchange practices	Practices that are concrete and contribute to consummate individual economic exchanges.
Normalizing practices	Practices concerned with the formulation and reformulation of rules and norms concerning market behaviour. How a market should work, or how (some group of) market actors should act.
Representational practices	Practices contribute to create images of markets and/or how they work. This definition and model of markets as constituted by practice form the basis of our analysis. Depicting the structure and workings of specific product markets.

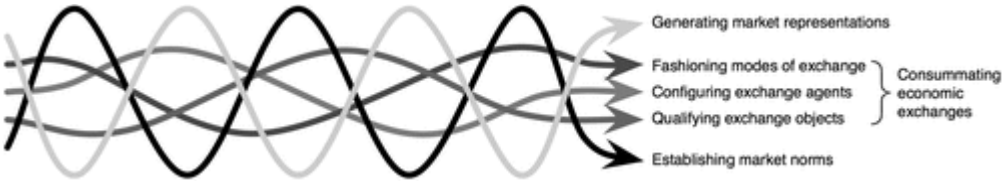
Source: adapted from Kjellberg and Helgesson (2006)

In the model proposed by Kjellberg and Helgesson (2006), the three types of market practices are interlinked by chains of translations involving intermediaries such as rules, measurements and descriptions. Markets are seen as in continuous development due to the varying market shaping practices and how they play out in the market (Araujo et al., 2008). Various forms of the market can coincide and even compete. However, they still require reconciliation in particular circumstances (Kjellberg and Helgesson, 2006). As argued by Andersson et al. (2008) attention to the practical situations that shape markets will require ways of understanding how agential decision are made. Helgesson and Kjellberg (2010) argue that attention must be drawn to markets being shaped by agents who are not professional marketers, this requires agents being conceptualised as a complex mix of various devices, individuals and organisations (Araujo and Kjellberg, 2009). Shove and Araujo (2010) draw attention to the importance of recognising the practices of humans and non-humans, as both can be carriers and observers of practice (Reckwitz, 2002), and even multiple practices (Ingram et al., 2007).

Harrison and Kjellberg (2016) consider the user–market relationship and how users can act as agents. Building on the conceptual work of Callon and Muniesa (2005) and Kjellberg and Helgesson (2006), they conceptualise market shaping as five interconnected sub processes: qualifying goods, fashioning modes of exchange, configuring actors, establishing market norms and generating market representations. Harrison and Kjellberg (2016) further argue that users' participation and impact in the sub-processes is depended on the market.

Harrison and Kjellberg (2016) recognise the circumstances that are favourable to user participation in each of the sub processes. The conceptualisation is depicted in figure 11 below and illustrates the interwoven nature of market shaping.

Figure 11: Market shaping conceptualised as five intertwined sub processes



Source: Harrison and Kjellberg (2016)

Callon and Muniesa's (2005) three economics exchange sub-processes (fashioning modes of exchange, configuring exchange agents and qualifying exchange objects) are interlaced. Therefore, establishing market norms and generating market representations, are underpinned by (Kjellberg and Helgesson, 2007a) and are balancing the economic exchange.

Ulkuniemi et al. (2015) view purchasing, an example of market shaping practice as it effects more actors beyond simply than the buyer and seller and their influences. Ulkuniemi et al.'s (2015) research identified five types of market-shaping actions for purchasing. Notably they found that agency goes beyond the scope of bargaining power in with large size organizations, for example government and public-sector (Ulkuniemi et al., 2015). Additionally, the show that the buying firms attempted to steer specific market development, as well as their own purchasing processes.

3.3.1 Market devices

Callon et al. (2007, pp. 318) ask the question "what is a market without a set of market devices?" This highlights the importance of market devices and the role they play in constructing and shaping markets. In considering that markets require products and services to be formed, assessed, and valued for the market to function, market devices facilitate this (Fligstein and Calder, 2015). Muniesa et al. (2007, pp. 2) conceptualise market devices as:

> "…offers a simple way of referring to the 'material and discursive assemblages that intervene in the construction of markets' and are a necessary pre-requisite to their existence."

Muniesa et al.'s (2007) widely cited definition highlights the important connection between market devices and the ability of actors to create agency, they contribute a central understanding, that devices do things, 'they act or make others act'. Muniesa et al. (2007) warn that the term device could present an unwarranted parting of objects on the one side and a person's mind and character on the other. Doganova and Eyquem-Renault (2009) expand that market devices go beyond the variety of the objects that they have examined; these analyses share a common focus on the materiality and the agency of market devices. What is lacking from this statement is the question who makes the devices act.

Market devices can be considered the pricing models, to merchandising tools, from trading protocols, to aggregate indicators, the topic of market devices includes a wide array of objects that have been often overlooked in sociological analysis (Callon et al., 2007). Doganova and Eyquem-Renault (2009) suggest that the business model can be successfully viewed as a market device. Market devices play a crucial role in the configuration of economic calculative capacities and in the marketability of goods and services (Callon et al., 2007). Doganova and Eyquem-Renault (2009) argue that in addition to playing a part in the emergence of individual calculative agencies, market devices contribute to the making of markets by mediating the relationships between these agencies and coordinating their action. Market devices are used by actors to buy and/or sell but also enable them to gauge the efficiency and effectiveness with which they act. Based on these measurement scores firms can seek to recover by developing new strategies (Fligstein and Calder, 2015). Once working or ready to work, market devices can become very large, important, or hard to control (Fligstein and Calder, 2015).

Continuing from their initial definition Callon et al. (2007, pp. 2) further qualify the social nature of market devices:

> "…market–enabling instrument that operates empirically for the enhancement of socially–situated practices of calculation and decision-making."

Market devices have been studied in the context of financial markets through distribution to accounting, and a variety of objects such as the stock ticker (Preda, 2006), financial formulae (MacKenzie and Millo, 2003) or consumer credit scoring (Poon, 2007).

Cochoy's (2009) research on grocery shopping highlights the impact on behaviour when a market device is equipped, as customers abandoned their pre-organised shopping lists. Hawkins (2012) examined the role of food packaging and how it is utilised to extending

shelf life, brand strategies and the qualities of food. Hawkins (2012) argues that packaging has acted as a market device as it transforms consumer practices. Hawkins (2012) critiques this market device as packaging had contributed to vast universal environmental issues (waste, recycling, landfills and litter). Hawkins (2012) performative scrutiny examines how food packaging demonstrates the relations between producing this device and the reality of how these practices become socially acknowledged. The market device also altered the calculative practice of the firm (Levinson, 2016; Notteboom and Rodrigue, 2008). Miller and O'Leary (2007) study of market devices in the microprocessor industry exemplifies the part played in the diverse networks in which they exist. Miller and O'Leary (2007) found that the industries steady acceptance of Moore's law (the opinion that the number of transistors in a dense integrated circuit doubles every two years) and use of technology road-mapping acted as a mediator among actors. The key actors, the manufacturers of semiconductors and the manufacturers of inputs for semiconductors, had diverse requirements such as technological innovation and cost efficiencies. Miller and O'Leary (2007) argued that the market device was successful as Moore's law was depicted through graphs and translated into associated instruments and the roadmap was also visual. In both, the devices guided and coordinated the action.

A further contribution from Pollock and D'Adderio (2012) examines how generic software packages achieve mobility effective in multiple contexts. The IT market is organised by affordances and constraints of classifying market devices, with economic and material artefacts impacting each other (Pollock and D'Adderio, 2012). Pollock and D'Adderio (2012) forward that affordances are the qualities of an object that clarify the features of a product, and how it should be utilised. It can therefore be argued that market devices can be crucial in the transformation of a market and in innovation (Mason et al., 2017).

Stabilised and clear markets are the outcomes of framings (Callon, 1998c; Fligstein, 2001; Finch and Geiger, 2010a), that necessitate dialogues between multiple actors and market devices (Doganova and Karnøe, 2015). The role of market devices in framing the qualities and value of goods is likely to be particularly salient for products claiming multiple or novel qualities such as environmental friendliness (Reijonen and Tryggestad, 2012). This adds to Finch and Geiger (2010) who saw framing a market as a way to centralise calculation. Market devices appear as a critical element in modifying market architectures because they stabilize and make visible new product qualities (Doganova and Karnøe, 2015). Moreover, they shape processes where actors propose, debate and contest the normalisation, representation and exchange conditions linked to a product (Doganova and Karnøe, 2015).

Doganova and Karnøe's (2015) investigation into the development of markets for clean technologies found that the market device (the technology list) played a dominant function in the construction of a market for technologies that reduce ammonia emissions. In Table 11, Doganova and Karnøe (2015) utilise Kjellberg and Helgesson (2006) interwoven classes of practices (see table 10). The table details how the technology list firstly, normalises a practice through standards. Secondly, how its representational practices by positioning AntiAmmonia in the category of environmental technologies (as opposed to the category of farm productivity technologies, for example). Finally, it intervenes in exchange practices by enabling farmers and the potential products they buy by determining the limits or boundaries of the calculation (cost and savings on nitrogen). This then permits farmer's ability to evaluate alternate solutions (Doganova and Karnøe, 2015).

Table 10: The multiple roles of the technology list as a market device

Market practices in which the Technology list intervenes	Market shaping efforts that the Technology list instruments	Other market devices that play a similar role	Product qualities enacted
Normalizing practices	Establish a standard	A standard	A means to comply with regulation
Representational practices	Determine relevant categories and measures	A label	An environmental technology
Exchange practices	Equip buyers with tools for qualification and calculation	A supermarket shelf	A source of costs and benefits to be compared to those of alternate products

Source: adapted from Doganova and Karnøe (2015)

Researching what market devices do, and are, is shifting from the view that every entity has a set of attributes that are necessary to its identity and function. The direction of scholarly attention is moving towards a view that society is a system of interconnected parts that work together in harmony to maintain a state of balance and social equilibrium for the whole (Doganova and Eyquem-Renault, 2009). This change is directing the debate as towards a practical viewpoint that sees people and the tools that they use as mutually performative. Mason et al. (2017) argue that we know very little of how market devices are generated or replaced in practice, we need to do much more to understand the work done to create new market devices and how they are effectively inserted into the world to shape what markets become. Fligstein and Calder (2015) affirm that there have been few attempts to research how market devices, the instruments permitting markets to act and those that emphasise the social positioning of the market.

Geiger and Gross (2017) examine the role of actors in innovating markets when there has been a perceived market failure. Geiger and Gross (2017) introduce the term 'redevised' to

signify what happens when a market is innovated in circumstances where public and commercial alignments differ. Market devices provide the mechanism to shape redevised markets as they are material and social arrangements. Redevising a market is a prolonged process and cannot be fully predicted as it can modify the market frames and underpin changes to practice. Reverdy (2010, pp. 159) scrutinised the unanticipated effects of gas market liberalisation and the inherited devices and new practices that transpired. Reverdy (2010) found that the market was shaped by combining previous market devices, for example long-term contracts and the oil and oil price index. Therefore, market transitions require significant learning for market actors as they must negotiate the best way to combine the old and new market devices (Reverdy, 2010). The learning process will lead to actors learning how to perform and calculate in a hybrid fashion.

This section highlights that market devices are socialised in specialist communities of experts and are fundamentally changing our understanding of practices that conceptualise markets.

3.3.2 Market objects and Marketing Objects

Finch and Acha (2008) and Geiger and Finch (2009) introduce the importance of market objects through their study of sales people in an industrial chemicals company. Market objects are considered to be used as a method of exchange, with market actors calculating differences similar market objects. Finch and Acha (2008) see market objects as continuously being created, defined, calculated and qualified. Finch and Geiger (2010a) suggest a unique standpoint by recognising goods and services as firstly market objects, and then secondly as marketing objects. Geiger and Finch (2009) state that once materiality becomes clear other actors are able undertake exchange through various practices. Brewer (2017) simply refers to the market object as the product being produced and sold, with no reference to a service. Brewer's (2017) study of the revival of the handmade bike as a market object in the U.S. exemplifies this by finding that ironically the successful stabilisation of the handmade bike was problematic to maintain as a business model. From Finch and Geiger's (2010b) research, we should examine the actions and discussions that have led to an object being taken for granted, seeking to understand the process the led to the object's initial stabilisation. Shove and Araujo (2010, pp. 23) state:

> "Objects have important consequences for the accomplishment of practices and for linking the structures of production and consumption. But as we suggested earlier,

see practices as the active integration of meanings, skills and objects means that these relationships are never stable, they co-evolve over time."

Çalişkan and Callon (2010, pp. 5) label market objects as 'pacified', implying as they do that market actors (such as marketers) appropriate the object into technical and cultural relationships. Therefore, the market object is pacified in the eyes of actors and can be exchanged. Finch and Acha's (2008) research found that the market was constantly adapting and changing due to the oilfield fluctuating. Due to several factors (such as drilling conditions, the oil quality, water quality and pollution) the value of oil altered. Finch and Acha (2008) concluded that the oil's value held different meaning to the various actors engaged in exchange. The calculations conducted on production were considered ahead of market exchanges in to order to stabilise the exchanges. Therefore, the actors expand the boundary of the possible exchange (Geiger and Finch, 2009).

Further defining market boundaries is filled with complexities, and agreement among several researchers, is that markets are complex multifaceted phenomena (Curran and Goodfellow, 1990). Ela and Irwin (1983) suggest the clouding of market boundaries will lead to increasing opposition from products and technologies outside the firm's usual set of competitors. Curran and Goodfellow (1990) state that the determination of market boundaries is an essential requirement for several marketing techniques. Brooks (1995) propose that spatial information about product supply and demand can be used to establish the degree of markets, which permits defining markets in a more granular way as the depth of competitive conditions that would be likely under the normal expectations that industries and markets have the same boundaries in space, time, or meaning and are unchanging across their component firms (Brooks, 1995). From a market studies perspective, Finch and Geiger (2010a) argue that market boundaries are momentarily stable through calculations of actors which are constantly qualified and requalified.

Finch and Geiger (2010a) propose identifying goods and services first as market objects and then as marketing objects. Finch and Geiger (2010a) define a marketing object as thing of exchange that merges elements of the buyers and sellers' worlds. Finch and Geiger (2010a) argue that marketing objects mediate a market's relationships and practices so that market actors acquire their powers to act of and through the object. Unlike the market object, the marketing object retains its connections with the worlds of production and consumption, despite efforts of market actors to turn it into a 'disentangled' market object.

Social practices and interactions are thus embedded in the use of objects (Latour, 1993). Table 11 consolidates the key concepts and definitions.

Table 11: Key concepts

Concept	Definition
Marketing Object	An object of exchange in the market space that simultaneously carries traces from world outside the market space.
Market Object	An object that can be assessed solely in the market space.
Boundary Object	An object that is share by different social works, sufficiently flexible to accommodate different interpretations in this world, yet retains a relatively stable entity.
Market	A socio-technical organisation that connects many actors and objects and service to allow for comparison between an array of market goods and services.
Frame	In market interaction, frames determine which connections are being considered and which are not; however, even those not taken in account can remain visible.
Calculation	A process by which objects are ordered into a single space (such as the market) and then compared, applying certain rules. Disentangling and qualifying are part of this process.
Disentangling	To be make compared, object shave to be (temporarily) detached from all other connects they may have outside the calculative space
Qualifying	Defining and stabilising a good

Source: adapted from Finch and Geiger (2010)

For Finch and Geiger (2010a) the effect of framing a market, is to place the idea of tacit consensus as its boundaries and move the inclusion/exclusion of calculation to centre stage. Rather than conforming fully to the agreed 'script', marketers will often subtly change what is included and what is excluded.

It can be seen that improving a product, alters the consumption practices of potential users and the relationship between the product and user, it can also redraw the boundary of competencies between professionals and amateurs (Shove and Araujo, 2010). Finch and Geiger (2011) argue that marketers often forget the consequences of such decisions with regards to boundaries. This underpins Finch and Geiger (2010a) who argued that marketers and professionals consider it their mission to continually unsettle markets and marketing objects (Finch and Geiger, 2010a). However, when marketers neglect an objects materiality, it questions how market objects exist to begin with (Finch and Geiger, 2011). Marketers and other actors achieve through their collaborations and other interactions, socially and technically, market objects, which are then pacified and materialized, and establish a commodity phase (Finch and Geiger, 2011).

Expanding their empirical study in pharmaceutical industry, Finch and Geiger (2011) investigated how market actors stabilise and de-stabilise market objects. Incremental

product development allows market actors to engage market objects to manage inertia and it impacts the networks that put the market object in place (Finch and Geiger, 2011). From Finch and Geiger (2011), marketing practitioners seek to position market objects in line with regulatory standards and procedures. This is viewed as a complex task that requires market objects to be well defined and managed. Market objects therefore require performative aspects of knowledge and expertise needed in adjusting and calibrating (Callon et al., 2007). Diaz Ruiz (2013) investigated the use of representational objects that market research practitioners' privilege when describing a market to their clients. Diaz Ruiz (2013) identified the dimensions: frame, content, purpose, and approach (summarised in Table 12).

Table 12: Dimensions

Dimension	Detail
Frame of the market	Exchange or non-exchange
Content	What to include in the content of the representation (actors or practices)
Purpose	What purpose will be accomplished (ostensive or performative),
Approach	How to approach what is assembled (internal or external perspectives).

Source: adapted from Diaz Ruiz (2013)

Diaz Ruiz's (2013) research sought to disentangle assemblages, so that the market representations can be qualified.

Further, Table 13 summarises the key lessons for marketing practice with regards to market objects.

Table 13: Summary of key lessons for marketing practice with regards to market objects

Lesson	Detail
Market-facing and customer-facing are mediated through the marketing object	Markets are active social spaces characterized by sets of mainly calculating practices, including marketing techniques such as product positioning. The object as a product is proposed to potential buyers as a focus of cultural entangling, including entangling with production and consumption. But 'knowing' these entanglements is mediated by the marketing object.
Boundaries are vital to the marketing object	Boundaries are a means of cutting the network to exclude not only potential goods, but also potential dimensions of calculating, and thus are a property of the object as much as of the market. Rather than being immutable, marketers' positioning practices require a reflective awareness of these boundaries and their bases as frames.
The marketing object prevents production and consumption	Positioning is likely to take place simultaneously in respect of the object's versions as good and as product. Positioning can bring these versions' attachments, connections, relations and entanglements into close contact, with often unanticipated consequences.

Source: adapted from Finch and Geiger (2010a)

To conclude this section on market objects, for the aim of the thesis, it is of central importance to recognise that marketing actions are crucial in producing market objects (Finch and Geiger, 2011).

3.4.2 Performativity

The thesis has so far introduced market devices and market objects and their role in market shaping. This section examines the role of performativity in markets. Fligstein and Calder (2015, pp 6) view performativity as the second means that market devices get constructed. The *Journal of Marketing Management* 2015 Special Issue on Marketing performativity has helped to advance the research agenda. In their editorial notes for the special issue, Mason et al. (2015) comment that marketing by its very nature is designed to be performative, as marketing theories bring about effects, rather than simply to describe. This aligns with Fligstein and Calder (2015) who add that performativity transforms the settings that are described. Lawlor and Kavanagh (2015) argue that markets are also performed, with Araujo (2007, p. 211) adding that marketing practices are performative as they create the phenomena they purportedly describe. D'Adderio (2008) argue that performativity struggles between competing 'agencements' leads to their mutual adjustment involving the (temporary) predominance of a strong programme, or the emergence of a new programme from the coexistence/assemblage of different ones. Finch and Acha (2008, pp. 50) define performativity as:

> "Performativity is of a set of concepts, routines, habits or practices which are immediately submerged in shaping a social setting."

Callon (1998a) and Cochoy (1998) state that the role of marketing in establishing, encouraging and decomposing markets is primarily performative. Araujo et al. (2008) consider that this is due to marketing playing an intimate role in the production he occurrences they study. Shove and Pantzar (2005, pp. 45) propose that the performance of practice involves and integrates materials, competences, and meanings. Therefore, the performance of practice is regarded as important or worthwhile to the actors who perform the practice (Shove and Pantzar, 2005).

The seminal work of Austin (1962) referred to performative utterances, whereby this conceptualisation of performativity was concerned with speech acts, that instead of simply describing an existing reality, perform that reality. Butler's (1988; 1990) seminal work builds on performative utterances and introduces the term gender performativity suggesting

gender is something that is made by doing. In considering markets and marketing practices, market-focused researchers are commenting on the need to expand the discussion with regards to performativity in markets. In table 14, MacKenzie (2004) outlined the difference between Austinian and Generic perspectives of performativity.

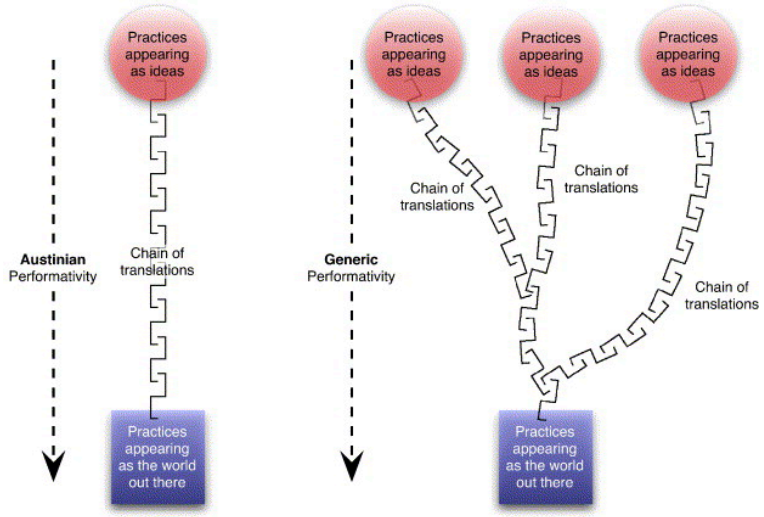
Table 14: Difference between Austinian and Generic performativity

Austinian performativity	Generic performativity
Indicates situations where there is an exclusive and extremely strong link concerning a specific theory and a real market.	Indicates a mixture of cases where ideas (theories, social categories) in some non-exclusive way contribute in shaping reality.

Source: adapted from (MacKenzie, 2004)

Kjellberg and Helgesson (2006) call for researchers to consider the multiple theoretical influences, and for the importance of studying performativity in more mundane markets. Emerging literature has considered the importance of performativity of economic ideas on the shaping of markets (Callon, 1998c; MacKenzie, 2003), and the role of marketing in market-making (Araujo, 2004). The performative power of a market actor is contingent upon on its network positioning, its business model, and the aptitude to demonstrate persuasive meanings concerning the market (Storbacka and Nenonen, 2011). Kjellberg and Helgesson (2006) further the performativity paradigm in illustrating the two types of performativity (figure 12), highlighting the more complex and uncertain paths that lead to practices appearing.

Figure 12: Difference between Austinian and generic performativity



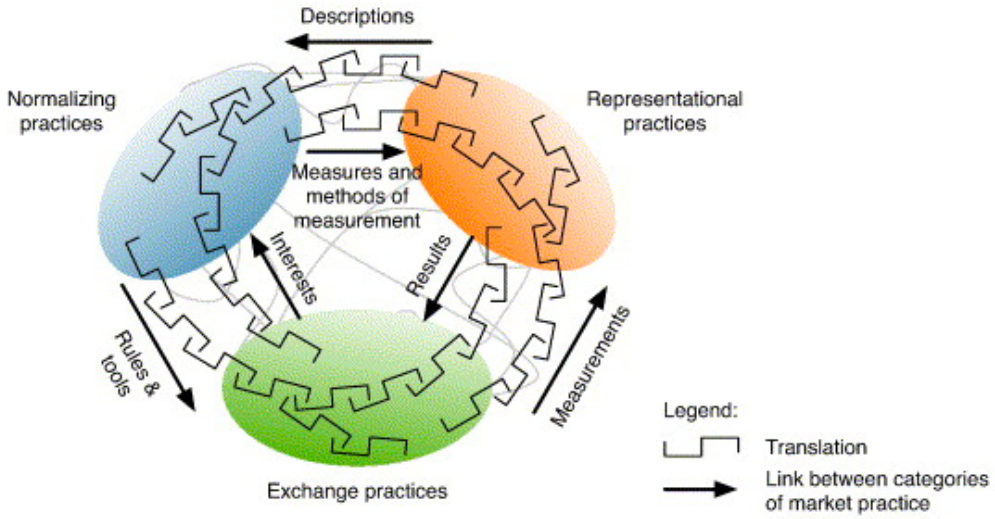
Source: Kjellberg and Helgesson (2006)

Cochoy (2015) comments on the performativity of marketing knowledge with regards to advertising utterances. Stating that what is performed is the marketing skill and expertise of

the advertiser, who achieves claims linguistically and practically. Venter et al.'s (2015) conceptualisation of market segmentation as performative, builds on the idea of linguistics by researching how performativity supposes that the organisation progresses in a discussion and text dialectic. They put forward that non-human texts can act and impact marketing practice. To implement marketing theory Venter et al. (2015) outline four sets of actions: establishing legitimacy, theory embodiment, contextualisation and maintaining the process.

Kjellberg and Helgesson (2006) further offer a practice-based model of markets that combines the three practices previously discussed as being linked through chains of translations, these involve descriptions, rules, tools and measurements (see figure 13). Kjellberg and Helgesson (2006) instances of generic performativity can be expected in most markets in comparison to Austinian, with the proposed framework satisfies both. Kjellberg and Helgesson (2006) argued for the need to study the role of marketing and other theories in shaping markets.

Figure 13: Market practices interlinked through chains of translations



Source: Kjellberg and Helgesson (2006)

D'Adderio (2008) argues that performativity should be viewed as an intrinsic part of economic models and not viewed as external. D'Adderio (2008) view that market models and market practices are connected, as models are performed in practice. MacKenzie (2003; 2006b) examines performativity within the financial derivatives market, finding that models constituted a key part of the market and not something that was peripheral. D'Adderio (2008) affirms that the importance of this finding, is that it established models are not just stating what is and is not allowed in the form of a guide. However, they are contributing to the shaping of processes. D'Adderio's (2008) research offers a theoretical

framework that illustrates reciprocal modification between formal routines and rules. This requires repeating framing and reframing with performances. D'Adderio (2008) offers the distinction between performativity and prescription. Performativity points to ambiguous circumstances where there is dynamic alteration, with prescription referring to the automatic replication and duplication. Callon (2007) indicates that there can be a vibrant modification between the model and reality. D'Adderio (2008) strengthens this by stating that complete prescription and simple description are eternally conceivable arguing that performativity is more likely than not.

Whilst advances have been made such as the special issue in 2015, performativity of marketing is still viewed as being under-researched (Kjellberg and Helgesson, 2006). Jacobi et al. (2015) add that there is a growing interest in market shaping practices in relation to the performativity of marketing expertise but that further research is needed.

3.3.3 Marketing exchange through Calculation, Qualculation and Calqulation

In contemporary societies partaking in market exchange is assumed to be a prerequisite for supporting living (de Vos and Wielers, 2003). Callon (1998a) sees market exchange as a process where price plays a central role in permitting two parties, who have varying interests, to undertake exchange activities. The construction of markets requires the mobilisation of a variety of bodies of expertise, from law to economics, accounting and marketing (Araujo, 2007). As compared with the other social sciences, the economic approach to economic organisation is decidedly more calculative. This is widely regarded at the distinctive 'Achilles heel of economics'. A failure to appreciate the limits of calculativeness gives rise to excesses, because of which economies are prone to mistaken assessments of many economic phenomena (Williamson, 1993).

Granovetter (1985) argues that social relations are embedded in and impact upon economic behaviour. Thus, social relations are not a self-regulating system, they are not always capable of preventing wrong doing and on occasion will facilitate it. Granovetter (1985) argues that there is a lack of empirical evidence to suggest actors have weaker relationship inside and outside of an organisation. Williamson (1994) puts forward the importance of calculativeness within the institutional environment and that it will continually re-appear and questioned the difficultly in differentiating calculativeness and trust. This is founded on the belief that personal and commercial relationships are fundamentally different, commercial relationships cannot accept non-calculative trust. Craswell (1993) states that

the economists' assertion that consumers can be labelled as rational and calculative is difficult to accept by non-economists. Uzzi (1997) suggests that trust is the best mechanism for arranging action and that calculative risk is a secondary. Trust should not be considered as purely the behaviour but needs to be utilised to rationalise the behaviour (Craswell, 1993). Uzzi (1997) advances this by arguing that vulnerability and possibility for betrayal should be considered in relation to trust. This forms the belief that an actor can be calculative in their decisions but be defenceless as they require trust of the opposite to act. However, being overly calculating in established trusting relationships could diminish the relationship and reduce the trust (de Vos and Wielers, 2003). Frederiksen (2014) reasons that engagement is an outcome of familiarity instead of calculation, believing that calculativeness and trust can occur inside and outside the market relationships.

Callon (1998a, 1998b) underpins Granovetter's (1985) view that embeddedness can combat the contradiction between economics (viewing consumers as relational and self-interested) and sociology (consumers as members of societies). Callon (1998a, 1998b) introduces the concept of framing to explain calculative agencies, whereby framing allows embedded networks of relationships to be organised and categorised (Araujo, 2007). Framing establishes a boundary around which interactions take place independently of their context (Callon, 1998b). Araujo (2007) questions the stability of framing, viewing it as a delicate and incomplete and that it requires significant investments. Callon (1998) puts forward overflowing as the counter to framing, it accounts for the externalities that agents do not consider accounting for (knowingly and/or unknowingly) within their calculative practices. Overflowing occurs when agents attempt to account for those externalities by internalising them which can create further externalities. Callon (1998) believes that there are relationships that disobey framing.

For Callon and Muniesa (2005), markets involve many calculative agencies involved in activities such as design, production, marketing, purchasing and consumption. These agencies are equipped with different sets of tools and capabilities and they can compete, cooperate or simply be unconnected from each other. In addition, the calculative power of each agency is likely to be heterogeneous (Araujo, 2007). Finch and Geiger (2010) propose that marketers position goods and services as disentangled market objects and thus provide both the criteria and means by which other market actors can evaluate differences and similarities across various alternatives (calculation).

This literature stream was advanced by Roscoe's (2013) research into markets for transplant organs, focusing on the normal behaviour economic valuation. Roscoe (2013) explored three distinct sets of calculations concerning the value of a transplant kidney: a contingent valuation calculation, a risk-premia based calculation, and a cost-efficiency simulation. Roscoe (2013) found that once the economic facts in each case were created they could them mobilise through normative discussions and assert moral strength.

Further Cochoy's (2002) seminal work, investigated how a seemingly insignificant device, such as a shopping trolley, impacted upon shaping exchanges in supermarkets. Cochoy (2002) introduced the term qualculation in opposition to calculative discussions mentioned above. Qualculation seeks to utilise quality based rational judgements (Cochoy, 2002). Cochoy's (2002) research whilst focused on supermarket shopping and the use of shopping trolley uncovered that although pricing and quantities for individual items on the shelves was relatively clear, collectively it was a modest means of employing calculation. The shopping as an active undertaking, represents qualculation, as consumers had to evaluate what the best choice was in the absence of calculation (Cochoy, 2002). Additionally, Cochoy (2008) found the shopping trolley represented an intentional cognitive process, made up of several different choice criteria for example the needs of others in the household. The customer was required to negotiate these needs in conjunction with a shopping list, product packaging, product labelling (ingredients and nutritional) information. Combined this shifts the consumer from simply calculations based on price to adopt a qualculation position focused on quality-based rational judgements (Cochoy, 2008). Lastly, Cochoy (2008) comments that the shopping trolley enables the individual consumer to form part of a small collective group, as they assemble at the same time and place around this device. What is noticeable from this commentary is the effect of a shopping basket and the emergence of consumers using a 'bag for life'. Cochoy (2008, pp. 17) concluded that a shopping trolley transforms customer's calculations as it leads them to complete certain actions by altering a financial restriction to an act of measurement. The shopping trolley enables customers to adopt the qualitative and quantitative continuum to access the complete calculative tools. Azimont and Araujo (2010) add that qualculation does not dismiss the quantitative, rather it combines it with qualitative components and judgments.

The relationship between making judgments is recognised by Callon et al. (2002) who affirm that defining and understanding the quality of things is crucial to being able to calculate. Power (2004) states that determining the correct range and balance is required for a successful measurement system, which creates the required knowledge. The occurrence of this creation is underpinned by making phenomena standardised and measurable (Azimont

and Araujo, 2010). Azimont and Araujo (2010) add that when objects are decontextualized they can be grouped and compared, thus available to additional calculative actions.

Cochoy (2008) seeks to combine qualculation and calculative through establish the term calqulation to create a new economic condition. Cochoy (2008, pp. 15) states that calqulation derives:

> "…I mean 'calquer' (a French verb for tracing, copying a model) one's decision on that of one's partner(s), and vice versa (calqulation thus designates a form of interactive deliberation). Talking about 'calqulation' is thus a means to theorize about the collective aspect of consumer choice"

Callon and Muniesa (2005) suggest that contingent on the specific attainment of each calculative step dictates the further action taken. For example, if the calculative requirements are not met, insight or judgement would be used. This implies that there is an active continuum between qualitative judgement and quantitative calculation (Callon and Muniesa, 2005). Cochoy (2002) argues that calqulation occurs when transitional circumstances required customers to select objects that have been positioned earlier in the space and time. Araujo (2007) argue that the assembling of markets demands actions that separate exchanges from the context their context, however, at the same time actions that embed exchange in an explicit context are required. The impact here is that what are believed to be predefine and stable markets can be destabilised, albeit temporarily at a specific time and place. The idea that Qualculation occurs if full calculation is not possible is not always the case (Cochoy, 2008).

3.3 Chapter Three Conclusion

The purpose of this section is to succulently summaries the marketization and market studies literature review and tease out the central parts that build towards informing the conceptual framework presented at the end of Chapter four.

2. What effect does marketization have on market shaping practices?

This chapter has introduced the theoretical frame of market studies that guides the subsequent chapters. Firstly, it has discussed markets and the role of marketers in markets. The literature suggests that markets are dynamic they are not spontaneous, self-organizing collections of dyadic exchanges portrayed in marketing textbooks (Araujo et al., 2010) viewing markets as plastic (Alderson, 1957; Araujo et al., 2010). Callon (1998b) suggests

created markets are formed via an array of practices that utilise and enhance the knowledge and expertise of those involved. Kjellberg et al. (2012) develop this by adding markets are fluid and are always being made by constant market practices. Marketers are involved in the creation and development of markets with Vargo and Lusch (2004) adding that markets are in the process of 'becoming', which requires the market to take on multiple incarnations based on the practices of the actors involved. Markets are socially constructed with recurrent exchanges happening between buyers and sellers (Fligstein and Calder, 2015).

This section discussed that markets are places of diverging practices that create disagreements around their organisation (Blanchet and Depeyre, 2016). Market practices bring together a variety of market actors acting in accordance with different market representations and engaging in divergent market practices, each trying to shape the market in a different fashion (Azimont and Araujo, 2007). The significance of social input on market practices was recognised as markets create the social instead of deconstructing it (Schatzki, 2001; Peñaloza and Venkatesh, 2006; Geiger et al., 2015). Kjellberg and Helgesson (2006) sustain that markets encompass multiple and often conflicting efforts to shape them. Sheth (1992) argue that market practices vary with profit and non-profit organisations and across nations where the importance of politics and employment laws will affect practices. Kjellberg and Helgesson (2006) put forward three interwoven classes of practices different actors may shape markets at the level of exchange, normalizing or representational practices. This includes the intentional and unintentional interactions concerning practices (Araujo et al., 2008).

As explored the body of literature relating to market studies undeniably asserts that markets are complex and dynamic. This discussion has highlighted potential market shaping practices. Interrelated questions arise over the practices that shape markets that are affected by multiple contexts. Such as, what market practices are utilised when there are opposing market views? How do these practices materialise and how are they shaped? Further, questions emerge over the role of market practices such as the devices and objects used. The literature suggests that as, yet we do not have a comprehensive understanding of all the potential market devices that can be used. Which necessitates a final consideration as to how power and responsibility are affected by market practices?

Five important aspects of the marketization and market studies literature are identified below:

Firstly, this chapter recognises marketization, noting that the marketization process is central to the market functioning (Callon, 2016). Firat and Venkatesh (1993) argue that life is increasingly experienced solely through the market. For Callon (2016, pp. 34) marketization informs thinking about the architecture of markets and the organization of competition. This chapter recognised that exchange is only part of the marketization process (Fine, 2002; Araujo and Pels, 2015; Mason et al., 2017). Marketization is considered as important to the formulation of the conceptual framework as it influences how and in what way the market can function, which in turns affects the marketing shaping efforts of actors.

Secondly, the use of Market objects and Marketing Object is developed as part of the conceptual framework. Brewer (2017) referred to the market object as the product being produced and sold, although there is not reference to a service. For Finch and Acha (2008) and Geiger and Finch (2009), market objects are used as a method of exchange, with market actors calculating differences similar market objects. Finch and Geiger (2010a) suggest a unique standpoint on positioning by recognising goods and services as firstly market objects and then secondly as marketing objects. Brewer (2017) simply refer to the market object as the product being produced and sold, there is not reference to a service. Shove and Araujo (2010) stated market objects have significant effects for the accomplishment of practices with Finch and Geiger (2011) finding that market actors stabilise and de-stabilise market objects. It was recognised that performativity is the second means that market devices get constructed (Fligstein and Calder, 2015). Markets and marketing have been designed to be performative, as marketing theories bring about effects, rather than simply to describe (Callon, 1998a; Cochoy, 1998; Araujo, 2007; Lawlor and Kavanagh 2015; Mason et al., 2015). Kjellberg and Helgesson (2006) concluded that instances of generic performativity can be expected in most markets in comparison to Austinian, with the proposed framework satisfies both. The performative power of a market actor is contingent upon on its network positioning, its business model, and the aptitude to demonstrate persuasive meanings concerning the market (Storbacka and Nenonen, 2011). Performativity is an important element in the conceptual framework as it allows for the examination of how actors perform market shaping practices. This provides scope to examine the performativity of Market Objects and Marketing Objects.

Fourthly, market devices were investigated as being central to the market (Callon et al., 2007), with markets requiring products and services to be formed, assessed, and valued for the market to function (Fligstein and Calder, 2015). Market devices can be pricing models to merchandising tools, from trading protocols to aggregate indicators, the topic of market

devices includes a wide array of objects that have been often overlooked in sociological analysis (Callon et al., 2007). Doganova and Eyquem-Renault (2009) suggest business model successfully viewed as market devices. Mason et al. (2017) and Fligstein and Calder (2015) argue that we know very little of how market devices are generated or replaced in practice, we need to do much more to understand the work done to create new market devices and how they are effectively inserted into the world to shape what markets become.

Finally, Calculation, qualculation and calqulation as market shaping practices are considered as important to the development of the conceptual framework. Callon and Muniesa (2005) markets involve many calculative agencies involved in activities such as design, production, marketing, purchasing and consumption. Williamson (1994) puts forward the importance of calculativeness within the institutional environment and that it will continually re-appear and questioned the difficultly in differentiating calculativeness and trust. Uzzi (1997) suggests that trust is the best mechanism for arranging action and that calculative risk is a secondary. Qualculation seeks to utilise quality based rational judgements (Cochoy, 2002). Cochoy's (2002) found that although pricing and quantities for individual items on the shelves was relatively clear, collectively it was a modest means of employing calculation**.** Azimont and Araujo (2010) add that qualculation does not dismiss the quantitative, it combines it with qualitative components and judgments. Calculation and qualculation were combined to create calqulation (Cochoy, 2008). Cochoy (2008) concluded that a shopping trolley transforms customer's calculations as it leads them to complete certain actions by altering a financial restriction to an act of measurement. The shopping trolley enables customers to adopt the qualitative and quantitative continuum to access the complete calculative tools. Considering calculation, qualculation and calqulation as part of the conceptual framework is important as many calculative agencies effect how actors use market devices, market objects and marketing objects.

Table 15 Provides a summary of the key terms used in this chapter which will be mobilised with the thesis.

Table 15: Summary of key terms and definitions

Term	Definition and citation
Markets	"…markets are plastic phenomena that emerge from organising, a process which the marketing discipline play a role in among others." (Araujo et al., 2010, pp. 5)
Market-making practices	Activities that shape the overall market structure (Araujo et al., 2008)
Marketing Practices	Firm-based activities aimed at developing an actor's position within a structure. (Araujo et al., 2008)
Market Device(s)	"…offers a simple way of referring to the 'material and discursive assemblages that intervene in the construction of markets' and are a necessary prerequisite to their existence" (Muniesa et al., 2007, pp. 2) "…market–enabling instrument that operates empirically for the enhancement of socially–situated practices of calculation and decision-making." (Callon et al., 2007, pp. 2)
Market Object	Market object as the product being produced and sold, although there is not reference to a service (Brewer, 2017). Finch and Acha (2008) and Geiger and Finch (2009) Market objects are used as a method of exchange, with market actors calculating differences similar market objects.
Performativity	Performativity is of a set of concepts, routines, habits or practices which are immediately submerged in shaping a social setting (Finch and Acha, 2008, pp. 50)
Market Practice	"…activities that contribute to constitute markets and includes efforts to shape as well as operate in markets." (Kjellberg and Helgesson, 2007, pp. 141) "…the bundles of practices including material arrangements that contribute to perform markets." (Araujo et al., 2008, pp. 8)
Calculations	Calculation, price-based computing (Cochoy, 2008). Qualculation seeks to utilise quality based rational judgements (Cochoy, 2002). Calqulation as the adoption the qualitative and quantitative continuum to access the complete calculative tools (Cochoy, 2008).
Marketization	''…entirety of efforts aimed at describing, analysing and making intelligible the shape, constitution and dynamics of a market socio-technical arrangement." (Caliskan and Callon, 2010, pp. 3). "Thinking about marketization amounts to thinking about the architecture of markets and the organization of competition." (Callon, 2016, pp. 34)
Exchange	An exchange is an event and something that occurs (Araujo, 2007),
Market Framing	Market interaction, frames determine which connections are being considered and which are not; however, even those not taken in account can remain visible (Finch and Geiger, 2010a).
The market	A socio-technical organisation that connects many actors and objects and service to allow for comparison between an array of market goods and services (Finch and Geiger, 2010a).

Chapter 4 Literature Review: Business Models

This final literature review chapter explores and analyses the relevant literature surrounding business models. It provides the final cross examination of the aims and research questions put forward in chapter one. The chapter is organised as follows: firstly, business models are outlined and discussed, then business model innovation is explored before concluding with an examination of open innovation and collaboration. Figure 14 visualises the structure of the chapter.

Figure 14: Structure of Chapter Three

4.1 Business Models

Business model research is currently receiving considerable interest from researchers and practitioners (Zott and Massa, 2011). This is exemplified through the emergence of journal special issues on the topic (*Industrial Marketing Management*, 2013; *Strategic Entrepreneurship Journal* 2015; *Long Range Planning*, 2017). The term business model is widely used but not clearly defined (Chesbrough, 2007; Zott et al., 2011; Desyllas and Sako, 2013). This is rationalised by Mason and Spring (2011) who caution that we are just establishing our understanding, of the practices involved in business models and their agency in making markets. Therefore, a complete composite understanding of business models is not yet conceivable.

Coombes and Nicholson (2013) state that business models are under-examined by industrial marketing researchers. Believing that there is scope to research open business models, and those co-created with multiple stakeholders in a supply chain (Coombes and Nicholson, 2013). Zott et al., (2011, pp. 1020) critique that in considering business models:

> "…it appears that researchers (and practitioners) have yet to develop a common and widely accepted language that would allow researchers who examine the business model construct through different lenses to draw effectively on the work of others."

This asserts that the multiple definitions and methods of classifying business models prohibits discussion and advancement, which rationalises the existing under-researched area

from industrial marketers. Baden-Fuller and Haefliger (2013) suggest that a business model negotiates the connection concerning technology and firm performance. Furthermore, the design of business models to be open, and to engage with users, impact and effects technology development (Baden-Fuller and Haefliger, 2013). Ehret et al. (2013) add to this position by commenting that a business model provides a possible answer to compromises amongst a technology, and a marketing orientation.

However, even with the lack of conceptual clarity surrounding business models, firstly in what they are, and secondly in what they do, the theme of value creation is often repeated, especially in the consideration as to how the firm can capture value (Chesbrough, 2010; Chesbrough and Rosenbloom, 2002; Teece, 2010; Zott et al., 2011). Business models have materialised as a significant way to bring innovation to the market (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010; Teece, 2010) and focusing interactions within the market (Dmitriev et al., 2014). Chesbrough (2010) proffers that true value is not realised until the innovation is commercialised by the firm through the business model. Teece (2010) argues that without a robust business model, innovation will fail, or value will not appropriately be captured from new products and services. If the value of the new products and services are accurately captured and understood by the firm, it may require a new business model to ensure the new products and services are properly supported by systems and processes (Chesbrough and Rosenbloom, 2002; Zott and Amit, 2010). Desyllas and Sako (2013) contend that although recognised as important, value capture is somewhat under-researched, despite the position that business models can be regarded as intellectual property (Zott et al., 2011). Björkdahl (2009) see the business model as a device that distributes resources as inputs, and then transforms them across customers and markets into potential economic outputs. Dahan et al. (2010) go further than economic value, by suggesting business models should include cross-sector collaborations, arguing they produce social and economic value. Acur and Bititci (2003) found that a firm should focus on creating value that is independent for each business unit, through horizontal strategies and the sharing of knowledge and expertise.

In putting forward a clear conceptualisation, Teece (2010, pp. 173) view a business model as: “a conceptual, rather than financial, model of a business.” Whilst for Zott and Amit (2007) a business model illuminates how a firm relates to external partners, and how it undertakes exchange with them to create value for all. Zott and Amit (2007, p. 181) state that a business model:

> "…represents the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities"

Advancing their initial definition Zott and Amit (2010, pp. 216) conceptualize a firm's business model as a:

> "…system of interdependent activities that transcends the focal firm and spans its boundaries. The activity system enables the firm, in concert with its partners, to create value and also to appropriate a share of that value."

This definition offers greater detail than previously, by specifically noting the importance of the firms' boundary and the important role that partners play in creating value. An important element is viewing the business model as fluid to capture the varying needs of creating value and knowledge from inflows and outflows (Chesbrough, 2017), they are not linear (Mason and Spring, 2011).

Mason and Chakrabarti (2017) use the term 'plastic' to describe business models suggesting they are constantly being moulded and shaped over time depending on the needs of the environment. This highlights a focus on the spatial-temporal nature of business models as key to understanding (Mason and Palo, 2012; Mason and Chakrabarti, 2017). Bohnsack et al.'s (2014) study of the automotive industry underpinned the notion of fluid business models, finding that firms mostly make adjustments in the value network and the revenue/cost model, and not to the value proposition itself. Zott and Amit (2007) identified that efficiency centred business models seek transaction efficiency to reduce costs for all.

In table 16, adapted from Zott and Massa (2011) summarises the common themes in the research of business models to date.

Table 16: Summary of emerging business model themes

Theme Number	Business Model Themes
1	The business model is emerging as a new unit of analysis
2	Business models emphasize a system-level, holistic approach to explaining how firms "do business"
3	Firm activities play an important role in the various conceptualizations of business models that have been proposed
4	Business models seek to explain how value is created), not just how it is captured

Source: Adapted from Zott and Massa (2011)

Mason and Spring (2011) forward the perspective that business models are performative, which is based on the view that business models move beyond simply describing the

proposed value creation, and that they play a crucial role in creating it. For Mason and Spring (2011) the business models' ability to command, control and direct actors, is framed and implanted in strategy documents, targets, presentations, and reports. These devices and tools are credible at portraying the message and authority of the practices required by the business model across networks and markets (Feldman and Pentland, 2003). Doganova and Eyquem-Renault (2009) convey that business models can be difficult to understand, explain, or even identify. They question if business models are deliberately enigmatic, and if this ambiguity is part of their charm. In exploring this assertion, Doganova and Eyquem-Renault (2009) suggest that business models essentially operate as calculative and narrative devices. This puts forward the idea that a business model has significance within the environment that it functions within, as extrapolating its performative nature elsewhere may not work. Baden-Fuller and Morgan (2010b, pp. 159) have argued that business models should be studied as models, as it reveals how they represent several facilitating functions: "scale models are copies of things; role models are models to be copied. In business models, the two notions come together." Baden-Fuller and Morgan (2010b) further highlight that the terminology surrounding 'model' implies something to be followed or imitated. Taking the view that business models are performative and enacted by actors, objects and devices, from this perspective it would be difficult to comprehend that this could be easily replicated. Björkdahl (2009) elude to this by commenting that business models are necessary and cannot be treated in isolation, they require the firms' management to envisage how they are appropriated. This potential circular relationship, concerning cause and effect, requires business models to be designed and redesigned with the practices that support them in mind (Mason and Chakrabarti, 2017). Further, Ferreira et al. (2013) proffer that the business model must be designed considering the interactions and relationships of between all actors. Any interaction between firms and its networks is critical for conducting business (Ford, 2011).

Building on the discussions contained within Chapter Three focusing on the development and understanding of markets, business models do not sit outside and watch the market rise, fall and evolve, they are instead an inherent part of the process (Callon, 1998a, 1998b; MacKenzie, 2006; Azimont and Araujo, 2010; Harrison and Kjellberg, 2010) which has implications for business model theory. This in turn raises questions with regards to who performs business models, what expertise they have and what practices do they use.

In table 17. Chesbrough and Rosenbloom (2002) demonstrate the key functions that a business model should perform.

Table 17: Business Model fulfils the following functions

Number	Function
1	Articulates the value proposition (i.e., the value created for users by an offering based on technology);
2	Identifies a market segment and specify the revenue generation mechanism (i.e., users to whom technology is useful and for what purpose);
3	Defines the structure of the value chain required to create and distribute the offering and complementary assets needed to support position in the chain;
4	Details the revenue mechanism(s) by which the firm will be paid for the offering;
5	Estimates the cost structure and profit potential (given value proposition and value chain structure);
6	Describes the position of the firm within the value network linking suppliers and customers (incl. identifying potential complementors and competitors)
7	Formulates the competitive strategy by which the innovating firm will gain and hold advantage over rivals.

Source: adapted from Chesbrough and Rosenbloom (2002)

Further, Mason and Mouzas (2012) study the flexibility of varying business models within upstream and downstream relationships, finding business models were used to direct problem solving. Using network influence, transactional relationships and corporate ownership, Mason and Mouzas (2012) present six alternative business models (as shown in table 18), with each model having varying capability to react to changing needs. Therefore, the business models depict how the firm frames their position and activities within networks of exchange relationships (Mason and Mouzas, 2012).

Table 18: The flexibility of six alternative business models

Business Model Type	Business Models Flexibility
The network influence business model	Included firms with strong, long-term, inter-firm relationships both upstream and downstream.
The transactional business model	Represented firms buying and selling based on price, quantity and delivery agreements.
The franchise business model	Utilised long-term relationships upstream, and ownership downstream.
The agent business model	Incorporated “supplier-focused” firms. These firms formed long-term relationships upstream, but sold their products downstream through transactional relationships, based on price, quantity and delivery agreements.
The sales-oriented business model	Included firms with transactional relationships upstream and long-term relationships downstream. Organisations worked to understand the market through close relationships with downstream retailers, while purchasing supplies purely based on price and quality.
The retail business model	Included transactional relationships upstream and corporate ownership downstream. Downstream customers included retailers and business-to-business customers.

Source: Adapted from Mason and Mouzas (2012)

Benson-Rea et al. (2013) study of the New Zealand Wine industry highlights the case for a plurality of co-existing business models within a single firm. Benson-Rea et al. (2013)

purposeful use of the term pluralistic recognises the concurrent varied approaches to value creation and capture with a single firm. It proposes that instead of developing one extremely complex business model, that it is difficult to maintain and communicate internally and externally. These mixed business models are a result of the firm attempting create and capture value depending on the structural and contextual customer need (Smith et al., 2010). This agrees with Teece (2010) who affirms that successful business model design evaluates internal and external factors, regarding customers, suppliers, and the broader business environment. Effectively the model must be refined to meet specific customer needs (Teece, 2010).

4.2 Business Model Innovation

Business models themselves are devices that are subject to innovation (Mitchell and Coles, 2003), although not seen as radical it can be rewarding for multiple stakeholders (Teece, 2010). Recent research eludes to the requirement for a more fluid view which speaks to business model innovation Björkdahl and Holmén, 2013; Chesbrough, 2010; Sanchez and Ricart, 2010; Zott et al., 2011; Massa et al., 2017). There is a growing agreement that business model innovation is fundamental to firms' success (Zott and Massa, 2011). Mitchell and Coles (2003) claim business model innovation provides a parallel way to gain competitive advantage in the market, as continual development of the business model prevents competitors being able to accurately understand and counter the value put forward by the firm. Business model innovation is a type of organisational innovation in which firms identify and adopt novel opportunity portfolios (Teece, 2010). Gambardella and McGahan (2010) add to understanding this by exploring that business model innovation occurs when a firm adopts a novel approach to commercialising its underlying assets. Despite the range of the research on business models, definitions for the construct have not united to inform a consistent usage (George and Bock, 2011, 2012). Markides (2006, pp. 20) see business model innovation as:

> "…the discovery of a fundamentally different business model in an existing business."

This definition is underpinned by (Björkdahl, 2009) who state that any primary alteration in the relationship concerning business model fundamentals, can be argued as business model innovation (Björkdahl, 2009). Further, Amit and Zott (2012, pp. 41) introduce the notion of performing and business model innovation by arguing:

> "…business model innovation can consist of adding new activities, linking activities in novel ways or changing which party performs an activity."

Khanagha et al. (2014, pp. 324) expand the definition further by introducing the notion of parallel business models in business model innovation:

> "…can range from incremental changes in individual components of business models, extension of the existing business model, introduction of parallel business models, right through to disruption of the business model, which may potentially entail replacing the existing model with a fundamentally different one."

Therefore, alliance partners and customers, can play a crucial role in business model innovation (Cortimiglia et al., 2016), with Amit and Zott (2001) seeing networks and alliances as central settings for business model innovation.

Bouchikhi and Kimberly (2003) and Chesbrough (2010) suggest that obstacles to business model innovation can include inertia from the existing arrangements of assets and processes. Johnson et al. (2008) argue that firms find business model innovation difficult, even though a model can reform and grow an industry, and that it is a mechanism for corporate change and rejuvenation (Demil and Lecoq, 2010). This is due to management not understanding the business model to be able to know when it should be revised (Johnson et al., 2008) and the value potential of a new business model (Bouchikhi and Kimberly, 2003; Chesbrough, 2010). Value can also be created through revolutionary business models (Baden-Fuller and Haefliger, 2013) in which both value creation and value capture occur via include suppliers, partners and distribution channels (Hamel, 2000). To negate the potential barrier, Hacklin et al. (2017) suggest pivoting the main business model is better to introducing second corresponding business model when value is transferring promptly. Hacklin et al. (2017) suggest that pivoting develops the product-market fit as it assigns management focus and key resources more successfully without increasing organisational complexity. Chesbrough and Schwartz (2007) see business model innovation as crucial to supporting open innovation. The suggestion that business models take form through various practices of experimentation (Hayashi, 2009; McGrath, 2010) with trial and error until they find the correct balance, suggests an incremental business model innovation.

Notably, Baden-Fuller et al. (2010) argue that business model innovation has its own unique characteristics. Whilst Amit and Zott (2012) argue the emergence of business model innovation is due to firms' unwillingness to take huge risks and belief that business model

innovation complements product or process innovation. Gambardella and McGahan (2010) agree with this understanding and develop this suggesting business model innovation counters the vulnerability of exchanging to one core market, therefore the change makes offerings commercially feasible over a range of markets. Table 19 encapsulates the findings of Amit and Zott (2012) who state business model innovation can occur in several ways.

Table 19: Summary of business model innovation can occur in several ways

Achieved by	Details
Adding novel activities	through forward or backward integration; we refer to this form of business model innovation as new activity system "content."
Linking activities in novel ways	we refer to this form of business model innovation as new activity system "structure."
Changing one or more parties that perform any of the activities	we refer to this form of business model innovation as new activity system "governance."

Source: adapted from Amit and Zott (2012)

Schneider and Spieth (2013) add to this perspective in arguing that for a firm to implement business model innovation, requires timing and accurate awareness of the firms changing environments. As conducting business model innovation is complex and challenging primarily due to inertia (Chesbrough, 2010; Doz and Kosonen, 2010). Amit and Zott (2012) contend that content, structure and governance are the pivotal design parts that embody a firm's business model, changing one or more of these parts equates to business model innovation.

Continuing the focus on the role and practices of management, Svejenova et al. (2010), proffer that an explicit leadership focus is needed for business model innovation. Doz and Kosonen (2010) suggest that to increase their agility, which can be achieved by developing three meta-capabilities: strategic sensitivity, leadership unity, and resource flexibility. Proactively managing complex business models requires leadership to set the agenda and vision (Smith et al., 2010), and the behavioural element concerned with business model innovation.

4.3 Open Innovation

The term Open Innovation was conceived by Chesbrough (2003a) as a new paradigm for the management of innovation, which marked a paradigmatic shift from a closed to an open model for innovation (Chesbrough and Crowther, 2006). This emergent area of research has attracted considerable interest from both practitioners and researchers (Christensen et

al., 2005; Gassmann, 2006; Vanhaverbeke, 2006; West and Gallagher, 2006). Chesbrough (2017, pp. 37) states:

> "An organization's business model helps to determine which inflows of knowledge can help fuel innovation, and which knowledge should be released to other organizations."

The above quotation reiterates the importance of the firm's business model with regards to their efforts to openly innovate. Firms look outside their boundaries to leverage internal and external sources of ideas (Chesbrough, 2003a; Laursen and Salter, 2006a), with the view that a single firm cannot innovate in seclusion (Dahlander and Gann, 2010). Open innovation requires the adoption of new, open business models designed for sharing or licensing technologies (Chesbrough, 2007b, 2010) and open strategies (Chesbrough and Appleyard 2007; Appleyard and Chesbrough, 2017). The business model itself can develop into part of the firms' intellectual property (Rivette and Kline, 2000; Rappa, 2001). The firm's business model helps establish which inflows of knowledge are required to facilitate innovation, and what knowledge should be relinquished (Chesbrough, 2017).

Further, Belderbos et al. (2014) study examined the pressure concerning technological value creation and the financial value appropriation in the co-ownership of intellectual property. Belderbos et al. (2014) found that lack of concern over appropriation resulted in co-patenting with universities equalling higher market value. Henkel et al. (2014) findings suggest that substantial external pressure may be needed for firms to re-evaluate how they generate and appropriate value. Whilst Laursen and Salter (2014) found that managerial mind-sets to openness and appropriability (such as capability or worthiness of being imitated or copied) are closely aligned, which suggests that the firm's pecuniary position is connected to its appropriability logic. Further Laursen and Salter (2014) argue that appropriability anxiety is stronger for direct and formal collaboration than for external search which includes less shared communication.

Open innovation is a wide-ranging concept incorporating several dimensions, and fundamentally openness is discussed in different ways (van de Vrande et al., 2009; Dahlander and Gann, 2010). Huizingh (2011) complement the richness of open innovation due to its ambiguity but counter that this has hindered the advancement of the theorisation. Open innovation has been critiqued by Trott and Hartmann (2009) for constructing an incorrect or artificial separation, contending that open innovation is the solitary substitute to the closed innovation model. Laursen and Salter (2006a) initially associated the number of external sources of innovation created with openness. Whereas Henkel (2006) saw openness

as finding and utilising internal ideas that were previously hidden or unused. Dahlander and Piezunka (2014) found that several firms fail to obtain ideas from external sources. They suggest motivating externals by simply applying their credible ideas and by making internal solutions public.

Whilst the open innovation paradigm is distinct, it has been shown to have similarities and has been motivated by the work on user innovation literature; such as von Hippel (1988), Cohen and Levinthal's (1990) work on absorptive capacity, Teece's (1986) complementary assets, and March's (1991) exploration and exploitation work. The emergence of open innovation as a separate but interrelated area of attention has been driven by factors such as: the shortening of product lifecycles, increased R&D cost vs number of successful innovations, changes in consumption and production, and the knowledge and mobility of employees (Chesbrough, 2003a; West et al., 2006). Chesbrough (2003a, pp. 43) defines open innovation as:

> "…the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively."

Fourteen years later Chesbrough (2017, pp. 35) developed definition views open innovation as:

> "…a distributed innovation process that relies on purposively managed knowledge flows across organizational boundaries, using pecuniary and nonpecuniary mechanisms in line with the organization's business model to guide and motivate knowledge sharing."

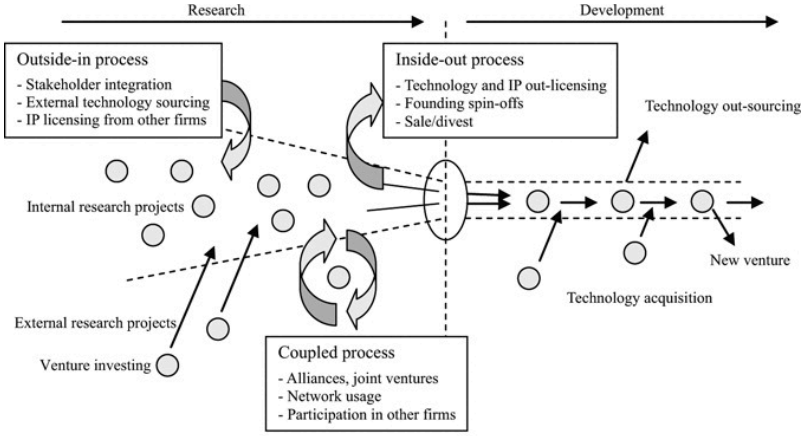
A key element of the open innovation paradigm is its relationship with the use internal and external knowledge, which includes the serval actors and channels such as a firms' customers, competitors, academic institutions and unrelated industries (Tether, 2002; Coombs et al., 2003; Howells et al., 2003; Acha and Cusmano, 2005; West and Gallagher, 2006). Open Innovation uses pecuniary (using money) and nonpecuniary means in line with the firms' business model to guide and motivate knowledge sharing (Chesbrough and Bogers, 2014). Laursen and Salter (2014) found that omitting competitors reduces the link concerning appropriability and openness. Koschatzky (2001) found that failure to exchange in knowledge sharing has a negative effect on the firms' long-term knowledge base and its ability to have relationships with other firms. The underlying objective of finding knowledge and technology out with a firm's boundary is to transform it into new products and services (Chesbrough, 2003a).

West and Gallagher (2006) suggest open innovation can improve process innovation, which relies on knowledge originally developed externally. However, external support is restricted as collaborators might not fully understand the inner workings of the firm. Enkel et al. (2009) found that open innovation adoption was restricted by several external factors such as: worry over loss of knowledge, high coordination costs, control and higher complexity. Internally factors highlighted included, finding the correct partners, balancing daily focus and resources issues (both financial and time).

Gambardella and Panico (2014) found that open innovation governance is essential for effective innovation performance. Allocating decision rights negates concerns regarding lack of bargaining power and reconditions incentives. Whilst for Felin and Zenger (2014) knowledge search needs to be matched with problem type and governance form. The choice of governance form, open or closed, is driven by innovation problem type.

In figure 15 Chesbrough (2003a) depicted the open innovation model. Whilst, Trott and Hartmann (2009) argue that the main critique of the open innovation model presented by Chesbrough (2003a), is that it is fundamentally linear, and has no feedback or feed-forward mechanisms.

Figure 15: Three core processes of open innovation in R&D management



Source: adapted from Chesbrough (2003a) and Gassmann and Enkel (2005)

Trott and Hartmann (2009) critique the open innovation paradigm for presenting the established innovation management literature a new way. Huizingh (2011) add to this position by stating open innovation is not a revolution but an evolution. Critically, Trott and Hartmann (2009) assert that the potential 'repackaging' is to more widely sell open

innovation to firms, as they will view that they have already implemented most of its principles, making the remaining changes seem more appealing.

4.4 Core Processes of Open Innovation

Gassmann and Enkel (2005) define the three core processes of open innovation in R&D management. As such the core processes are: outside-in process (Inbound), so-called inside-out (Outbound) and coupled (merging Inbound and Outbound). They further divided inbound and outbound innovation to interactions that are pecuniary versus non-pecuniary and proposed the four different categories illustrated in Table 20.

Table 20: Summary of comparison of four different types of openness

	Outbound innovation	Outbound innovation	Inbound innovation	Inbound innovation
	Revealing	**Selling**	**Sourcing**	**Acquiring**
Logic of exchange	Non-pecuniary—indirect benefits	Pecuniary—money involved in exchange	Non-pecuniary—indirect benefits	Pecuniary—money involved in exchange
Focus	Revealing internal resources to the external environment	Out-licensing or selling products in the market place	Sourcing external ideas and knowledge from suppliers, customers, competitors, consultants, universities, public research organizations.	Acquiring inventions and input to the innovative process through informal and formal relationships

Source: Adapted from Dahlander and Gann (2010)

Inauen and Schenker-Wicki (2011) relate that the decision to innovate internally or externally in comparison to a make or buy assessment. The ability to search, evaluate and acquire external innovation and technology requires expertise of this process (von Zedtwitz and Gassmann, 2002; Dahlander and Gann, 2010). Whilst Cassiman and Valentini (2016) argue that engaging concurrently in buying and selling knowledge should permit firms to generate effective innovation outcomes. Cassiman and Valentini (2016) found that open firms can reduce avoidable costs by combining knowledge inflows and outflows. In one of the few open innovation studies to research services, Mina et al. (2014) investigated the UK business services. They found that open innovation practices are also connected to the use of a service inclusive business model in manufacturing firms and service integrated manufacturers casual knowledge exchange actions.

4.4.1 Outside-in Process (Inbound)

The first core process of open innovation, outside-in process (inbound), includes all activities for external technology sourcing (Gassmann and Enkel, 2005). It requires firms to source knowledge and technologies from its environment from various stakeholders (Chesbrough, 2003a), seeking to potentially circumvent internal R&D (Chesbrough and Crowther, 2006). Enkel et al. (2009) highlight the assimilation of suppliers, customers, and external knowledge sourcing, improves and extends the firm's knowledge base, and can increase its capacity to innovate (Laursen and Salter, 2006; Lettl et al., 2006; Piller and Walcher, 2006). Enkel and Gassmann's (2008) study found that the most common inbound knowledge sources were: clients, suppliers and competitors, public and commercial research institutions. This highlights the importance of the acceptance of strong and varying innovation networks (Dittrich and Duysters, 2007; Chesbrough and Prencipe, 2008; Enkel, 2010).

Further Sisodiya et al.'s (2013) study identified key factors that support the inbound process and increase its effectiveness in a business-to-business setting. The inbound process relies on the firm's ability to create and develop relationships with other firms, improving the ability to manage this will improve firm performance (Sisodiya et al., 2013). Furthermore, Sisodiya et al. (2013) suggests that network spill overs and flexibility are key to success. Sisodiya et al. (2013) found a non-linear interaction with respect to flexibility, stating that a high capability to manage relationships and embrace an open innovation mind-set, increases financial performance regardless of high or low flexibility. Chesbrough and Brunswicker (2014) argue that with inbound open innovation the firm can gain external knowledge without offering financial payment for thoughts and assistances (nonpecuniary). Dahlander and Gann (2010) argue this occurs when firms access knowledge shared via donations or as an element of setting standards (Dahlander and Gann 2010).

4.4.2 Outbound Open Innovation

The second core process open innovation, the inside-out process (outbound), refers to outward technology transfers (Gassmann and Enkel, 2005). Chesbrough and Crowther (2006) argue that with this position, firms must shift from relying on purely internal paths to market, to firms seeking an external firm whose strategy and business model can commercialise the knowledge and innovation (Enkel et al., 2009). This can be achieved through technology and IP out-licensing, making sales, divesting and finding spin-offs

(Gassmann and Enkel, 2005). This utilisation is out with the firm's traditional boundary which provides accesses to markets that it does not compete in (Enkel et al., 2009), which therefore creates more income and revenue (Gassmann and Enkel, 2004; Lichtenthaler and Ernst, 2007). Enkel and Gassmann (2008) found that with the outbound open innovation process, firms have in-licensing but no out-licensing policies to externally commercialise innovation and technology. However, large multinational firms were found to distribute significant resources to having a functioning out-licensing strategy (Enkel et al., 2009). As such there is an increase in corporate venture activities (Vanhaverbecke et al., 2008), such as developing new business models (Chesbrough, 2007b), and commercialising across industries in new markets (Enkel and Gassmann, 2010).

4.4.3 Coupled Process (Inbound and outbound innovation)

The third core process of open innovation is the coupled process (combining inbound and outbound), which refers to working together with complementary partners or by participating in other companies (Gassmann and Enkel, 2005). The coupled process creates alliances and joint ventures and normalises an interconnected approach (Gassmann and Enkel, 2005; Chesbrough and Crowther, 2006). Inauen and Schenker-Wicki (2011) add that alliances can be minority investments, corporate venture capital investments, and joint ventures. The concept of interconnected, resonates for centralised and decentralised networks (Inauen and Schenker-Wicki, 2011). In centralised networks, partners are tied to a lead firm and decentralised networks, there are numerous equal partners and lend themselves to a modularising innovation situation.

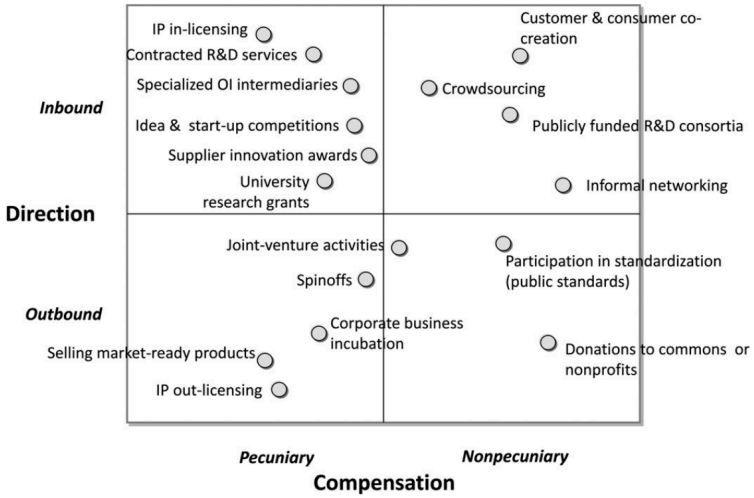
Chesbrough and Crowther (2006) argue that any act of inbound open innovation is an act of outbound open innovation for another firm. Bianchi et al.'s (2011) study recognised the importance of three inbound and outbound activities: licensing (in and out), non-equity alliances, and technical and scientific services. Enkel et al. (2009) found that the coupled process existed in firms of varying sizes and that firms used external partners who are not in competing market and technology leaders. As illustrative, partnerships with world class and local universities were common (Enkel et al., 2009). Colombo et al. (2014) found that within open source software community SMEs, the size of the community was a negative factor in comparison to the amount of open source software community projects.

Dahlander and Gann (2010) comment that firms from other industries are a crucial source of innovation as the repackaging of current knowledge, concepts, and technology leads to

innovation. These proven solutions can reduce risk and uncertainty (Dahlander and Gann (2010), which permits internal R&D to become more open (Chesbrough and Prencipe, 2008). Inauen and Schenker-Wicki, (2011) found that external openness can lead to a higher level of innovation functioning, adding that overly fixating on internal sources disadvantages the firm through unexploited opportunities. Early supplier incorporation is an influential management strategy for ensuring continuous improvement of the engineering process (Inauen and Schenker-Wicki, 2011). Du et al. (2014) observed the relationships concerning open innovation partnerships finding that the financial performance of R&D projects finding that when managed loosely science-based partners. Additionally, Du et al. (2014) found that R&D partnerships with market-based firms required formal management to perform.

Figure 16 demonstrates the varying modes of open innovation in terms of inbound and outbound and whether they are pecuniary or non-pecuniary. It is worthwhile noting that the number of modes available in the outbound process in less than the inbound process.

Figure 16: Modes of open innovation



Source: Adapted from: Chesbrough and Brunswicker (2013)

4.4.4 Emergent Research Gaps: Open Innovation

Research gaps exist in the practical application of open innovation (West et al., 2006; Gassmann, 2006). Research studies have repeatedly discovered that companies conduct more inbound than outbound activities (Chesbrough and Crowther, 2006; Bianchi et al., 2011; Cheng and Huizingh, 2010; Chiaroni et al., 2011). Chesbrough and Brunswicker (2014, pp. 19) state that:

> "Inbound open innovation practices are far more commonly used than outbound practices."

This is underpinned by Schroll and Mild (2011) who argue that the lack of outbound open innovation practices can be rationalised by inadequacies of the market or the firm. There is less known about open innovation with regards to traditional industries, such as manufacturing and the service industries (Chesbrough and Crowther, 2006; Laursen and Salter, 2006; Muscio, 2007; van de Vrande et al., 2009). Researchers have only recently considered how open innovation relates to government agencies and independent not-for-profit organisations (Chesbrough and DiMinin, 2014). Chesbrough and Bogers (2014) suggested that the business model foundation that underpins the definition of open innovation could be applied to public and not-for-profit organisations. These organisations are not necessarily commercially focused and may have a requirement to create and capture value to maintain their survival (West and Bogers, 2017).

The recurrent theme that innovation in services is under-researcher is exemplified by its focus on products (West and Bogers, 2017). Chesbrough (2010) concluded that open innovation differs in services as there is a greater opportunity for value creation by customising and personalising the offering. Additionally, Chesbrough (2010) viewed open innovation as both complimentary to products and services and integrate them. Chesbrough (2017, pp. 38) recently asserted that the future of open innovation will be a future that will be more extensive, more collaborative, and more engaged with a wider variety of participants.

4.5 Collaboration

The introductory sections on open innovation has highlighted the importance of fostering collaborative relationships with customers, suppliers and partners (Chesbrough, 2006). Democratisation of innovation was called for by Von Hippel (2005) who claimed that firms need to organise resources in with a multi stakeholder view. Enkel et al. (2009) add that the notion of co-creation is an important aspect of the open innovation literature. The open innovation paradigm is not just concerned with final output of collaborative efforts but portrays a complete innovation management strategy that intentionally searches and utilises internal and external opportunities (West and Gallagher, 2006). Holmes and Smart (2009) argue that collaborative activities designed to innovate are a distinct element of prominent economies. Holmes and Smart (2009) state that the use of more collaborative arrangements to conduct exchanges for the purposes of innovation is fast becoming one of the most

distinctive features of leading economies. Chesbrough and Schwartz (2007) add that partnerships allow open business models to be even more successful, co-development relationships are a key achievement mechanism. Depending on the context, to be successful firms needs to align business models with co-development partners and state the objects of the relationship (Chesbrough and Schwartz, 2007). Henkel (2006) argues that developing an open innovation process can spread beyond only considering market facilitated exchange. Without any initial contractual arrangement in obtaining technology firms can share with the public to progress collaboration, but without any contractual guarantees of obtaining it. Lee et al. (2010) affirm that terms such as strategic alliances, collaboration, co-operation, networking is used interchangeable and should be clearly defined.

At this stage of the thesis, it becomes essential to define the following terms: collaboration, co-creation, co-development, co-production and co-design. Although Payne et al. (2008) use the two terms interchangeably (co-creation and co-production), others have argued the conceptual importance of differentiating the terms (Etgar, 2008; Jacob and Rettinger; 2011; Vargo and Lusch, 2008; Canhoto et al., 2016). Vargo and Lusch (2004) initially stated that the customer is always a co-producer, and then subsequently amended this to the customer is always a co-creator (Vargo and Lusch, 2006). This appropriately highlights the distinction between the two terms. Canhoto et al. (2016) argue that the difference between co-creation and co-production is important. Value is seen to be entrenched and no longer passive in the co-creation process concerning the customer and the supplier (Grönroos (2000; Prahalad and Ramaswamy, 2000; Vargo and Lusch, 2004). Prahalad (2004) go further and state the importance of recognising value is entrenched in personalised experiences. Etgar (2008) suggests that co-creation is facilitated by the customer being invited by the firm at the consumption state. Moving to co-production, Etgar (2008) argues that it is a component of co-creation as it is concerned with customisation between customer and the supplier. Further Desouza et al. (2008) assert the importance of nurturing collaborative partnerships to produce innovation via co-development. Through deeper connection with the firm the co-development relationships will lead to service innovation (Desouza et al., 2008). Deck and Strom (2002) view co-development as having three levels: firstly, a strategy for development chain design; secondly process and governance structures that define how the partners will work together, and thirdly information technology that effectively supports collaborative development.

Table 21 Summarises the five terms and offers some of the pertinent definitions and citations.

Table 21: Defining Collaboration

Term	Definition(s)	Citation
Collaboration	Collaboration is where two or more people or organizations work together to realize or achieve something successfully.	Marinez-Moyano (2006)
	Various Internal and external various departments working collectively towards common goals	Kahn (1996)
	Collaboration in business can be found both inter- and intra-organization	Eisingerich and Bell (2008)
	Inter-organizational collaboration depicts relationship between two or several organizations in which the participating parties agree to invest resources, mutually achieve goals, share information, resources, rewards and responsibilities, as well as jointly make decisions and solve problems.	Chan and Prakash (2012)
Co-creation	Co-creation occurs when the customer takes the firm's value proposition and integrates it with his or her own resources to generate something, the value of which is subjectively determined by the beneficiary	Vargo and Lusch (2008)
Co-development	Is a relational approach emphasizing the early cooperation between the supplier and the buyer	Crespin-Mazet and Ghauri (2007)
	These partnerships embody a mutual working relationship between two or more parties aimed at creating and delivering a new product, technology or service.	Chesbrough and Schwartz (2007)
	as a process where the technology originator and customer users worked together to discover what a technology could do and how it should do it in a specific industry application.	Anderson and Crocca (1993)
	Where the customer takes a very active role as a team member in a joint development process, where their involvement starts at the earliest stages of the project. By contrast, most other participatory techniques are either highly involved but without being early, or early but without being highly involved.	Neale and Corkindale (1998)
	Supplier-customer co-development is taken to refer to any situation in which a supplier involves its customer(s) in the development of new products or services	(Coviello and Joseph, 2012; Fang, 2008; Fang et al., 2015)
Co-production	Co-production is the customer's involvement the supplier's production processes, not just the interaction in the consumption stage.	Grönroos (2008)
	Co-production involves the purposeful integration of operand and operant resources from the firm and the customer, to develop a value proposition, which can range from the co-conception of goods and service to their co-disposal.	Sheth and Uslay (2007)
	Customers participating in the performance of various activities within the production process and encompasses all cooperation formats between the customer and service provider.	Etgar (2008)
Co-design	"collective creativity as it is applied across the whole span of a design process"	Sanders and Stappers (2008)
	Creative cooperation during design processes—rather than on the co-creation, which also refers to	Steen et al. (2011)

	creative cooperation during service delivery and usage, for example, to interactions between customers and service provider at service touch points	

The decision to partner externally will have different implications for each of these (Chesbrough and Schwartz, 2007). Chesbrough and Schwartz (2007) consider that the firm must establish if the R&D capabilities are core, critical or contextual. Table 22 demonstrates the relationship between the firm's capability and nature of the co-development relationship.

Table 22: Core capabilities for R&D in co-development partnerships

	Core	Critical	Contextual
Capability Details	Key sources of a company's distinctive advantages and value added. They comprise the key assets to be leveraged in any co-dev deal.	Vital to the success of the complete product or service offering in the marketplace but are not core capabilities of the firm. These are the capabilities that lend themselves most easily to co-dev arrangements. expand the value proposition of its offerings to customers without the need for a commensurate increase in R&D investment.	Needed to complete the offering but provide little of the differentiation or value added for the business.
Partner Role	Vital: access in-house R&D or very select strategic partners	Important but not core to overall business (might be core to partner).	Necessary but not value adding: develop multiple sources of capability.
Number of partners	None or very few	Small number	Safety in numbers
Depth of Relationship	High	Medium	Low

Source: Adapted from Chesbrough and Schwartz (2007)

Therefore, firms can develop more robust business models if they honestly assess their own capabilities, and the context, and clarity of purpose of engaging in a co-development partnership (Chesbrough and Schwartz, 2007).

Whilst, table 23 highlights the varying objectives that firms have with regards to co-development and how the objective impacts upon co-development.

Table 23: Different business objectives of co-development

Objective	Business Requirement	Implications for co-development
Increase profitability	Lower Cost	Increase volume to spread fixed costs: partner for less critical components
Shorten time to the market	Incorporate already developed components or subsystems	Seek partners with proven capabilities
Enhance innovation capacity	Increase number and variety of front-end technologies	Create strategic relationship partners with universities and research labs
Create greater flexibility in R&D	Share risks with partners	Develop research partnerships in bottleneck areas
Expand Market Access	Broaden pathways to market for products and services	Leverage partners complementary R&D to tailor offering to new markets

Source: Adapted from Chesbrough and Schwartz (2007)

Fawcett et al. (2008) consider the effect and difficulty of collaboration with regards to and creativity in supply chain relationships. Fawcett et al. (2008) found that performance improvement depended on their ability to achieve high levels of supply chain collaboration, in particular the ability to rationalize, simplify and manage relationship are key. Bock et al. (2012) argue that partner reliance is an important attribute of developing formal collaborations. In ambiguous markets collaborations, via the ability to find to knowledge, potentially increases the accurateness management decision making (Combs, 1999) and suggesting alliances can improve strategic flexibility (Heimeriks, 2007; Lee and Park, 2008). Needing partners can increase the firm's likelihood of coordination costs and asset specificity (Bock et al., 2012). Bock et al. (2012) see business model innovation in ambiguous and unstable markets as a challenge for existing collaboration arrangements. Any business model innovation can potentially impinge upon the factors that facilitate successful collaboration, such as development of mutual value, transparency, trust (Nooteboom, 1996).

To conclude, the ability to partake in collaborative value creation via joint innovation, marketing alliances, with customers, and/or the supply chain (Lambe et al, 2002; Möller, 2013; Niesten and Jolink, 2015; Ritter and Gemünden, 2004) is fundamental to the ability to manage, incorporate and absorb learning from alliances has significant performance (Sluyts et al., 2011).

4.6 Chapter Conclusion

The purpose of this section is to succulently summarise the business model's literature review and draw out the central parts that build towards informing the conceptual framework presented at the end of Chapter four.

From reviewing the extant literature, firstly, it was established that business models are an area of research with scant literature by industrial marketing management (Coombes and Nicholson, 2013), but that the area is receiving renewed interest from researchers and practitioners (Chesbrough, 2007; Zott et al., 2011; Mason and Spring, 2011; Desyllas and Sako, 2013). Furthermore, it was discussed that value creation is a fundamental aspect of business models (Chesbrough, 2010; Chesbrough and Rosenbloom, 2002; Teece, 2010; Zott et al., 2011). For Zott and Amit (2007) a business model illuminates how a firm relates to external partners and how it undertakes exchange with them to create value for all. Business models therefore can be seen to bring innovation to the market (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010; Teece, 2010) by distributing resources (Björkdahl, 2009) and producing social and economic value (Dahan et al., 2010).

Four key important aspects of the business model's literature present in the conceptual framework discussed below.

Firstly, business models were presented as performative, plastic, and considered as spatio-temporal in their nature (Mason and Spring, 2011; Mason and Palo, 2012; Mason and Chakrabarti, 2017). As the conceptualisation of business models moves beyond simply describing the proposed value creation, it highlights the crucial role they play in value creation. Additionally, highlighting that they are performed through devices, and act as tools that carry messages and instructions. Doganova and Eyquem-Renault (2009) assert that business models essentially operate as calculative and narrative devices. Benson-Rea et al. (2013) highlight the plurality of co-existing business models within a single firm, forwarding this instead of developing one extremely complex business model that is difficult to maintain and communicate internally and externally. If business models create value, are performative and considered as spatio-temporal in their nature how do they interact with other attempts but actors to shape market practices.

Secondly, it was identified that business models themselves are devices that are subject to innovation (Mitchell and Coles, 2003). Business model innovation was viewed as making changes to the existing model (Amit and Zott, 2012), to replacing it all together (Khanagha et al., 2014). The role of alliance partners and customers was identified as important in business model innovation (Cortimiglia et al., 2016), with Amit and Zott (2001) seeing networks and alliances as central settings for business model innovation. Further, Bouchikhi and Kimberly (2003) and Chesbrough (2010) suggesting obstacles to business model innovation, include inertia from the existing arrangements of assets and processes.

The importance of this literature is considering how business model innovation effects the market shaping practices of actors.

Thirdly, open innovation was examined as a shift from a closed to an open model for innovation (Chesbrough, 2003a; Chesbrough and Crowther, 2006). Whereby firms look outside their boundaries to leverage internal and external sources of ideas (Chesbrough, 2003a; Laursen and Salter, 2006a), with the view that a single firm cannot innovate in seclusion (Dahlander and Gann, 2010). As such a key element of the open innovation paradigm was identified in its relationship with the use of internal and external knowledge, which includes the actors and channels such as a firm's customers, competitors, academic institutions and unrelated industries (Tether, 2002; Coombs et al., 2003; Howells et al., 2003; Acha and Cusmano, 2005; West and Gallagher, 2006). Further, the three core processes of open innovation in R&D management (Gassmann and Enkel, 2005) were introduced. The core processes were identified as: outside-in process (Inbound), so-called inside-out (Outbound) and coupled (merging Inbound and Outbound). From the literature, it was shown that this was further divided into inbound and outbound innovation, to interactions that are pecuniary versus non-pecuniary and proposed the four different categories (Gassmann and Enkel, 2005). It was also highlighted that inbound innovation was more commonly studied (Schroll and Mild, 2011; Chesbrough and Brunswicker, 2014). Additionally, gaps were illuminated in the breadth and depth of open innovation research with regards to firm type such as manufacturing and service industries (Chesbrough and Crowther, 2006; Laursen and Salter, 2006; Muscio, 2007; van de Vrande et al., 2009), with government agencies and independent not-for-profit organisations (Chesbrough and Bogers, 2014; Chesbrough and DiMinin, 2014). Finally, service was identified as a key gap in open innovation research (Chesbrough, 2010; Gassmann et al., 2010; West and Bogers, 2017). The open innovation literature is important to the conceptual framework with regards to considering how actors market shaping activities are augmented by moving towards an open approach.

Lastly, this chapter examined the literature surrounding collaboration, recognising how collaboration is interwoven with business models, business model innovation and open innovation. It was established that with regards to open innovation of collaborative efforts were not just part of the final output (West and Gallagher, 2006). Chesbrough and Schwartz (2007) partnerships allowed open business models to be even more successful, showing that co-development relationships are a key mechanism for this achievement. Holmes and Smart (2009) state that the use of more collaborative arrangements to conduct

exchanges for the purposes of innovation is fast becoming one of the most distinctive features of leading economies. The key terms of collaboration, co-creation, co-development, co-production and co-design were outlined, and the nuances explored (Etgar, 2008; Jacob and Rettinger; 2011; Vargo and Lusch, 2008; Canhoto et al., 2016). The literature highlighted that the decision to partner externally will have different implications for each of these processes (Chesbrough and Schwartz, 2007). In addition, Chesbrough and Schwartz (2007) consider that the firm must establish if the R&D capabilities are core, critical or contextual when selection collaborative relationships. Finally, collaborative value creation was viewed as a fundamental skill for firms to manage, incorporate and absorb learning from alliances with significant effects performance (Sluyts et al., 2011). Considering the importance of collaboration with regards to the business models' literature is important in the development of the conceptual framework as the business model chosen a firm may require differing amounts of collaboration to create the required value.

4.7 Connecting the three literature streams and the conceptual framework

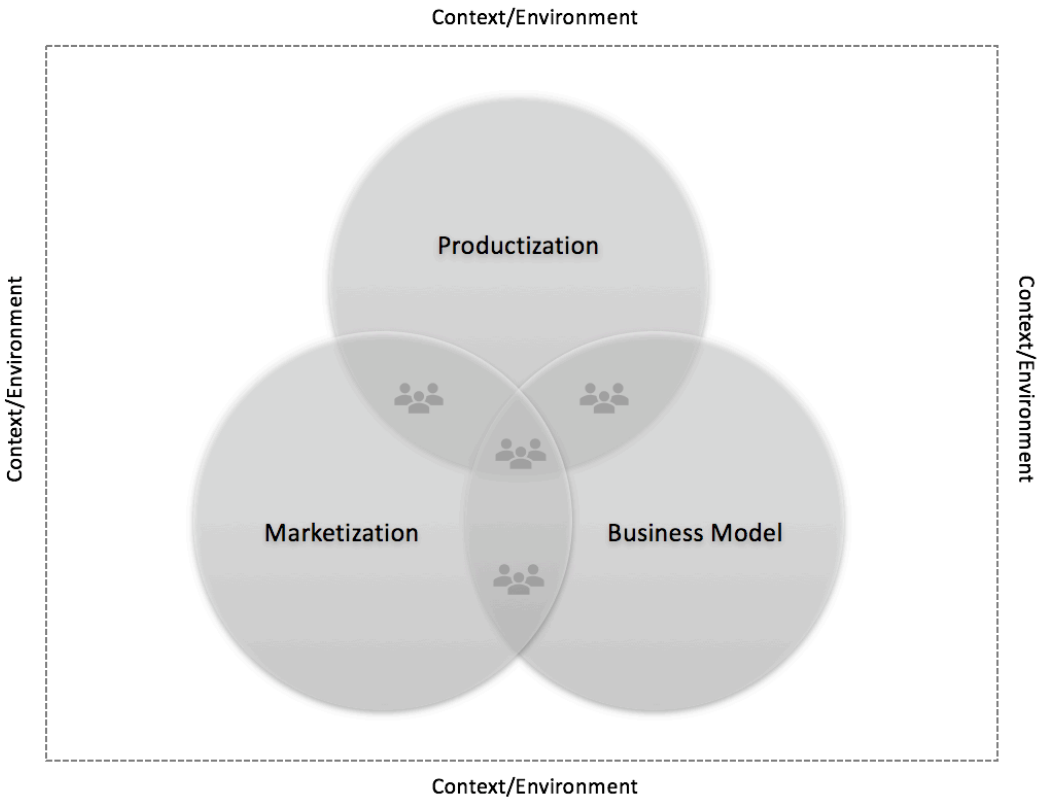
The purpose of the three literature chapters was to critically evaluate the existing literature from each stream. This section draws together the three chapters and demonstrates how the three main areas, productization, marketization and Business Models are connection. The matrix in table 24, below begins to draw together the three literature streams to demonstrate the relevance and importance of each stream. By displaying each stream in this manner, it is shown that there is a connectedness between them all. The success of one theme requires the presence of the other two with no being particularly dominant over the other.

Table 24: Connection Matrix of Literature Chapters

Connection Matrix of Literature Chapters			
	Productization	**Marketization/ Market Studies**	**Business Models**
Productization		Stabilises and Allows Exchange. Needs market objects, marketing objects, market devices and performativity to mould markets.	Requires an open mindset to enrage with external partners. Collaboration would be difficult to achieve without.
Marketization/ Market Studies	Outbound Productization needs market actors to communicate and determine materiality of service and product. Recognises markets create the social.		How the firm is allowed to organise to create value. Determines what value they are trying to achieve. Elements of the market conditions can be dictated.
Business Models	Must allow for full value to be captured to demonstrate success. Business model innovation effects ability to productize. Helps identify knowledge & expertise needs to create value.	Business Models effected by the environment. Must operate within agreed rules. Can demand more than one model. Calculative and narrative devices that actors shape.	

Figure 17 displays the conceptual framework that was proposed as an analytical tool required to provide an overall picture of the conceptual distinctions and organize ideas drawn from the literature review chapters. Presented as overlapping circles to show the parity between the three themes. The four overlapping spaces, signified by the icons at the centre of each, represents where significant collaboration and innovation takes places. In the conceptual framework Productization, Marketization and Business Models are bound by the context and environment of the firm.

Figure 17: Conceptual Framework



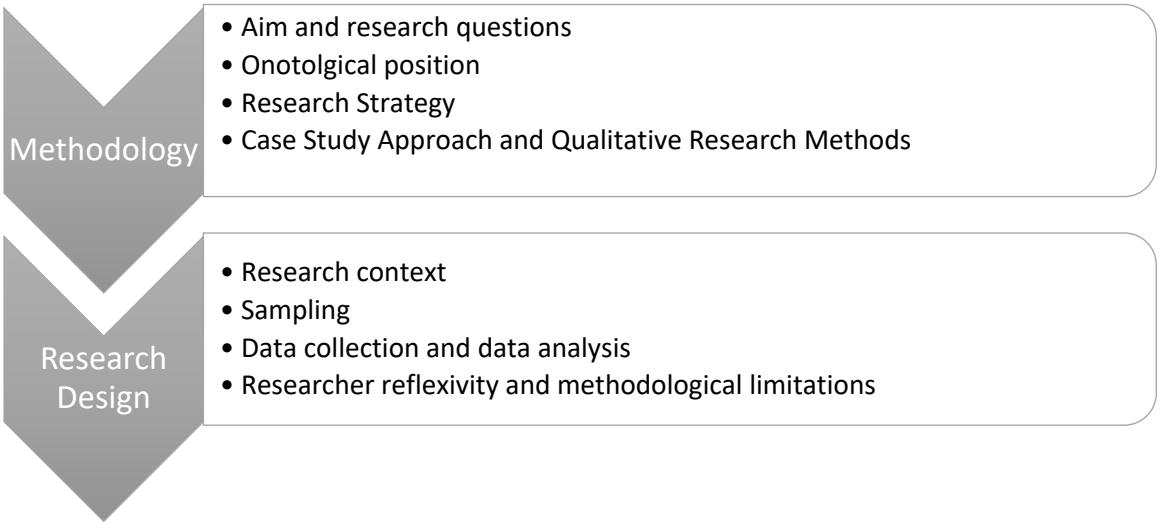
The novel connection between these three themes helps to justify the exploratory and qualitative research design employed to answer the research aim and objectives set. The subsequent chapter, chapter five, outlines the methodology used to conduct the empirical research.

Chapter 5 Methodology

5.0 Introduction

This chapter discusses the research methodology employed in this study. It begins by firstly considering the ontological positioning, reasoning and the overall research design, including the methods selected. This chapter highlights the methodology utilised to ensure that the research produced is reliable and robust. It also acknowledges how the data has been collected and analysed and highlights the rationale for the methodological decisions taken. Based on the aim and research questions emanating from the literature review chapters, this chapter establishes the research as positioned within the pragmatist paradigm and utilises a case study approach with a multi-method qualitative design, with triangulation of methods including observations, document analysis and depth interviews. The two phases of the data collection are outlined. The research design also considers the access to the case context, the associated ethical issues with this specific case study, and details how risks were appropriately mitigated. The chapter concludes with a consideration of the limitations. Figure 18 provides an overview of the chapter.

Figure 18: Chapter Five Overview



5.1 Research Aim and Questions

The critical insights identified in the three literature review chapters form the foundation of the research strategy, as such it is important to reiterate the aim and questions underpinning the research. The aim of this thesis is to examine how the productization of services is organised as a way of facilitating collaboration and arranging innovation. With specific research questions probing:

1. How is productization mobilised and exchanged by market actors?
2. What effect does marketization have on market shaping practices?
3. How does a firm's business model facilitate its ability to organise and capture value?

5.2 Ontological position

O'Gorman and MacIntosh (2015, pp. 55) state that the first stage in formulating a research design is to articulate clearly the ontological positioning. As such, stating the ontological position is to articulate whether you see the world as objective or subjective. It also defines the basic assumptions that they make about the nature of both reality and knowledge (Guba and Lincoln, 1998; Fleetwood, 2005). Ontology is divided into the objective perspective and the subjective perspective. O'Gorman and MacIntosh (2015, pp. 56) state that the objective perspective:

> "…might be thought of as looking at reality as made up of solid objects that can be measured and tested, and in which exist even when we are not directly perceiving or experiencing them."

Whilst Saunders et al. (2009, p. 110) add that objectivism portrays the position that social entities exist in reality, and as external to social actors concerned with their existence. O'Gorman and MacIntosh (2015, pp. 56) further add that subjective perspective looks at reality as made up of the perceptions and interactions with living subjects. From Bryman and Bell's (2015, pp. 29) perspective objectivism:

> "…is an ontological position that asserts that social phenomena and their meanings have an existence that is independent of social actors"

Table 25 highlights the research assumptions of Positivism, Interpretivism and Pragmatism by demonstrating the underlying ontology, epistemology, theoretical perspective and axiology.

Table 25: Research assumptions of Positivism, Interpretivism and Pragmatism

Paradigm	Ontology (What is reality?)	Epistemology (How can I know reality?)	Theoretical Perspective (What approach do you take to know something?)	Axiology (Role of values)
Positivism	There is a single reality or truth.	Reality can be measured. Focus is on reliable and valid tools to obtain that.	Positivism and Post-positivism	Value free and unbiased
Interpretive	There is no single reality or truth. Realty is created by individuals in groups.	Reality needs to be interpreted. It is used to discover the underlying meaning of events and activities.	Interpretivism (Phenomenology, Symbolic interactionism, Hermeneutics).	Value-laden and Biased
Pragmatism	Reality is constantly regenerated, debated, interpreted considering its usefulness in new unpredictable situations.	Best method is one that solves problems. Finding out is the means, change is the underlying aim.	Deweyan Pragmatism. Research through design.	Goal Orientated

Source: Adapted from O'Gorman and MacIntosh (2015, pp. 70)

5.2.1 Axiology

O'Gorman and MacIntosh (2015, pp. 69) state that axiology is the philosophical study of value, often seen as the collective terms for ethics and aesthetics, the two branches of philosophy that depend on notions of value. Within axiology the researcher's own values play a pivotal role in what type of research process is chosen if they wish to have credible results, Heron (1996) argues that "our own values are the guiding reason of all human action."

5.3 Research Philosophy Epistemological Position

Epistemology can be considered as the study of the criteria by which the researcher classifies what does and does not constitute the knowledge (Hallebone and Priest, 2009). It is concerned with the way in which we obtain valid knowledge (O'Gorman and MacIntosh, 2015, pp. 58). Therefore, it becomes instructive to initially consider the epistemological approach to the research as the epistemology can be considered the division of philosophy which:

> "…studies the nature of knowledge and also what constitutes acceptable knowledge in a particular field of study." (Saunders et al., 2007, p. 597).

The key term associated with such a perspective for informing the research is objectivity, in terms of both the outlook upon the social world, and the analysis provided by the researcher (Chisnall, 2001).

5.3.1 Positivism

Within the positivist paradigm the purpose of science is to develop scientific law, which means the starting point is the observation of a certain set of objects that are examined for predictabilities (Smith, 1998). Positivism is rooted within the realist ontology and has its philosophical basis in the physical sciences (Bryman and Bell, 2003), whereby phenomena are measurable. Within the positivist paradigm, data sets are often large, which allows for generalisations to be made (Saunders et al., 2007). As a research philosophy, positivism is concerned with factual knowledge gained through observation that can be measured (Bryman and Bell, 2003). The positivist view is that there is one reality (Denscombe, 2010). Positivism is contingent on quantifiable observations that can be statistically analysed (Bryman and Bell, 2003). Collins (2010, pp. 38) states that positivism is:

> "…as a philosophy, positivism is in accordance with the empiricist view that knowledge stems from human experience. It has an atomistic, ontological view of the world as comprising discrete, observable elements and events that interact in an observable, determined and regular manner."

In positivist studies the role of the researcher is restricted to data collection and analysis through an objective approach and the research findings are usually observable, quantifiable and repeatable (Stake, 1995). The researcher in positivist studies is strictly limited to data collection and interpretation of the research findings (Saunders et al., 2007). For positivists, the researcher can be considered as independent from the study. Wilson (2010) clarifies that independent means that the researcher maintains minimal interaction with the research participants whilst carrying out the research. Positivists believe that behaviour is caused by influences outside the individual (Brewer, 2000). As Crowther and Lancaster (2008) inform positivist studies usually adopt a deductive approach.

The criticisms of positivism often tend to be the advantages of Interpretivism and vice versa. Kuhn (1951) argues that the dominance and acceptance of one paradigm in science limits the questions asked and the result achieved. Crotty (2003) finds that a key criticism of positivism is the assertion of certainty in its findings. Gay et al. (2009) submit that you cannot apprehend the full depth of individuals and environments through a positivist approach. Popper (1959) argued that lacking historical perspective or context means that

findings cannot be assumed to be repeatable. Additionally, Quine (1951) considers that experience must be interpreted prior to describing or classifying it. Crotty (1998, pp. 29) states:

> "articulating scientific knowledge is one thing; claiming that scientific knowledge is utterly objective and that only scientific knowledge is valid, certain and accurate is another."

The main criticism of positivism is its failure to distinguish between the natural and social worlds (Marsh and Stoker, 2002). In so far as social structures are not autonomously shaped, they do not occur free of agents and are moulded by the actions of agents, thus alter depending on location and time (Marsh and Stoker, 2002). Simply people are social products (Wotherspoon, 1998) and a key critique of positivist research is to how to adequately account for this contextualisation and complexity.

5.3.2 Interpretivism

In contrast to the reductive outlook of positivism, Interpretivism seeks value through an analysis of the totality of social phenomenon (Denscombe, 2003). As a research philosophy, it seeks to engage with the meanings people find in the social world and attempts to interpret these meanings from individual's viewpoints (Saunders et al., 2012), whereby the researcher is seeking opinions and diverse points of view (Denzin and Lincoln, 2008). For interpretivists, the research aims to comprehend, not forecast behaviours (Easterby-Smith et al., 2002). Interpretivism was developed in opposition to positivism and the key term that emerges in opposition becomes subjectivity (Bryman and Bell, 2003; Saunders et al., 2007). Interpretivism also acknowledges that scientific knowledge has boundaries and limitations (Saunders et al., 2012).

Interpretivists recognise the social world is constructed by subjective people and develops into an essential aspect of the research being undertaken (Saunders et al., 2007). Myers (2008, pp. 39) states that:

> "Interpretive researchers assume that access to reality (given or socially constructed) is only through social constructions such as language, consciousness, shared meanings, and instruments"

In the interpretivist approach, it is central that the researcher, as a social actor, realises and attempts to understand differences between people within their methodological decisions

(Bryman and Bell, 2015). Interpretivists believe that several realities exist, and that reality is a mental construct that is created by individual and social views, where people dynamically fashion their own environments (Brewer, 2000). Interpretivists therefore suggest that society is a shifting entity that is created by people themselves (Brewer, 2000).

The interpretivist approach is criticised with regards to the ability to identify right or wrong (Feyerabend, 1975), this stems from concerns surrounding what it claims to capture, or represent (Bryman and Bell, 2015). Additionally, the interpretivist characteristic of subjectivity, underpins the likelihood there is a tendency of contradictory and inconsistent explanations (Saunders et al., 2012). The belief that Interpretivism can provide deeper and more meaningful insights than scientific data has also been critiqued (Burrell and Morgan, 2017).

5.3.3 Pragmatism

Pragmatism is seen as a central position and viewed as the alternative to positivism and interpretivism, with Chakrabarti and Mason (2015) adding that pragmatism seeks not to divide the researcher by philosophical stance but appease them, as pragmatism holds connections with both methodologies. As a research philosophy pragmatism stems from the work of American philosophers (James 1907; Dewey, 1922). Pragmatism has been utilised in organisation studies, management, political science economics, sociology and cognitive sciences (Ansell 2011, Cohen 2007, Elkjaer and Simpson 2011, Evans 2010, Hodgson and Knudsen 2010, Winter 2013). Farjoun et al. (2015) explain that the term pragmatism originates from the Greek word pragma, which means action and where we develop the words practice and practical. A consideration of usefulness in context, is a key aspect of pragmatism (Easton, 2010), with Davies (2015) adding that knowledge must be active and used for a purpose. Pragmatism also includes standard behavioural judgments and aims, as it occurs based on mental dispositions and categories that are developed in interaction with the physical, and especially the social environment (Nooteboom, 2012). Saunders et al. (2007, pp. 36) state that pragmatist researchers:

> "recognise that there are many different ways of interpreting the world and undertaking research, that no single point of view can ever give the entire picture and that there may be multiple realities."

Collis and Hussey (2014, pp. 54) add to this by stating that researchers should adapt and move philosophical conventions over time. Pragmatists use whatever combination of

methods necessary to find answers to research questions (Nooteboom, 2012). Welford and Prescott (1994) argue this is embodied in business, as the firms making decisions are continually calculating concerning variables. Farjoun et al. (2015) also suggests this demonstrates a pragmatic level of 'plasticity' to make things happen. Therefore, pragmatism accepts theories to be important if they encouragement action (Simpson and Lorino, 2016).

In terms of connecting theory to data, a pragmatist approach relies on a form of abductive reasoning, which shifts between inductive and deductive approaches (Coffey and Atkinson, 1996). Peirce (1903) referred to pragmatism as the logic of abduction, a concise statement expressing a general truth or rule or hypotheses. Chakrabarti and Mason (2015) state that with regards to data collection and analytical techniques, pragmatism asks what methods will achieve the best results in relation to the aims of the research. Therefore, Johnson (2006) asserts that pragmatism is uniformly concerned with answering empirical and conceptual issues as part of the research process. Farjoun et al. (2015) argues that pragmatism views knowledge, habit, practice, action, and reflexivity as entrenched within problem solving.

Peirce (1878) foundationally argued that the principle of belief(s) is found in the formation of habit(s), Dewey (1922) sees habits as a learnt tendency of how to respond, and are habits of acting, not demonstrations of reality (Mautner, 2005), as such beliefs are embodied by putting theory into practice (James, 1907). Peirce (1901, pp 221) stated:

> "There would be no logic in imposing rules, and saying that they ought to be followed, until it is made out that the purpose of hypothesis requires them."

Table 26. highlights the relationship between pragmatism and rational actors and structural models. It further illuminates that pragmatism embraces and aims for a multifaceted but truthful view to individuals and institutions (Farjoun et al., 2015).

Table 26: Pragmatism between Rational Actors and Structural Models

Actors and Structural Models	Pragmatism
Agency and structure	Agency and structure are mutually constituent and interpenetrating, and they coexist at multiple levels
Model of human nature	Balanced interplay of emotion, habit, and deliberation; follow and challenge rules Stress on learning and sense making Related but different from "bounded" rationality; behaviourally plausible
Relations between levels of analysis	Recursive; macro and micro interrelated
Institutions and social structures; identity, culture, categories	Constraining but also enabling and generating change and innovation
Institutional persistence	Effortful, requires explanation
Institutionalization	Based on accumulated learning and can lead to uniqueness and strategic advantage
Institutional and organizational change	Endogenous, dialectic, and layered change Continuous renewal
Change and stability	Change and stability interlinked (duality)
Organizational adaptability/inertia	Can accommodate both inertia and "intelligent" adaptation
View of environment	Enacted and discovered through action Coevolving with organizations

Source: Adapted from Farjoun et al. (2015)

Robbins (1999) criticises Pragmatism for its dismissive thoughts and lack or credit regarding successful scientific theories, due to pragmatism not preferring either scientific theories and religious doctrines. For Robbins (1999) both are believed to be useful even if false representations of the world.

Chakrabarti and Mason (2015) argue that pragmatism has been well adopted by researchers in the marketing field. With regards to the field of Market Studies as highlighted in chapter three, in considering methodological perspectives, Overdevest (2011) highlights the accessibility of pragmatism as it is concerned with practices, actions, and the results of both, with context being crucial to understanding them. Simpson (2010) extends this by suggesting pragmatism can understand practice by combining habitual and creative aspects of practice. Additionally, through the lens of Market Studies Çalışkan and Callon (2009, pp 387) view that pragmatism offers:

> "…the conditions of complexity and mobility in the relations between things, people and their contexts', and in particular the 'attentiveness to things and materialities."

Pragmatism can also be traced to studies of performativity (Callon, 2006; Mackenzie, 2004; 2006; MacKenzie and Millo, 2003; Mackenzie et al., 2007; Azimont and Araujo, 2010). With Overdevest (2011, pp. 536) arguing that pragmatism and performativity can:

> "…produce real effects in the world that rebound on us to reveal success of failure."

This extract highlights the effective relationship between pragmatism and Market Studies, as pragmatism seeks to find workable solutions. From the literature in chapter three, practices are considered as being performed, remembered and repeated, but adapted when required (Orlikowski, 2002; 2007), again aligning with the pragmatist approach of doing what is necessary to meet the aims of the research (Nooteboom, 2012).

For Goldkuhl (2004) pragmatism uncovers the relationship between practice and objects. Whilst Brennan (2006) argues that pragmatists see knowledge developed from objects, and as knowledge develops so does the use of objects. Benton and Craib (2001, pp. 87) states:

> "…people act on the basis of the meaning that objects have for them; these meanings are developed through social interaction and modified through interpretive processes employed in further interaction."

From a Market Studies perspective as pertinent to this thesis, Finch and Geiger (2010; 2011) have researched the use of marketing objects. A pragmatist approach allows for the interrelations and interactions surrounding the conceptualisation and mobilisation of the marketing object to be explored.

As it is illustrated in table 27. below, unlike positivism and interpretivism as research philosophies, pragmatism as a research philosophy can integrate more than one research approach and research strategy within the same study.

Table 27: Summary of Positivism, Interpretivism and Pragmatism

Positivism	Interpretivism	Pragmatism
Determination	Understanding	Consequences of actions
Reductionism	Multiple participant meanings	Problem Centred
Empirical observations and measurement	Social and historical construction	Pluralistic
Theory Verification	Theory Generation	Real-world practice orientated
Deductive	Inductive	Deductive and Inductive (Abductive)
Quantitative	Qualitative	Quantitative and/or Qualitative
Highly structured, large samples. Measurement, quantitative, but can use qualitative.	Small samples, in-depth investigations, qualitative.	Mixed or multiple method designs, quantitative and/or qualitative.

Source: Adapted from Saunders et al. (2012) and Simpson and Lorino (2016)

Further, Easton (2010) argues that pragmatism offers a commanding rationalisation for adopting a case study approach as it would enable studying the phenomena in depth. Easton (2010) asserts that a single case study of an organisation would be effective with pragmatism. Farjoun et al. (2015) extends that pragmatism excels when utilised to examine another theory, and when there is a strain concerning agency, structure and experience.

In consideration of the above and in line with the established research aim, this research study employs the philosophical traditions of pragmatism.

5.4 Research Strategy

The research strategy provides the overall direction of the research including the process by which the research is conducted. Deductive, Inductive and Abductive reasoning are considered the main ways of collecting data and are discussed below. This study adopts abductive reasoning to meet the needs of the research aim and question underpinning this thesis.

5.4.1 Deductive Reasoning

Deductive reasoning is where arguments based on laws, rules and accepted principles are generally used (Zikmund, 2003). Deductive theory commences with a hypothesis and inspects the potential to reach a precise and sound conclusion (Zikmund, 2003). Babbie (2010) clarifies that deductive reasoning begins with the anticipated outcome. Wilson (2010, pp. 7) add that the research design then considers how it can test the hypothesis. Whilst Gulati (2009, pp. 42) argues that deductive reasoning considers:

> "If a causal relationship or link seems to be implied by a particular theory or case example, it might be true in many cases. A deductive design might test to see if this relationship or link did obtain on more general circumstances"

To add to this, Bryman and Bell (2002) state that with deductive reasoning, it is feasible to find a logical conclusion even if the generalisation is not accurate. They take the position that the conclusion may be logical even if the generalisation is not. Critically absences exist with respect to the transparency that deductive reasoning offers, with regards to how theories are tested and formulated (Saunders et al., 2007).

5.4.2 Inductive Reasoning

Inductive reasoning is the opposing method of data collection to deductive reasoning (Saunders et al., 2007; Bryman and Bell, 2015). Inductive theory commences with observations (Zikmund, 2003) and seeks to find a pattern within them (Babbie, 2010). Inductive reasoning principally involves moving from the definite to the general (Zikmund, 2003). Copi et al. (2007) argues that in comparison to deductive reasoning, the truthfulness of the conclusion must be plausible centred on the data provided. Goddard and Melville (2004) add that an inductive approach ensures that theories are put forward near the end of the research, and the theories are a result of observation(s). Bernard (2011, pp. 7) states that inductive reasoning:

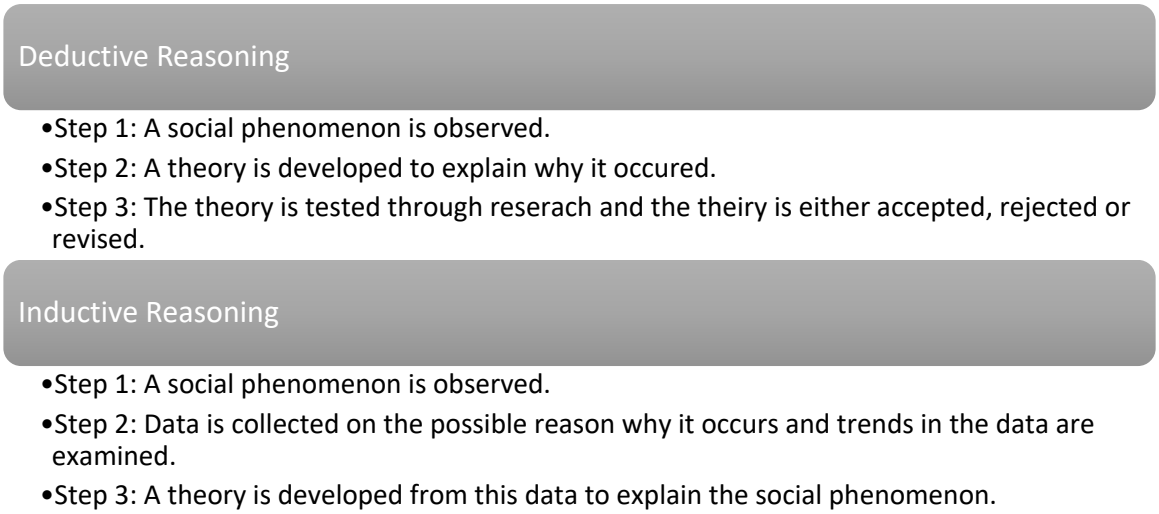
> "involves the search for pattern from observation and the development of explanations – theories – for those patterns through series of hypotheses"

An inductive approach still utilises present concepts to develop the research questions, but the researcher is able to modify the bearing of the research procedure (Saunders et al., 2012). Popper and Miller (1983) submit that despite inductive reasoning's substantial achievements, the way it is applied in research practice can be problematic. Which is exemplified by Saunders et al. (2007, pp 27) stating:

> "no amount of empirical data will necessarily enable theory-building."

Figure 19 highlights the differing approaches of deductive and inductive reasoning.

Figure 19: Deductive and inductive reasoning strategy



Source: Adapted from Bryman and Bell (2003)

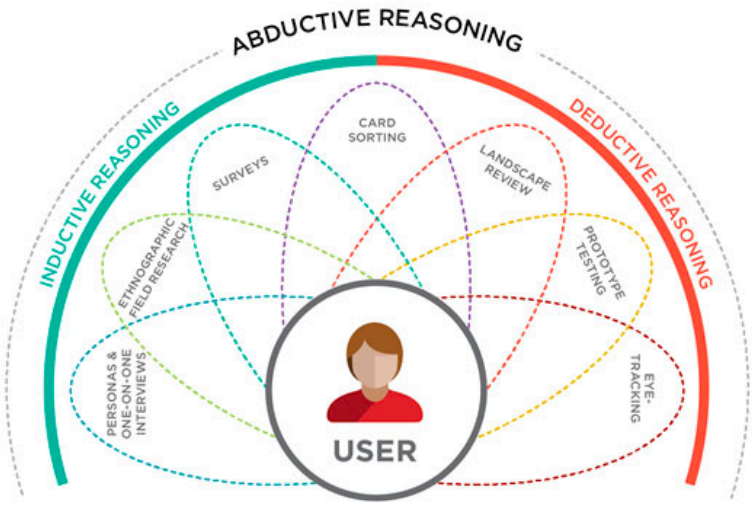
With regards to the application of deductive and inductive approaches, researcher bias can also distort the proper application of inductive argument (Bryman and Bell, 2003).

5.4.3 Abductive Reasoning

Stemming from the debate surrounding deductive and inductive reasoning, abductive reasoning was offered as a solution to bridge the criticism of both and merge the advantages. Abductive reasoning, as illustrated in figure 20, is viewed as an overarching data collection approach that spans inductive and deductive reasoning. Mantere and Ketokivi's (2013, pp. 72) state that:

> "…we predict, confirm, and disconfirm through deduction, generalize through induction, and theorize through abduction."

Figure 20: Abductive reasoning spanning inductive and deductive reasoning



Source: Adapted from (Saunders et al. 2007; Bryman and Bell, 2015)

In Peirce's (1931) seminal work, he revealed that the term abduction derives from a translation error and was called 'retroduction'. Abductive reasoning is developed from the American philosophical logic offered by Peirce (1905) that relates to the pragmatist perspective. Abduction is therefore concerned with examining the relationship concerning everyday language and concepts (Peirce, 1931; Kirkeby, 1994). Bryman and Bell (2015, pp. 27) state that abduction is prevalent within business research, it is utilised to make logical inferences and construct theories about the world. Abductive reasoning is effectively considered as thoughts or reasons, places or steps, moving from premises to conclusions. Bryman and Bell (2015, pp. 27) state:

> "Abduction starts with a surprise or puzzle then seeks to explain it. Puzzles arise when researchers encounter empirical phenomena which existing theory cannot account for. Abductive reasoning seeks to identify the conditions that would make the phenomena less puzzling."

Further, Dubois and Gadde (2002) state that an abductive approach is rewarding if the researcher is seeking to uncover new things, additional variables and further relationships. As abduction turns unanticipated facts into matter of course (Mantere and Ketokivi, 2013). This requires backwards and forwards process's and commitment with the social world as an empirical source of theoretical ideas, and with the literature, (Atkinson et al, 2003; Dubois and Gadde, 2002; Schwartz-Shea and Yanow, 2013), fluctuating between inductive and deductive reasoning (Coffey and Atkinson, 1996). The result of this backwards and

forwards motion is ‘a string picture’ of the setting, achieved by positioning a systematic merging of induction and deduction (Dubois and Gadde, 2002).

Abductive reasoning engages the researcher in choosing the sound rationalisation from contending explanations or understandings of the data (Mantere and Ketokivi, 2013). Alvesson and Karreman (2007) see this as significant in permitting the researcher to stay open to the likelihood of being surprised by the data, instead of using data to underpin their misconception (s) (otherwise known or unknown).

Table 28 portrays a summary of inductive, deductive and abductive reasoning.

Table 28: Summary of Inductive, Deductive and Abductive reasoning

Inductive	Deductive	Abductive
Reasoning from specifics to general conclusion about all of them.	Reasoning from a general warrant and reason to specific firm.	Reasoning to best prediction. Is problem driven and provides a tentative solution

Source: Bryman and Bell (2003)

With regards to the use of abduction in industrial marketing management, abductive approaches are common within the established field of study (Dubois and Gadde, 2002; Dubois and Gilbert, 2010; Järvensivu and Törnroos, 2010; Nordin et al., 2013; Brodie et al., 2017). Brodie et al. (2017) argue that abduction facilitates innovative and important theoretical understanding. Brodie et al. (2017) further add that building theory in the real world, with a manager, increases the likelihood or true theories being discovered and creating practical value.

To reiterate based on the aims and research questions, the researcher will adopt an abductive reasoning approach for this thesis.

5.5 Case Study Approach

Yin (2014, pp. 2) states that conducting case study research would be preferable when: the main research questions are ‘how’ and ‘why’ questions, and if the researcher has little or no control over behavioural events, and the focus of the study is contemporary (as opposed to an entirely historical) phenomenon. Yin (2011, pp 4) states:

> “Compared with other research methods, case study research contributes to ‘examining the context and other complex conditions related to the case(s) being studied, which are integral to understanding the case(s).”

Arnould et al. (2006) have argued that the role of context and its implications for theorising has been under-considered by researchers. Welch et al. (2011) believe that the true value of the case study approach is in the context. Case study thinking has moved beyond the traditional perceptive of viewing them as a linear process (Yin, 1989; 2014), whereby Dubois and Gadde (2002, pp 556) viewing them as:

> "a nonlinear path-dependent process of combining efforts with the ultimate objective of matching theory and reality."

Therefore, a case study can focus on describing processes, individual or group behaviour in its total setting, and/or the sequence of events in which the behaviour occurs (Stake, 2005). Additionally, Eisenhardt's (1989) widely cited work adds to this by stating that an overlap concerning data collection, and analysis permits the researcher to explore and examine novel themes that may have been extrapolated from the initial data collection. Easton (2010) further explores that case study research permits the researcher the ability to draw out and unravel complex factors and relationships (although these may be in one or a small number of occurrences). Verschuren (2003) views this as an iterative and non-linear process, as the researcher continually moves back and forth between the diverse stages of the case.

The flexibility that case research allows in this respect is one of its major advantages and one that is not shared by, for example, survey-based methods. Case research can therefore be defined as a research method that involves investigating one, or a small number of social entities, or situations about which data are collected using multiple sources and developing a holistic description through an iterative research process. Case studies can be used to achieve certain aims via exploratory, descriptive and explanatory cases (Yin, 1989).

The case study undertaking begins with a thorough literature review (Dubois and Gibbert, 2010; Gibbert et al., 2008; Yin, 2014). Dubois and Araujo (2007) add to this by stating that deciding what is a case is guided by theoretical aims and criteria. Table 29. below highlight the relevant situational considerations for different research methods.

Table 29: Relevant situations for different research methods

Method	Form of research question	Require control of behavioural events?	Focuses on contemporary events?
Experiment	How, why?	Yes	Yes
Survey	Who, what, where, how many, how much	No	Yes
Archival Analysis	Who, what, where, how many, how much	No	Yes/No
History	How, why?	No	No
Case Study	How, why?	No	Yes

Source: adapted from Yin (2014, pp. 9)

Schramm (1971, pp. 5) argues that a case study tries to illuminate a decision(s), from this Yin (2014) highlights that cases of decision(s) as the major focus of case studies, other common cases include: individuals, organisations, processes, programs, neighbourhoods, institutions and events. Easton (1995, p. 475) affirms that case studies offer depth and extensiveness for understanding the specific phenomenon. The case study enables researchers the ability to intimate with the studied objects which provides inductive and rich description. The case study research approach is successful when little is known about the phenomenon, and in situations where current theories seem inadequate (Easton, 1995; Eisenhardt, 1989; Yin, 1989). Halinen and Törnroos (2005) note that case studies respect context and processes in the same real-world settings, and therefore can be used to study change processes. Dubois and Gadde (2002) argue that a single case can aim to develop theory and to do so the approach must be systematic and grounded in an abductive logic.

The advantage of the case study approach is that it permits the researcher to focus on the setting and provides the ability to collect several versions of data collection and analysis. In addition, data collected can be both qualitative and quantitative. The combination of methods helps the case study demonstrate validity through triangulation (Denzin, 1970; Yin, 1994). This can be achieved by an assortment of means such as: document analysis, archival data, interviews and observations. Dubois and Gadde (2002, pp. 55) recognise that the case study approach has an ability to provide deep insights of empirical phenomena and their contextualisation. Adopting a case study method permits the researcher to get access over a period of time required to conduct the study successfully and increase its richness (Easton, 2010).

The case study method can also be utilised to build theory (Yin, 2009) and to test theory (Eisenhardt, 1989). Van Maanen et al., (2007, p. 1146) states that method can generate and shape theory, just as theory can generate and shape method. Eisenhardt (1989) views

replication as a key component of building theory from case studies and is critical of descriptive case studies and prefers to focus on means of testing theory.

Ragin (1992, p. 217) uses the word 'case' to refer to serval categories such as: data, theoretical, historically specific and substantive. Ragin (1992) sees developing a case (casing) as it can provide operational conclusions to challenging relationships between ideas and evidence, between theory and data. Bromley (1986) views case selection as the ability to develop a deep and detailed consideration of a single or small number of cases, found in their real-life contexts. Eisenhardt (1989, pp. 537) argues that a case should not be randomly selected, as the key consideration is that the case study approach is capable of sufficiently answering the research questions (Carson et al., 2001). Patton (2002) argues that in selecting cases it is appropriate for them to be information rich with regards to the literature and that purposive sampling and/or snowball sampling is acceptable. Gerring (2004, pp. 342) argues a case study should be:

> "an intensive study of a single unit… a spatially bounded phenomenon – e.g. a nation-state, revolution, political party, election, or person – observed at a single point in time or over some delimited period of time"

Further, Poulis et al. (2013) argue that the role of context plays a crucial role in case selection and in the importance of contextualised sampling processes.

In organisation and management research, Yin (1989) emphasises the existence of both single and multiple case studies. Single case studies describe the presence of a phenomenon while multiple case studies can offer a foundation for theory building. Eisenhardt and Graebner (2007) argue this is achieved by multiple comparisons where findings can be views as distinctive to a single case or steadily repeated by numerous cases.

Multiple cases facilitate theory development, but theoretical sampling is much more complicated, which should concern more of the contribution to the theory development within the set of cases. Eisenhardt (1989) indicates that the resultant theory built from case study research can be novel, testable and empirically valid. She also proposes a process for building theory through within-case and cross-case analysis, which has guided this research). The theory-building process 'occurs via recursive cycling among the case data, emerging theory, and later, extant literature' (Eisenhardt and Graebner, 2007), and is embedded in rich empirical data (Yin, 1994).

The number of cases should not be characterised and viewed as 'the more, the better', as selecting cases should be underpinned by purposeful sampling (Fletcher and Plakoyiannaki, 2011; Yin, 2009). Dyer and Wilkins (1991, p. 614) argue that single case studies have historically been strong at advancing theory in social sciences and continue to impact. Countering Eisenhardt (1989), Dyer and Wilkins (1991) offer that multiple contexts and/or cases reduces the depth and understanding of the context, which contradicts the benefits of case study research. Dyer and Wilkins (1991, p. 614) state that a single case focuses on when key purpose and allows the researcher to identify novel theoretical relationships and critique deep-rooted theories.

Piekkari (2010) found that case studies are by far the most popular qualitative methodology in industrial marketing journals following their study of 10 years' worth of papers in *Industrial Marketing Management*, *Journal of Business-to-Business Marketing* and *Journal of Business and Industrial Marketing*. Industrial marketing research is characterized by the use of qualitative case studies to build theory (Dubois & Araujo, 2004, 2007; Easton, 2000; Harrison & Easton, 2004). Beverland and Lindgreen (2010) highlight that business-to-business marketing research has a long tradition of using qualitative case studies. The central outlet of work within the area, *Industrial Marketing Management* (IMM), has actively encouraged the use of case methods, resulting in many important theoretical advances in the field. Business-to-business marketing (Industrial marketing) research, by virtue of its name, is concerned with a firm's relationship with stakeholders and other firms and is therefore ripe for case study research. Easton (2010) identifies that due to the nature of the subject, case study research is the most common method used by industrial marketing researchers. The chief units of analysis are organisations and relationships, which are complex in their structure and difficult to access. Easton (2010) reasons that pragmatism can provide a very powerful justification for the use of case studies as case studies as a research method offers the possibility of studying a problem defined situation in detail.

A case study approach is widely used within the area of productization and accepted within the discipline (Davies et al., 2007; Chattopadhyay, 2012; Alter, 2012; Valminen and Toivonen, 2012; Durugbo, 2014; Leoni, 2015). Additionally, it is common and accepted to only state the industry sector and withhold the firms name as best practice (Chattopadhyay, 2012; Alter, 2012; Valminen and Toivonen, 2012; Ritala et al., 2013; Durugbo, 2014; Leoni, 2015). Simula et al. (2008) called for researchers to use case study to investigate productization and build theory from this, as it would uncover how firms have implemented productization and what kind of challenges and benefits they have encountered. Further,

Leoni (2015) asserted that due to the infancy of research towards productization, it lacks a deep analysis of the phenomenon.

Yin (2014) views construct validity, internal validity, external validity and reliability as the key criteria for judging the quality of research designs. The key criticisms of case study research can be summarised as: issues in data reporting, validity and rigour. With regards to construct validity, case studies can fail to develop a sufficiently operational set of measures and that subjective judgements are used that tend to confirm the researchers preconceived ideas (Flyvberg, 2006). Internal validity is mostly concerned with explanatory case studies as the researcher needs a full understanding of all the casual relationships to draw conclusions, missing one factor resulting in the research design fails to combat internal validity. External validity questions the ability to generalise the findings beyond what was studied, this is present for all qualitative methods, as they lack statistical generalisation. Seawright and Gerring (2008) state that the generalisability of case studies can be increased by the strategic selection of cases, implying that the research can purposefully select cases to achieve the best results.

Ultimately, all methodological approaches have their advantages and disadvantages, May (2011, pp, 226) proffers that the single most important choice of method is the research aim and that should motivate the method instead of a thin and rigid fixed methods approach.

5.6 Qualitative Research Methods

The previous sections have presented that this thesis is following a philosophical underpinning of pragmatism, and abductive reasoning. Qualitative research can be utilised following the philosophy of pragmatism (Bryman and Bell, 2015; Dubois and Gadde, 2002; Saunders et al. 2007). Additionally, Stake (2000) asserts that following from a case study approach, qualitative research is one of the most common ways to conduct inquiry. Case study research can be qualitative data only (Yin, 1984), as demonstrated by Sutton and Callahan (1987) sole use qualitative data collection methods in their case study. Eisenhardt (1989) extends this by displaying that with regards to case studies qualitative methods combines data collection methods such as archives, interviews, questionnaires and observations (Eisenhardt, 1989; Hartley, 2004).

Having established that qualitative research fits with the selected philosophy of pragmatism, the abductive reasoning approach and case study approach, the remaining of this section is

organised as follows: qualitative research methods, semi-structured interviews, observation, participant observation and document analysis.

5.6.1 Secondary and Primary Research

The secondary research was collated from various sources such as academic journals, internet databases and books. The foremost journals utilised were *Industrial Marketing Management*, *Research Policy*, *Marketing Theory, Consumption Markets & Culture*, *R&D management*, *Technovation*, *Journal of Business Research*, *Journal of Services*. Easterby-Smith *et al.,* (2002) argues that secondary research permits the researcher to clarify and define research problems.

In considering the nature of primary research, it can be qualitative and/or quantitative. The primary research conducted for this thesis, was specifically designed to fill the identified gaps that had been highlighted at the secondary research stage. Additionally, this study was designed to answer the aims and objectives guiding the research and providing the researcher with full control over its design ensuring that they were fully satisfied.

5.6.2 Qualitative Research

This thesis adopts a multi-method qualitative research approach, utilising multiple qualitative data collection approaches. When selecting a qualitative, quantitative or mixed methods approach, it is crucial to ensure that the methods being selected and utilised allow for the successful completion of the research aim and question set (Easterby-Smith et al., 2002). Firstly, this section will examine the nature of using qualitative research.

William (2005, p.85) states that that qualitative methods materialised when it was realised that quantitative research was unable to express human feelings and emotions. Therefore, qualitative research is concerned with understanding subjective experience. Lincoln and Guba (1985) affirm that qualitative research methods are greater at adapting to handling several and less agreeable realities, as the methods associated with it allow the researcher to unpack the nature of interaction between researcher and respondent. Overall, qualitative research seeks to develop detailed descriptions, or evaluations, or to develop theory (Flick, 2015). Geertz (1973b) proposed that qualitative research should provide 'thick description' that offers a way to understand context and meaning so that those external to the culture, can comprehend the behaviour.

Qualitative research highlights subjective understanding (Bryman and Bell, 2003), and enables successful and deep understanding of the research topic (Easterby-Smith et al. 2009). Miles and Huberman (1994) advance this notion further by stating that a qualitative research method(s) offers a deep understanding, knowledge and comprehension into the phenomena being researched.

5.6.2.1Criticisms of Qualitative Research

It is important to have an appreciation of the criticism of the selected method and any limitations. The positivist's critique of qualitative research is centred around three key pillars: replication, generalisation and lack of transparency. Bryman and Bell (2015, pp. 413) suggest the main criticisms of qualitative research are: that it is impressionistic and subjective, lacks generalisability and has difficulties in replicating the studies.

In considering this critique, it is considered impressionistic and subjective in so far as it relies upon the researcher's own unsystematic views with regards to significance and importance. Furthermore, the researcher can develop close and personal relationships with respondents which can be problematic (Bryman and Bell, 2015, pp. 413). Further the absence of generalisability through the subjective interpretations of researcher and inability to replicate the efforts is widely cited as a key criticism (De Vaus, 2002). Bryman and Bell (2015, pp. 414) add that replication issues are due to qualitative research's unstandardized procedures, and the variability of the researcher as the data collection instrument (Barbour 2000). With regards to the scope of qualitative research, it tends to be used in small scale research and cannot be generalised to other settings (Maxwell 2005). Lesser arguments include the labour-intensive nature of the research (Bowen 2006; Elo and Kyngäs, 2008).

5.6.2.3 Criteria for Evaluating Qualitative Research

Within the rational paradigm, criteria can be formulated in terms of internal validity, external validity, reliability, and objectivity (Bryman and Bell, 2015). As shown in table 30 below Lincoln and Guba (1985) subsequently formulated several procedures aimed to increase the credibility of qualitative research focusing on: credibility, transferability, dependability and confirmability.

Table 30: Comparison of Quantitative and Qualitative

Traditional Criteria for Judging Quantitative Research	Alternative Criteria for Judging Qualitative Research	Strategy Employed
Internal validity	Credibility	Prolonged engagement in the field. Use of peer debriefing Triangulation Member checks Time sampling
External validity	Transferability	Provide thick description Purposive sampling
Reliability	Dependability	Create an audit trail Code-recode strategy Triangulation Peer Examination
Objectivity	Confirmability	Triangulation Practice Reflexivity

Source: Adapted from Lincoln and Guba (1985)

Further table 31. below highlights the main sources and procedures associated with the qualitative research methods used in this thesis. These will be discussed in detail in the following sections.

Table 31: Sources and procedures of qualitative research methods

Method	Potential Source(s)	Procedure(s)
Interviews	Primary participants. Secondary participants	Tape recorded semi-structured interviews, then transcribed the interviews for the participants to review
Observations	Observed participants' interactions	Notes and videotaped the observations
Document Analysis	Reports, newsletters, publications.	Read all materials and documented and descriptive statistics related to the research issue

Source: Adapted for this thesis from Yamagata-Lynch (2010)

5.6.3 Methods: Interviews

Interviews as a potential data collection method are best suited when they are applied to the exploration of more complex and subtle phenomena (Denscombe, 2010). Whereby the value of interviewing as a research method is that it provides the researcher with the opportunity to enter the other person's perspective (Patton, 2002). Interviews can be used when researcher needs to gain insights into things such as people's opinions, feelings, emotions and experiences (Denscombe, 2010). King (2004) argues that qualitative research interviews allow the researcher to understand a topic from the respondents' viewpoint.

Unstructured interviews, semi-structured interviews and structured interviews are they three main types of interviews. The advantages, disadvantages and applications of each are shown in table 32. below.

Table 32: Strengths, weaknesses and applications of interview approaches

	Strengths	Weaknesses	Applications
Unstructured	Provides rich information. Explores previously unknown themes that arise from the interview. Creates relationships which may lead to more information. Uses natural language.	Very time consuming. Resource intensive Lacking in generalizability Can generate lots of often irrelevant data. Susceptible to interviewer bias.	Exploratory research investigating past events when subjective views and experiences are sought in conjunction with other research methods
Semi-structured	Questions prepared in advance to cover critical points, useful when the researcher is inexperienced. Interviewees still retain freedom and flexibility to express their own views. Increased reliability and scope for comparability. Interviewee can respond in language natural to them	Time consuming. Resource intensive. Needs good interview skills to keep on topic. Interview questions are open to researcher bias May lack in generalizability	Multiple interviewers. Only one chance to conduct the interview. Researcher has some knowledge of the topic, In conjunction with other research methods.
Structured	Can produce consistent generalizable data. Minimal risk of bias. Large sample size. Can be conducted quickly. Sophisticated interviewing skills not required.	Little opportunity for feedback. Question responses are limited and restrictive. Little scope to cater for the unforeseen. Real-time changes to the interviews cannot be made.	Clear focus and a question to be answered. High level of knowledge on a topic to allow for appropriate question formulation. A well-developed literature

Source: Adapted from Lochrie et al. (2015, pp. 119)

To facilitate in-depth exploration of the foremost issues, in-depth semi-structured interviews were chosen to achieve the research aim and questions set for this thesis. Johnson (2002: 106) offers that in-depth interviewing allows for deep information and understanding. In-depth interviews can discover the opinions, insights and thoughts of groups or individuals through language (Easterby-Smith et al. 2009).

Denscombe (2010) argues that with semi-structured interviews, the interviewer still has a clear list of issues to be addressed and questions to be answered. However, semi-structured interviews enable the researcher adapt questions in line with the respondents' answers and emergent themes as they are malleable and controllable (Burgess, 1982). Therefore,

respondents can feel free to express themselves and this in turn is of great value to the researcher (Denzin, 1970). Boyce and Neale (2006, pp. 3) define in-depth interviewing as a:

> "…qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation… Interviews are often used to provide context to other data (such as outcome data), offering a more complete picture of what happened in the program and why."

Whereby one-to-one interviews are the most common type of interview and can be conducted in person, via telephone or more recently electronically (Denscombe, 2010). Working within the pragmatism paradigm, in-depth interviews were tailored to specific teams and individuals, as the researcher moved between observations and interviews.

Limitations of interviews as a method arise, as they can be prone to bias due the respondents having an agenda. Moreover, interviewing requires sufficient researcher skills and knowledge in terms of time keeping, staying on track, asking the appropriate questions and knowing when to probe emergent themes further. The emphasis on building a rapport with participants and establishing trust, can be both time consuming and difficult to achieve dependent on the area of study. Further, more trivial limitations are considered to be the resources (time, cost and equipment) required to conduct, transcribe and analyse them.

5.6.4 Methods: Observations and Participant Observations

Walliman (2001) states that qualitative research can use observations to understand the feelings and motivations underpinning actions and attitudes. Whilst Denscombe (2010) asserts that the strength of observation as a method, is that it allows the researcher to observe directly, for example they are able to see what respondents do instead of what they say they do. Goffman (1959) expands this perspective by suggesting that respondents could put on a performance during a face-to-face interview that does not represent the truth with regards to their practices, methods and behaviours. Respondents may only present a partial truth for many varying reasons (Goffman, 1959). Consequently, observations act as a technique to move past respondents' self-interpretations and behaviours (Crotty, 2003). It is also possible that dependent on the area of study, respondents may struggle to articulate fully a behaviour or a practice (such as the embodied, tacit or taken for granted), by utilising observations it can allow the researcher to probe these behaviours.

Participant observation is one type of data collection method typically used in qualitative

research (Denscombe, 2010). Participant observation has been utilised as a tool for collecting data about people, processes, and cultures in qualitative research (Saunders et al., 2009). Participant observation can be considered as the process enabling researchers to learn about the activities of the people under exploration, in the natural setting, through observing and participating in those activities (Easterby-Smith et al., 2002). Becker and Geer (1957, pp. 28) offer that participant observation:

> "…the method in which the observer participates in the daily life of the people under study, either openly in the role of researcher or covertly in some disguised role, observing things that happen, listening to what is said, and questioning people, over some length of time."

Table 33. Highlights the key advantages and disadvantages of participant observation.

Table 33: Advantages and Disadvantages of participant observation

Advantages	Disadvantages
Non-interference. It stands a better chance of retaining the naturalness of the setting than other social research methods. **Insights**. It provides a good platform for gaining rich insights into social processes and is suited to dealing with complex realities. **Ecological validity**. The data produced by participant observation have the potential to be particularly context sensitive and ecologically valid. **Holistic**. Participant observation studies offer holistic explanations incorporating the relationships between various factors. **Subjects' points of view.** As a method of social research, participant observation is good for getting at actors' meanings as they see them.	**Access, Commitment, Danger and Deception.** There are limited options open to the researcher about which roles to adopt or settings to participate in. Demanding method in terms of personal commitment and personal resources. Environment could be hazardous. Researchers hide their identity. Can create ethical problems. **Reliability**. Dependence on the 'self' of the researcher and on the use of field notes as data leads to a lack of verifiable data. Reliability is open to doubt. **Representativeness of the data**. There are problems of generalising from the research. The focal role of the researcher's 'self' and the emphasis on detailed research of the setting open participant observation to the criticism that it is difficult to generalize from the findings.

Source: Adapted from Denscombe (2010)

There are five main types of participant observation: Non-Participatory, Passive Participation, balanced Participation, Active Participation and Complete Participation. Table 34 Highlights the level of involvement for each and the limitations of each. During the thesis, and in line with the research aim, and pragmatism paradigm, the researcher undertook the role of an active participant.

Table 34: Participant Observation Type

Type of Participant Observation	Level of Involvement	Limitations
Non-Participatory	No contact with population or field of study.	Unable to build rapport or ask questions as new information comes up.
Passive Participation	Researcher is only in the bystander role	limits ability to establish rapport and immersing oneself in the field.
Balanced Participation	Researcher maintains a balance between "insider" and "outsider" roles	this allows a good combination of involvement and necessary detachment to remain objective.
Active Participation	Researcher becomes a member of the group by fully embracing skills and customs for the sake of complete comprehension.	This method permits the researcher to become more involved in the population. There is a risk of "going native" as the researcher strives for an in-depth understanding of the population studied.
Complete Participation	Researcher is completely integrated in population of study beforehand (i.e. he or she is already a member of population studied).	There is the risk of losing all levels of objectivity, thus risking what is analysed and presented to the public.

Source Adapted from: DeWalt et al. (1998), Spradley (1980), Schwartz and Schwartz (1955)

5.6.5 Methods: Document Analysis

Firstly, document analysis is an efficient and effective way of gathering data because documents are manageable and practical resources (Denscombe, 2010). Document analysis, defined by Bowen (2009, pp. 27) as:

> "…a systematic procedure for reviewing or evaluating documents, both printed and electronic (computer based, and internet transmitted) materials."

Documents can be easily accessible, common and offer contextual information with regards to the organisation (Bowen, 2009). Documents are non-reactive data sources, as they can be viewed numerous times (Bowen, 2009, pp. 31). Table 35 exhibits the three primary types of documents utilised in the study.

Table 35: Three primary types of documents

Document Type	Description
Public Records	The official, ongoing records of an organization's activities. Examples include student transcripts, mission statements, annual reports, policy manuals, student handbooks, strategic plans, and syllabi.
Personal Documents	First-person accounts of an individual's actions, experiences, and beliefs. Examples include calendars, e-mails, scrapbooks, blogs, Facebook posts, duty logs, incident reports, reflections/journals, and newspapers.
Physical Evidence	Physical objects found within the study setting (often called artefacts). Examples include flyers, posters, agendas, handbooks, and training materials.

Source: Adapted from Denscombe (2010) and O'Leary 2014)

Denscombe (2010) proposes that documents are a source of data in their own right, and are an alternative to questionnaires, interviews or observation. Platt (1981) and Scott (1990) argue that documents need to be evaluated to ensure their validity. The four basic criteria to do so is outlined in table 36 below.

Table 36: The validity of documentary data

Criteria	Description
Authenticity	Is it the genuine article? Not a fake or a forgery?
Representativeness	Is the document typical of its type? Does it represent a typical instance of the thing it portrays? Is the document complete? Has it been edited?
Meaning	Is the meaning of the words clear and unambiguous? Are there hidden meanings? Does the document contain argot and subtle codes? Are there meanings which involve 'what's left unsaid' or 'reading between the lines'?
Credibility	Is it accurate? Is it free from bias and errors? This will depend on factors like: What purpose was the document written for? Who produced the document? What was the status of the author and did he or she have a belief or persuasion that would colour the version of things? If it reports on events, was it a first-hand report directly witnessed by the author? How long after the event was the document written? When was the document produced? In what social context and climate?

Source: Adapted from Platt (1981) and Scott (1990)

Table 37. below summarises the advantages and disadvantages of documentary research.

Table 37: Advantages and Disadvantages of documentary research

Advantages of documentary research	Disadvantages of documentary research
Access to data. Vast amounts of information are held in documents. Depending on the nature of the documents, most researchers will find access to the sources relatively easy and inexpensive. **Cost-effective**. Documentary research provides a cost-effective method of getting data, particularly large-scale data such as those provided by official statistics. **Permanence of data**. Documents generally provide a source of data which is permanent and available in a form that can be checked by others. The data are open to public scrutiny.	**Credibility of the source**. The researcher needs to be discerning about the information they use. Researchers need to evaluate the authority of the source and the procedures used to produce the original data to gauge the credibility of the documents. **Secondary data**. When researchers use documents as a source of data, they generally rely on something which has been produced for other purposes and not for the specific aims of the investigation. **Social constructions**. Documents can owe more to the interpretations of those who produce them than to an objective picture of reality.

Source: Adapted from Denscombe (2010)

To consolidate, based on the above discussion, this thesis used a multi-method qualitative study consisting of semi-structured interviews, observations, participant observation and document analysis, to help successfully achieve the research aim and questions.

5.7 Research Design

The innermost aspect of any research project is to create a sound and robust research design (Chisnall, 2001), that complements the philosophical position previously outlined (Creswell, 2009), as it helps to reveal the most suitable methods (Esterby- Smith et al., 2002). This will also illuminate the most appropriate methods used for the analysis (Chisnall, 2001). Green et al. (1988) comment that a sound research design will impact that the information garnered is relevant to the aims and objectives of the research, and that they were acquired accurately. This research design section will address: the research context, sampling approach and criteria, data collection undertaken, data analysis, the role of the researcher diary, considerations of researcher reflexivity and the difficulties and limitations of the study.

A key aspect of the research design and ensuring stringent adherence to the access agreement with the organisation of the case study focus, centred on the successful University ethical application and approval. Further from an organisational perspective,

access and the contact and consent agreement were based on the established permissions (this included providing substantial documentary information on the intended fieldwork, including confirming the interview questions and outlined methods). Due to the highly confidential nature of the industry, this was negotiated in conjunction with the thesis supervisor and best practice was adhered to regarding all the collected data, for example all names of the interviewees, companies and productions are presented in the thesis with pseudonyms, as required by the participants and ethical approval.

5.7.1 Gaining Access

Gaining access to the large utility firm developed in several ways. Firstly, the first supervisor of the thesis had previously conducted a successful research project with a senior manager at the firm. This provided a basis for initial contact and building on this established relationship with the large utility firm. At this stage, the benefits of the research were proposed and outlined to the utility firm and any questions clarified. Additionally, the researcher's prior qualifications and work experience were presented to the utility firm demonstrating the researchers' level of knowledge and expertise in the subject matter and authorizing their presence.

5.8 Research Context

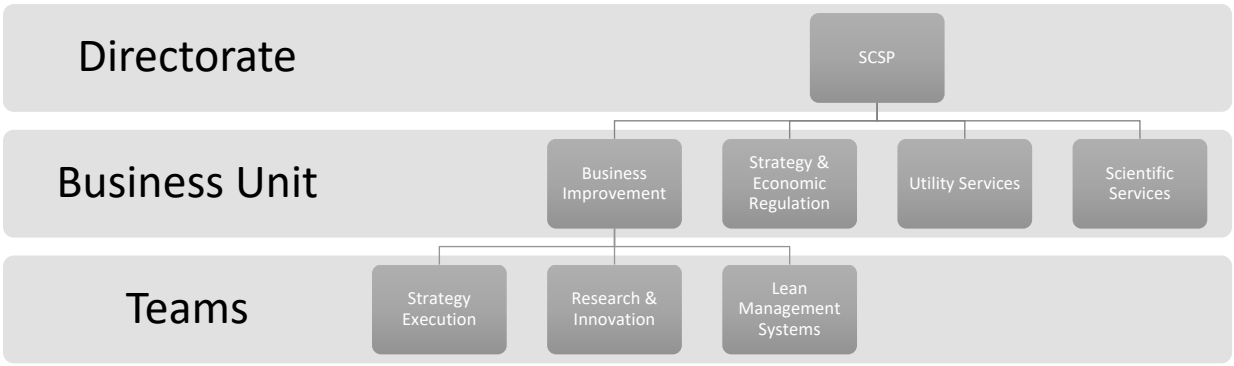
The following section will set out the research setting that surrounded the study. The main site of inquiry was a large public Scottish utility firm that is the sole industry provider of two key utility services to customers. It employs approximately four thousand people nationwide, has around five million customers and one billion pounds in revenue per annum.

The firm was established circa fifteen years ago by an act of parliament that merged three authorities into one utility firm. The firm is funded through revenue raised from customer charges and borrowing from the Government. The firm has two principal consultancy arms that are non-regulated businesses that operate worldwide. They have a combined profit of three million five hundred thousand pounds.

In establishing access to the research context, the researcher first established contact in the Strategic Customer Service Planning (SCSP) directorate, who aim to enable an affordable, reliable and resilient utility services that meet customer expectations. Once access had been successfully negotiated and the necessary ethics approved, the researcher was specifically

located in the Research and Innovation Team. This directorate works closely with the other directorates and teams the business, in particular, Customer Service Delivery (CSD) and Capital Investment (CI). Figure 21 below provides a summary overview of the Strategic Customer Service Planning directorate, the business unit and teams within it to contextualise a more nuanced understanding of the research access.

Figure 21: Strategic Customer Service Planning directorate



5.8.1 Regulatory framework

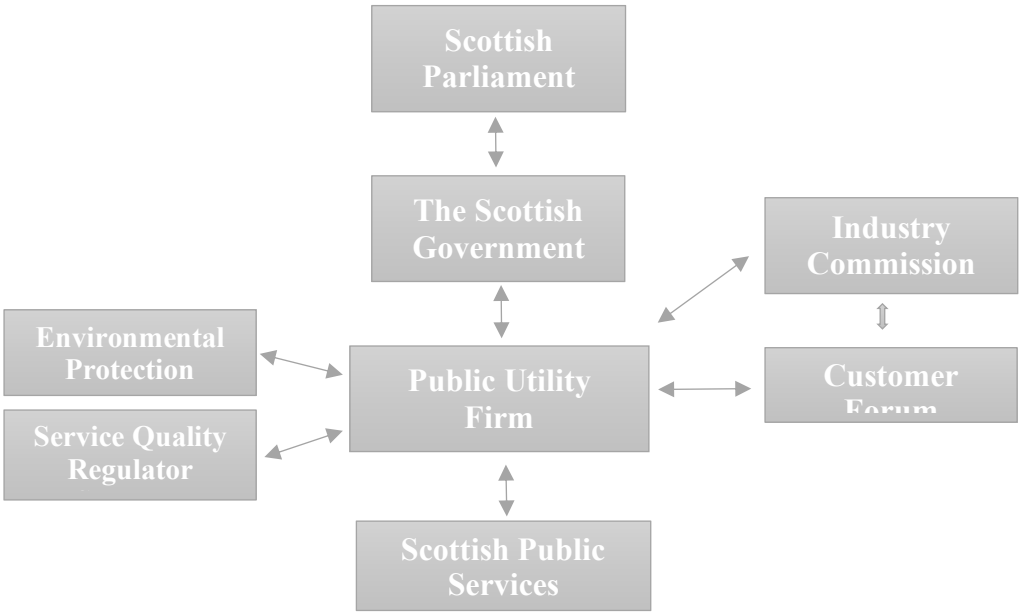
The utility firm is wholly accountable to government and is governed by a diverse and unique regulatory framework. The regulatory framework was established by the Scottish Parliament, table 38 below displays the nature of the regulatory framework and the key stakeholders in it.

Table 38: Summary of Utility firm regulatory framework stakeholders

Stakeholder	Role in framework
Scottish Parliament	Holds the public utility firm and Ministers to account and regularly calls executives to its committees to give progress updates.
Scottish Government	Scottish Ministers, acting on behalf of the people of Scotland, set the objectives for the industry to be delivered at least cost to customers. Set the objectives for the utility firm and appoint the Chair and Non-Executive Members.
Industry Commission	Are a non-departmental public body with statutory responsibilities. Industry to provide a high-quality service and value for money to customers. Is the Economic regulator, sets charges and reports on costs and performance? Charges reviewed every six years.
Customer Forum	Brings the customers voice to the table into seek to agree with the Utility firm their Business Plan for 2021-27, which determines future service levels, investment priorities, and how much customers should pay for the utility services subject to approval from the industry commission. The Customer Forum's role is to determine what, in the customer's interest, should be considered reasonable.
Scottish Public Services Ombudsman	Responsible for investigating complaints about public services in Scotland, once the services' complaints procedure has been completed and sharing lessons from complaints to improve the delivery of public services.
Environmental Protection Agency	Responsible for making sure that the environment and human health are protected. To ensure that Scotland's natural resources and services are used as sustainably as possible and contribute to sustainable economic growth.
Service Quality Regulator	Ensures Public and Private Supply is safe. Monitors the quality of samples taken. Enforces serious breaches of the regulations. Inspects the public utility firm's assets and activities.

The above table depicts the complex nature of the utility firm's regulatory commitments. For example, the commitment spans concern regarding price, quality of service and risk. Further, the purpose of figure 22 below is to highlight how the industry commission, customer forum and consumer fixture unit are required to collaborate with each other. This is demonstrated to contextualise the environment of this specific case.

Figure 22: Large public utility firm regulatory framework



5.8.2 Alliance Partners and contractors

The firm has three main alliance partners responsible for delivering infrastructure and non-infrastructure. Contracts are award in line with EU compliant procurement process and are typically twelve years in length, reviewed after six years. The first alliance is a partnership between two competing firms and is an infrastructure partner. The second alliance is a partnership between two competing firms and are a construction infrastructure partner. The third alliance partner is a joint venture between three competing firms. They are the non-infrastructure alliance partner. The alliance partners are supported by smaller tier one contractors. Tier one contractors also work with the utility firms in-house managed delivery vehicle on non-complex capital maintenance projects. Tier one contractors cannot sub-contract work to tier two framework contractors. Around the fifty-eight small to medium sized businesses are tier two framework contractors.

5.9 Sampling

Selecting the appropriate sample for research is a complex task. Sampling refers to the appropriate selection of segments to study within a population. Several factors come into question when selecting a population for research, for example ability to gain access, suitability for study, the need for the sample to represent the population. Once the sampling population has been identified, a sampling frame is then defined to decide who within the population should be chosen. In sampling, as with all other elements of the research design, this judgement is based on the preceding decisions of ontology and epistemology.

Sampling techniques can be divided into two groupings probability and non-probability (Easterby-Smith et al., 2002). Probability sampling is a way of achieving samples that are representative of the whole population of interest and involve random selection (Taheri et al., 2015, pp. 160). Randomisation or chance is the core of probability sampling techniques (Bryman and Bell, 2015). Non-probability sampling involves a specifically chosen sample based on particular characteristics or similar differentiating features relevant to the study; therefore, it cannot be determined whether the results of the study are representative of the entire population (Taheri et al., 2015, pp. 160). Members are not selected at random (Bryman and Bell, 2015). There are theoretical and practical reasons for using non-probability sampling (Saunders et al., 2012). Practical reasons such as it being quicker and cheaper were not appropriate for consideration, as part of the reason for selecting non-probability sampling.

5.9.1 Theoretical and purposeful sampling

Theoretical sampling is aimed at generating and developing theoretical data (Glaser and Strauss, 1967), via the process of collecting, coding and analysing data in a concurrent way in order to create a theory (Saunders et al., 2012). Glaser and Strauss (1967, pp. 45) define theoretical sampling as:

> "…the process of data collection for generating theory whereby the analyst jointly collects, codes and analyses his data and decides what data to collect next and where to find them in order to develop his theory as it emerges."

Theoretical sampling progressively and systematically tailor's data collection to serve the emergent theory (Strauss and Glaser, 1967). Glaser (1978 p.37) state:

> "…theoretical sampling cannot know in advance precisely what to sample for and where it will lead."

Breckenridge and Jones (2009, pp. 120) extend that theoretical sampling is purpose-driven as it is explicating and refining the emerging theory. The selection of participants will alter in conjunction with the theoretical needs of the study (Morse 2008). Table 39 highlights the advantages and disadvantages of theoretical sampling.

Table 39: Advantages and Disadvantages of Theoretical Sampling

Advantages	Disadvantages
• The possibility to strengthen the rigor of the study if the study attempts to generate a theory in the research area. • The application of theoretical sampling method can provide a certain structure to data collection and data analysis processes, thus addressing one of the main disadvantages of qualitative methods that relate to lack of structure. • This type of sampling usually integrates both, inductive and deductive characteristics, thus increasing comprehensiveness of studies.	• It is a highly systematic process, application of theoretical sampling method may require more resources such as time and money compared to many other sampling methods. • There are no clear processes or guidance related to the application of theoretical sampling in practice • Overall, theoretical sampling is the most complicated than other sampling methods

Source: Adapted from Saunders et al. (2012)

Patton (1990) argues that purposive sampling can provide researchers with strong theoretical reasons for their choice of units (or cases) to be included in their sample. Sandelowski (1995, pp. 181) define purposeful sampling:

> "…as the selection of participants with shared knowledge or experience of the particular phenomena identified by the researcher as a potential area for exploration."

Purposeful sampling refers to the selection of archetypal cases where phenomena are most likely to serve the theoretical purpose of the research and its questions (Silverman, 2000; Stake, 1995). It encompasses recognising and choosing people or groups of people that have vast knowledgeable and expertise of the phenomena being researched (Cresswell et al., 2011). It relies on the person's availability, willingness to participate, and communicate experiences (Bernard, 2002; Spradley, 1979). Purposeful sampling is a common and acceptable sampling technique for qualitative research when looking at cases that are rich in information and that non-random sampling should not be selected purely due to a qualitative research study being conducted (Patton, 2002). Whilst a purposeful sample is selected at the outset of the study (Breckenridge and Jones, 2009). Purposive sampling reflects a group of sampling techniques that rely on the judgement of the researcher when it comes to selecting the units (such as people, organisations and events) that are to be studied (Bryman and Bell, 2015). The different purposive sampling techniques can either be used on their own or in combination with other purposive sampling techniques (Saunders et al., 2012).

The terms theoretical sampling and purposeful sampling tend to be used interchangeably in qualitative research sampling (Sandelowski 1995). Hood (2007, pp. 158) extend this view by stating:

> "…all theoretical sampling is purposeful, but not all purposeful sampling is theoretical."

Further, Biernacki and Waldorf (1981) argue that snowball sampling is particularly appropriate when the population you are interested in is concealed and difficult to contact. Snowball sampling is a type of non-probability sampling technique (Bryman and Bell, 2015). Morgan (2008) argues that a snowball sampling technique can be used after spending time in the field after observing and developing relationships.

To conclude, the principles of non-probability resonate with this thesis, in terms of theoretical sampling, that is purposeful, and an element of snowball sampling has been selected to achieve the research aim and questions.

5.10 Data Collection

There are several data collection options that could be employed in this research. These stem from the researcher's position around ontology, epistemology and paradigm position (Bryman and Bell, 2015), as explored earlier in the chapter. Data in a case study approach can be collected in through multiple qualitative research techniques, including: interviews, observations and document analysis (Eisenhardt, 1989). These collection techniques allow the researcher to negotiate the boundaries between the phenomena studied, and the context (Dubois and Gibbert, 2010). Within the research design of the thesis, respondents and sites were selected for observation in an emergent and opportunistic way (Eisenhardt, 1989) and the research design encompasses multiple qualitative techniques to allow for greater validity (Yin, 2003).

This case study draws upon secondary and primary data collection. Data collection began in April of 2014 and data collection ended in August 2015, it was planned and undertaken in two distinct phases. Phase one began in April 2015 and ended in June 2015 and phase two began in May 2015 and ended in August 2015. The process of data collection was inspired by the emerging theory, whether substantive or formally (Glaser, 1978, p. 45).

Primary data collection began by sampling purposefully from the team members of the Standards and Specification team. The Standards and Specifications team comprised of experienced engineers, regarded as experts and specialists by their peers in areas of asset management, and with established reputations in industry associations. This allowed the

researcher an initial overview of both projects and processes. It also provided the researcher with access to other actors in the network, such as suppliers, in-house asset managers and operations teams who came together to negotiate standards and specifications for a range of sensors, components and subassemblies. The interest in this initial team focused on the understanding that the Standards and Specifications team were at the forefront of supporting innovation in the organisation, and in anticipating developments among suppliers. The researcher negotiated observation at relevant Standards and Specifications meetings and actively observed systems and processes of documenting projects and standards within their practice. Field notes and initial impressions were recorded, and this formed the basis of emergent understandings of the team dynamics. The researcher was also able to enrich this initial understanding and sense making, by attending and observing public workshops and industry conferences relevant to the research questions.

5.11.2 Data collection: interviews

Interviews were conducted on the utility firm's premises at several locations across Scotland. The interview protocol was shared with a senior manager at the utility firm who was not selected to be interviewed. This allowed the questions to sense checked by someone with expertise of the utility firm. The interviews were audio recorded and transcribed, and they were conducted without close observation (Watson, 2011). The interviews were conducted using a semi-structured format (Spradley, 1979), with an emphasis placed on open-ness and that as a method it was flexible to allow discussion and probing questions based upon the answers of the respondents. The indicative questions were devised based on the initial observations and ongoing source document analysis that the researcher had undertaken. Researcher reflexivity was practiced between data collection phase one and phase two, which allowed emergent theory to be considered and an iterative approach to be utilised.

Interviews were deemed as the most appropriate way of gathering information as the case study was exploratory, therefore carrying out research in this manner allowed an understanding of the ways in which the firm worked and the role of each of the respondents. Collecting data in this manner allowed access to rich data and provided a clear explanation of how the organisation and its practices had changed over time.

As mentioned above, the initial interviews were conducted with the Standards and Specification team. Primary data was gathered through interviews with staff members at

each level of organisation (see table 40). The first set of interviews was semi-structured, with the aim of understanding the role of each employee, their background and how they came to be in this position. The remaining interviews utilised snowball sampling as participants could recommend potential respondents who would be suitable for the study. This approached increase the robustness of the study as it utilised and accessed the internal knowledge, expertise and networks of the firm's employees, which would have been difficult to reveal otherwise. An overview of the respondents interviewed is provided below, with pseudonyms used:

Table 40: Interviews Field Work Log

Date	Type	Name	Position	Duration
April 2014	Interview	John S	Standards & Specifications Manager	58:37
April 2014	Interview	Brian S	Standards & Specifications Strategist	1:11:08
April 2014	Interview	Martin F	Asset Manager	51:43
April 2014	Observation & Interview	Julie	Standards & Specifications Administrator	1:09:52
May 2014	Interview	John C	Head IT Operations	53:13
May 2014	Interview	Angus	Standards & Specifications	44:13
May 2014	Interview	Kevin	Planning Manager and Standards & Specifications Planner	1:13:03
May 2014	Interview	Stephen H	Technical Team Leader	1:03:02
June 2014	Interview	Angela J	Knowledge Management Specialist	1:06:19
June 2014	Interview	Paul S	Supply Chain & Procurement	51:15
April 2015	Interview	Jenny	Collaboration Change Consultant	1:37:49
April 2015	Interview	Lloyd	Commissioning Manager	1:37:49
April 2015	Interview	Peter	Strategic Change Lead	48:35
May 2015	Interview	Jim	Strategy Manger Business Improvement	52.49
May 2015	Interview	Karen	Business Change Manager	1:14:26
May 2015	Interview	Bob	Alliance Manager Capital Investment	1:13:04
May 2015	Interview	Dougie	Regulation Manager	25:13*
May 2015	Interview	Irene	IT Systems Manager	21:07*
May 2015	Interview	Shirley	Risk Manager	1:01:48
May 2015	Interview	Colin L	Operations Manager	25:17*
May 2015	Interview	Brian H	Customer Experience Manager	32:23*

* Audio equipment failed during interviews only partially recorded.

5.11.3 Data collection: Observations

The researcher acted as both observer and latterly participant observer. Team meetings, seminars, training events, workshops, conferences and external events, were attended by the researcher (see table 41). This provided access to internal confidential documents and presentations and aided initial sense making into the organisation and team functions. Due to confidentiality observations were not audio recorded or transcribed, notes were taken by the researcher. Observation allowed the researcher to understand the practices of actors and their interactions in a natural organisational setting.

Table 41: Fieldwork Observations Log

Date	Type	Position	Duration (min)
February 2014	Observation	Utility Firm and Supplier Alliance	One business day
April 2014	Meeting - Observation	Utility Infrastructure – 4 participants	90 minutes
April 2014	Observation	Standards & Specifications documentation demonstration	60 minutes
May 2014	Meeting - Observation	Utility Infrastructure Specifications Review	90 minutes
November 2014	Observation	Innovation and Service Workshop	One day
April 2015	Workshop Observation	Innovation and Service Workshop	Three days
April 2015	Observation	Utility Leadership Nation	120 minutes
May 2015	Observation	Spring Team Away Day	One day
June 2015	Observation	Leadership Vision Event	One day
July 2015	Observation	External Industry Workshop	One Day
August 2015	Observation	Winter Team Away Day	One day

5.11.4 Data collection: Document Analysis

Document analysis was also undertaken to allow the researcher to examine the importance attached to non-human actors, in total one-hundred and four documents were examined and analysed, including internal and external documents such as: annual reports, strategy, regulatory documents, process documents, performance results and training materials. Conducting an internal and external approach to document analysis permitted the researcher to gain an understanding of the roles and impact of the key stakeholders such as: government, regulators, alliance partners and customers and the narratives surrounding these documents. This also allowed for triangulation of data through the multi-method approach.

5.12 Data Analysis

Once saturation was achieved, in qualitative research analysis, the research must understand and transform large quantities of data to be analysed. Patton (2002, pp. 432) states that this comprises decreasing the amount of raw data, scrutinising trivia from significance, recognising important themes and creating a conceptual framework. The researcher's intimate knowledge and familiarly of the data is crucial to being able to develop a conceptual framework. Therefore, qualitative data analysis software such as NVivo was not used during the data analysis stage, whilst potentially useful for data management, it was considered that NVivo lacked the ability to grasp the context of the data and reduced the

researchers' familiarity with it. This is further justified by Geertz (1984) who argues that the key skills required for the analysis of qualitative data are reading, interpretation and reflection.

Therefore, the data analysis was approached manually with word documents, hard copies and highlighters. The data was organised into primary and secondary sources. Audio files were transcribed into Microsoft Word documents. The researcher used 'jotting' through Microsoft Word's "Comments" feature (Emerson et al., 2011) as it helped organise fleeting and emergent reflections and commentary on issues that emerged. The researcher also listened to the audio files and took notes of the discussion.

Firstly, phase one data was sequentially analysed, then phase two data sequentially analysed. Finally, phase one and two data were combined and re-analysed sequentially. Adopting this sequential and combined method allowed the researcher to reflect upon the emergent key themes of the data and its relationship with the literature.

Codes are considered labels that assign symbolic meaning to the descriptive or inferential information compiled during a study (Miles et al., 2013). Saldana (2013, pp. 3) define a code as:

> "A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence capturing, and/or evocative attribute for a portion of language based or visual data."

In line with the nature of the research aim and questions, the researcher followed Saldaña's (2013) established two cycle coding technique. First cycle coding methods were codes initially assigned to the data chunks, and second cycle coding methods generally worked with the resulting first cycle codes themselves.

5.12.1 Thematic Analysis

Braun and Clarke (2006) suggest that thematic analysis should be seen as a foundational method for qualitative analysis. It is the first qualitative method of analysis that researchers should learn (Braun and Clarke, 2006). Thematic analysis compliments a pragmatic approach to data collection (Saldana, 2009; Patton, 2002). Ryan and Bernard (2003) state that themes come both from the data (an inductive approach) and from the investigator's prior theoretical understanding of the phenomenon under study. Themes are patterns across data sets that are important to the description of a phenomenon and are associated to a

specific research question (Daly et al., 1997). Braun and Clarke (2006, pp. 79) define thematic analysis as:

> "…method of Identifying, analysing and reporting patterns (themes) with the data. It minimally organises and describes your data set in (rich) detail."

Further Saldana (2009, pp. 13) notes an important distinction between a theme and a code:

> "…A theme is an outcome of coding, categorization, and analytic reflection, not something that is, in itself, coded (that is why there is no "Theme Coding" method in this manual, but there are references to thematic analysis and a section called Themeing the Data)."

Aronson, (1995) adds that thematic analysis focuses on distinguishable themes and patterns of living and/or behaviour. Rossman and Rallis (2003, pp. 282) explain the differences:

> "…think of a category as a word or phrase describing some segment of your data that is explicit, whereas a theme is a phrase or sentence describing more subtle and tacit processes"

Further Riessman (1993) argues that thematic analysis focuses on the importance of is said and not necessarily how it is said. Themes capture important aspects of the data in relation to the research question, via a level of patterned response within the data set.
The thematic analysis of the data followed the framework put forward by Braun and Clarke (2006) in table 42.

Table 42: Phases of Thematic Analysis

Phase	Description of Phase
Familiarising yourself with your data	Transcribing data, reading and rereading the data, noting down initial ideas.
Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
Reviewing potential themes	Checking in the themes work in relation to the coded extracts and the entire data set, generating a thematic map of the analysis.
Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definition and names for each theme.
Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back the analysis to the research question and literature, producing a scholarly report of the analysis.

Source: Adapted from Braun and Clarke (2006)

Using a systematic thematic analysis permitted the researcher to be immersed further in the data. Table 43 below illuminates the thematic coding and sub-themes serviced from the data that align with the research aim and question. These will be developed in depth in the findings chapters which follow.

Table 43: Coding Structure of the research

Thematic Coding	Sub-themes
Exchanges	what is exchanged, what is the impact, what is measured, effect of measurement.
Practices	Networks and relationship, Social interaction, Knowledge sharing, expertise recognition.
Practice and Materials	Intangible practices, Day to day office practices, use of technology in practice, Skills and expertise, Devices used to shape exchanges, market objects, marketing objects, affordances of devices and objects., inherited devices and objects, performativity.
Marketization	Market shaping, framing and overflows, Calculations and qualifications.
Business models	Multiple models, flexibility, business model innovation.
Innovation	Knowledge capture, expertise, alliances, collaboration.
Productization	Stabilising, exchange, conflict, innovation, standardisation tension, products, services, collaboration, how to productize, customisation, systemisation.

Table 44, positioned below, provides an example of how thematic coding was applied to the empirical data and was guided by the literature undertaken. The table provides a sample of five extracts from five different respondents.

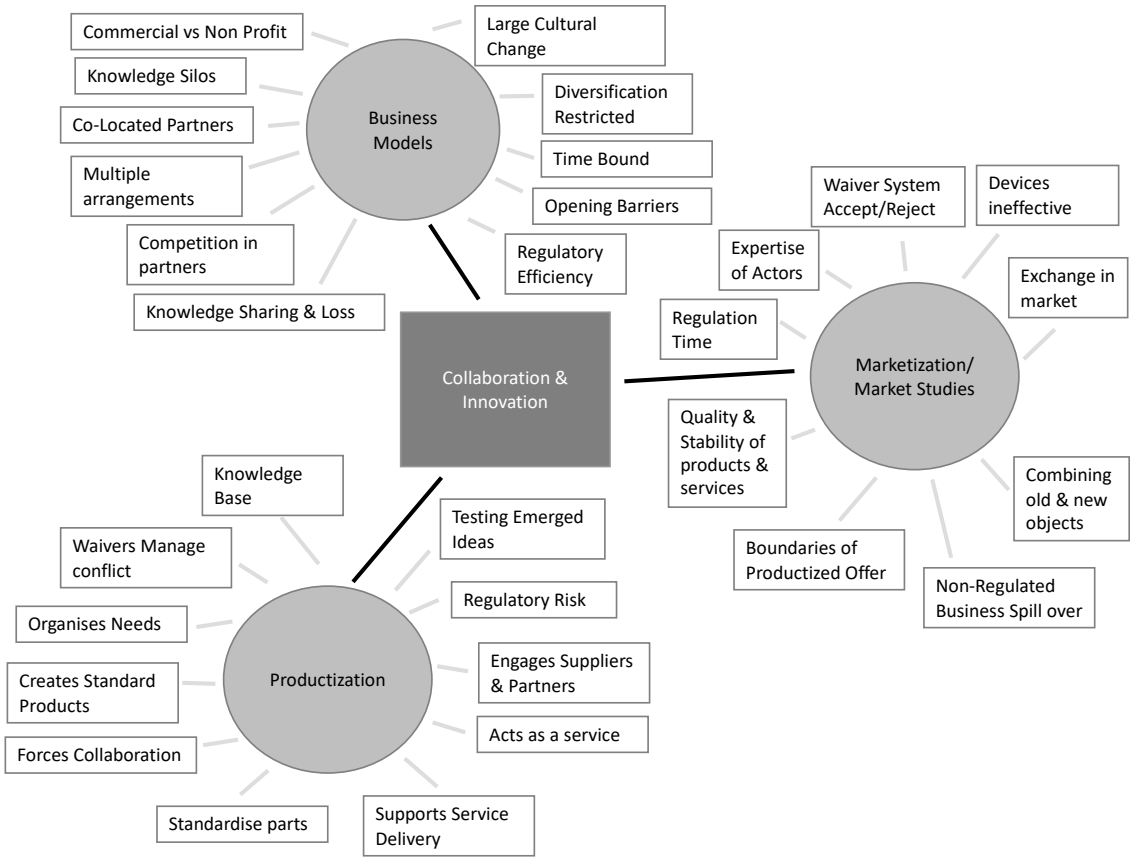
Table 44: Thematic Coding Examples

Thematic Coding Examples			
Quote	**Text**	**Code**	**Themes**
1.	Martin "We have things called 'waivers' that come in, so we have suite of documents, our specifications and you have to build a utility treatment works or whatever to that specification. If you for some reason can't comply with that spec, you could submit a waiver and ask ourselves if you can cut that corner or whatever it is. So I don't know off the top of my head how many of these waivers we get in, but probably I alone must get 10 or 12 a week, so as a group we must be getting 40, 40… If we say 40-50 a month I wouldn't be too far off it, and that's waivers coming in, that's actually specific spec waivers."	Productization, Standardization, Product.	Control cost increase efficiency, Stabilise exchange, frustration, waste, potential conflict, time, service, performativity.
2.	Brian S "What we're trying to do is dispel the myth that waivers never get approved in the public utility firm which was getting passed around at one time (laughter) and when they actually published the stats, we could show that just over 90% of waivers were actually getting approved if all the information came in with them and they could show that there was a benefit public utility firm and people have gradually got the message after a number of years that if they discuss things with us, they've much more chance of getting something accepted at the end of the day when they've come to sign the handover papers if it's been discussed with us and agreed with all the stakeholders then they've much more chance of getting it through quickly and easily than they have if they get, if they have a non-compliant design or non-compliant description and they try and get it passed through at the last minute, they've got a problem."	Productization, Standardization, Market Devices, Practices, Marketing Objects, Performativity.	Publishing results, potential conflict, managing relationships, gradual communication, acceptance of market and marketing objects, strength and flexibility in standards and specifications.
3.	Jenny "So, these three alliances deliver these types of interventions made up of multiple partners that have formed a joint venture specifically to deliver that kind of intervention… So these companies have been formed as independent entities so all of the staff are sponsored by one of the host organisations so you have three sets of people sitting in one office and multiple other offices… So, the public utility firm people are not only having to work differently with their suppliers in a way and	Business Models, Business Model Innovation, Open Innovation, Practices, Marketization	Complex arrangement of Alliances, New model implemented, Deep embedment of new way of working, commitment to open

	have to be so much more open in sharing with their information than culturally they've ever been before but they're also having to change the style of working with them, so to engage with them at different times and stuff. And they're strangers, they don't know who each other is, there isn't a database, you can't search someone."		knowledge sharing, weak relationships cultural change required, collaboration required.
4.	Paul "…in procurement because then we can go to market with more details on what we're actually going to be spending and they are going to be spending, and that helps the supply chain all the way through for continuity and it brings more efficiency throughout it, so there's a lot of knowledge out there, and people do know it's going on, but they've all got their own project agendas, so you're always…not fighting, but you're always kind of scrambling internally to try and get hold of that knowledge."	Productization, Standardization,	Stabilising exchange, allowing greater insight into product needed, speed of decision making, knowledge still not fully stabilised, concern over gaps.
5.	Stephen H, "There are terrible problems with knowledge management and a lot of it is down to ownership. If you give someone the ownership of it then he is expected to deliver and he will deliver that. If you don't make it part of someone's accountability - people will say - file under too difficult, I am not getting measured on this anyway. A lot of it gets lost and in the past the ....we have always had a PPA procedure that has never been policed, there has been no consequences of doing it so it is rarely done…"	Marketization, Practices, Knowledge Management, Market Devices	Attempt to capture knowledge, market device lacking, device not managed, conflict between ownership and outcome.

Attride-Stirling (2001) argues that thematic network analysis helps to recognise, sort and link the most common themes in rich qualitative data. Figure 23 displays the thematic network analysis that was performed after the thematic analysis. The global themes of collaboration and innovation in positioned at the centre of the network. The Organising Themes of Business Models, Productization and Marketization/Market Studies around placed around the global theme. Basic themes are then extrapolated from the identified Organising Themes. The benefit of presenting the data in such a way is that it allows the initial conceptual framework presented to be examined. Positioning Collaboration and Innovation at the centre allowed the researcher to visualise how Productization, Marketization/Market Studies and Business Models are connected.

Figure 23: Network of Thematic Analysis



5.13 Researcher Reflexivity

By adopting a pragmatic philosophy, the researcher can influence the research, in comparison to a positivistic philosophical approach where the researcher generally does not interact with research subjects (Brewer, 2000). In qualitative research, the researcher is encouraged to be an active agent (Ozanne and Murray, 1991), bringing the researcher's inherent biases, which must be acknowledged and identified (Miles and Huberman, 1994). Biases could include those related to personal history, gender, biography, social class, race, as well as those directed situated within the research setting (Denzin and Lincoln, 1999, pp. 6).

The above discussion brings importance to the requirement for researcher reflexivity, especially in qualitative research where the researchers "position themselves" in a qualitative research study (Creswell, 2013, pp. 47), where the researcher is often constructed as the human research instrument (Stake, 1995). Reflexivity is an attitude of attending a continual and systematic context of the researcher in knowledge creation, Malterud (2001, pp. 483) defines reflexivity as:

> "A researcher's background and position will affect what they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions"

Reflexivity allows the researcher as Weis and Fine (2000, pp. 34) suggest not to hide behind the cloak of neutrality. Attia and Edge (2017) argue that reflexivity involves a process of on-going mutual shaping between researcher and research. Etherington (2004) suggests being transparent with participants about research decisions, sharing interpretations of data and stating where their data will be represented. Attia and Edge (2017) coin the terms prospective reflexivity and retrospective reflexivity. Prospective reflexivity concerns itself with the effect of the whole-person-researcher on the research. Retrospective reflexivity concerns itself with the effect of the research on the researcher.

Reflexivity was embedded in this thesis in several ways. Firstly, with the supervisory team who guided the researcher throughout the thesis by challenging assumptions and encouraging periods of reflection. Additionally, transparency was practiced through the Universities ethical practices where the researcher was explicit in the purpose of the research and how the data would be used going forward. Every respondent was offered the opportunity to withdraw at any stage without reason.

Further transparency was enabled by providing a senior manager at the utility firm the interview protocol for feedback in advance of any interviews being undertaken. This allowed for the manager to sense check the questions and ensure the matched with how the research was initially explained to them. After phase one of the research was complete a report was written for the associated consultancy firm on the emerging themes and recommendations emanating from the research, this was developed with the supervisory team. One reflective tool the researcher did not utilise was a researcher diary. Upon reflection, this could have been a useful tool as the researcher would have been able to make notes after each interview or observation about the impact of their role in that moment. The diary would also have been useful at tracking the development of the researcher's skills and understanding and provide a context for reflecting on the research and the problems that develop.

5.14 Methodological Limitations

The following section discusses the methodological limitations of the research and the researcher's response to the proposed limitations. The pertinent limitations can be found in

the adoption of a single case study approach and the use of qualitative research and qualitative research techniques as the data collection method. Yin (1984) highlights case studies have three key limitations: Lack of rigour, very little basis for scientific generalisation and too long and difficult. To overcome these criticisms the case study approach followed was systematic, the aim of the research was not to generalise, and length of the research was a key strength in terms of gathering a rich amount of data from several data collection tools. Furthermore, qualitative research is critiqued for lacking scientific rigour, an ability generalise, difficulty in replicating and external validity. To overcome these concerns the qualitative research strategy followed the framework put forward by Lincoln and Guba (1985), which involves following several procedures aimed to increase the credibility of qualitative research: credibility, transferability, dependability and confirmability.

Ethical considerations were also crucial throughout the study and the close relationship between participants and researcher and the trust build up, are recognised as key, this is especially relevant as the researcher switched from observer to participant observer at the latter stages of the thesis. The change in role could have impacted the trust in terms of the perceived motivations of the researcher within the team. To counter this, the researcher strived to create sound working relationships with respondents and was transparent regarding all aspects concerning the thesis.

Sensitivity is a key issue when considering the difficulties of conducting research with respondents worried about being implicated with research findings (Saunders et al., 2007). As explained above, the research granted confidentiality to all respondents and offered respondents the ability to voluntarily withdrawal from the research at any stage as suggested by Alvesson and Deetz (2000). These key steps permitted the research the ability to overcome the aforementioned difficulties of conducting the research.

5.15 Conclusions

The aim of this chapter was to evaluate appropriate research methods and outline and justify the research design of the thesis. To summarise, the research is following a philosophy of pragmatism and an abductive approach to data collection. Furthermore, the thesis is utilising a single case study approach with multi-method qualitative methods. The context is a case study of a large Scottish public utility company. Data collection was achieved through triangulation of qualitative techniques of interviews, observations and document analysis. Data analysis was conducted manually using a thematic approach. Finally,

researcher reflexivity was explored, and ethics considered before the methodological limitations were discussed and countered.

Chapter 6 Findings Towards the Productization of Services

6.1 Introduction

This chapter introduces the first empirical chapter of the thesis, its fundamental aim is to examine the first research question in relation to the empirical research undertaken and findings derived. To reiterate, the first research question probes:

1. How is productization mobilised and exchanged by market actors?

The contribution of this chapter is crucially to understand how is productization configured and how does it work in practice. To be able to address this question it is firstly, necessary to consider the public utility firm's motivation for productizing, considering what the firm had to do to be able to productize, and how the firm has managed the ongoing nature of productization. To achieve this the chapter will consider the findings as three broad areas: how is the productization of a service achieved, how is the productization of a service managed, and how does this impact upon business-to-business (B2B) relationships.

The literature presented in Chapter Two examined productization and servitization. In short, productization was demonstrated to be a process of seeking to make or develop elements of service into a product. It was developed that servitization is where a firm seeks to add service elements to enhancement their traditional product offering. Within the case study framing of the large public utility firm, importantly to highlight is that it is not commercially focused in terms of achieving sales targets, achieving revenues and hitting certain profit margins. Their organisational focus is on providing two key utility services to customers in Scotland. A key consideration emerges from this understanding as they are not concerned with adding services to products, or products to services, for the traditional reasons demonstrated by the literature.

6.2 The Productization of Services

Prior to conducting the first round of interviews, beyond the productization process, the researcher was particularly interested in how knowledge and expertise was utilised and communicated by the respondents. Reading initial source documentation ahead of the interviews, the large public utility firm often referred to 'standard products', standardisation and productization without clearly defining each of these definitions. One of the first

interviews was conducted with Martin, a Standards & Specifications Manager, and the complex and more nuanced nature of productization to the firm slowly unravelled:

> Martin: "I think it's a made up word actually, Productization."
> Researcher: **"**It sounds American."
> Martin: "It sounds American doesn't it? Is it a z or an s, I don't know?"

Martin's expertise as a civil engineer had been amassed through approximately twenty years of service. This meant that he had experienced the change from the regional councils, to the utility firm in its current capacity. Martin expanded, "workwise I've done everything within the utility firm, so I've been through quite a bit of change with that." His uncertainty with regards to the origins and spelling of productization, began to elude to the nature of it being implemented in a public utility firm. Suggesting that despite the humour surrounding the spelling of productization, it was seen as important to achieve and manage. This theme is further exemplified by Paul, a Procurement and Supply Chain Manager, who adds:

> "Yes, standardisation or productisation, whatever you call it, will bring quality products to the group."

Reflecting after the early stage interviews with Martin and Paul, the researcher deliberated the respondents use of productization and the lack of certainty surrounding the use of the terminology, as Simula et al. (2008) argued productization requires a consensus on definitions of productization in general; whether it meant a process or an outcome. However, as the interviews progressed with these two respondents in particular, and supported by the further data collection in the firm, it became apparent that the public utility firm had a working definition of how productization was understood in their context, this led the researcher to further explore what was meant by productization, it emerged as an organisational understanding as to how to prioritise tasks that will be performed under and develop responsibilities.

The difference between productization and standardisation is discussed by respondents, however no respondent specially defines their use of the terms and they were used often interchangeably. This initial understanding referred the researcher back to the literature and the understandings of the relationship between the need to standardise elements to productize, and to continue to productize further standardisation efforts are required. Building on Andreini et al.'s (2015) assertion, that productization requires a shift from relationship intensive customer projects, towards a more standardised offering. However, considering the context of the large public utility firm they are not primarily concerned with international mass markets (Myers et al., 2002).

The duration of the productization work is disclosed by John S, who is an Asset Manager. His relevant expertise is formed by his IT and technical engineering background. His interest in the productization efforts is shown through his management of, "30,000 bits of physical information, bits of information, maps, plans, drawings, files, discs.." John S adds:

> "…we have been working on this for 5 or 6 years or more really, they are building a lot of very small assets to deal with flooding issues, blockages and stuff like that. So they have come up with a standardised product. There is kiosk that will go next to it so it will be very much like a plug in and play, rather than going out with a pretty vague ideas of what we need we are pretty much saying - we know exactly what we need and it is going to be exactly the same for every one of these."

John uses the phrases 'standardised product' with his initial explanation of productization. Showing that the public utility firm looked to implement productization initially on smaller assets. John highlights that the standardised product stabilised the emerging idea and allowed them to exchange it with greater ease. The ease of exchange is facilitated by employees being able to understand, view and play with the standard product, if they find it effective, they reduce uncertainty. These findings add to Bask, Tinnilä and Rajahonka (2010) who saw standardisation acting as a tool to allow efficient service output and production.

John's assertion "We know what we need," offers that by following a process of productization. the utility firm can quite clearly articulate what they know, and what they believe the solution to be. It offers two insights it: Firstly, it suggests that the utility firm truly does know what solution is required. It raises the question, is the utility firm aware of any technology innovations or changes to best practice. Secondly, from an external designer's perspective it allows them to identify the possible misalignments, by being able to specifically identify the baseline knowledge of the utility firm. From John's insights, conceptualising the productization process begins with standardisation, standards products and finally being in the position to offer productization.

Karen, a Business Change Manager, although she initially trained as an accountant, her expertise has moved into benefits management and benefits management realisation. Karen further explains the utility forms need to productize its offering.

> "…And one of those that was identified was the use of much more standardised products and productization. Because what seemed to be our experience was that we

had a habit of creating something and then rather than reuse it or tweak a lot of it we would then go and design something."

Karen combines the use of the terms standardised products and productization. This again portrays that a crucial element of the utility firm was to initially standardise in order to then productize, representing a clear effort to systemise and standardised offerings to make them easier to exchange (Flamholtz, 1995). She offers insight into the need to consolidate the firm's knowledge and expertise into something that was stable and exchangeable to designers. Her comprehension supports the conceptualisation of standardisation as an important part of the productization process. Karen's use of the term "more" is subtle, but starts to reveal a conscious thought, that solely having standardised products may not be required and feasible.

Karen further comments:

> "So trying to get people to think of the bigger picture and how do we change behaviours to get people to think immediately, 'Do we have a standardised product? Rather than running off to design something. Because that is the sexy thing to do, is to go off and design something new. Bit boring to say, 'Have we got something on the shelf? Or something that is pretty close that we would just need to do a wee tweak around the edges that we could then use, plug in and play type of thing."

Karen's perception of productization eludes to the importance of a culture shift in the behaviour of employees. She highlights the discipline required of employees to use the utility firm's existing knowledge and experience before making decisions. Productization is seen as the process that is capable of drawing these elements together for employees. Karen's viewpoint sees productization as having the ability to provide a workable solution within certain parameters with small amounts of adjustment required to be the complete solution. This understanding encapsulates the idea that productization can stabilise the emerging need, the exchange is simplified the existing knowledge, expertise and product. From this the utility firm and the external designer can adjust with greater understanding of the final solution required. Productization is used to tangibly accumulate and evaluate knowledge (Leoni, 2015) and portray the expertise of the firm to its customers (Valtakoski and Järvi, 2016). Valminen and Toivonen (2012) argued that for knowledge intensive businesses, customer-orientation was still a problem to those who required the transfer of professional knowledge to customers, with Ritala et al. (2011) adding that this is due to the vast levels of diversity found. The utility firm is productizing with internal employees, partners and suppliers they are not engaging with the final consumers of its services. This

means that the public utility firm are not required to transfer professional knowledge to customers.

Paul, is a Supply Chain and Procurement Manager at the firm, he had worked there for approximately ten years. Paul's expertise is in supplier relations management, which he refers to 'as getting people to work to the contracts, managing the suppliers and the stakeholders. Paul's core responsibility is to make sure that the suppliers and the whole supply chain functions efficiently. The researcher asked Paul about the utility firm's use of knowledge management systems, with Paul responding:

> "…apart from the standardisation, yes, I suppose so…the productisation, we've now got a grasp of certain commodities that we want to study, and that's through the knowledge of the utility firm knowing what we want to standardise, so we go through a process of selection at a high level, so yes, we probably use it more for productisation, however we don't get full knowledge."

Referring to productization as a knowledge management system was a novel answer and something the researcher was not expecting to hear. The understanding gained from this insight, considers that productization when integrated with an IT system (Paul does not specify which system), allows employees the ability to store and access knowledge. The IT system would systematically help facilitate the ongoing changing nature of the standards used, the reasons for changes, and provide the sources of knowledge. In considering that systemising productization is what will permit the utility firm, to turn a manual, hands-on, value-added service into a product, that can be run with or without specific employees. It enables the productization process to be distributed wider throughout the firm. If not the process itself, then the emerging ideas and solutions. Paul's comments highlight that the utility firm sought to identify high level commodities that could be productized by using the internal knowledge of the utility firms to assess the capability of standardising them. Paul mentions "however we don't get full knowledge" which implies that there is something lacking from the process. Is the utility firm failing to capture all the relevant knowledge, which led the researcher to question, is full knowledge required or possible?

John S further comments on the continual improvement element of productization:

> "You just have to make it fit, so there is less of that money spend designing that bespoke type thing. It is a standard type thing, so I think that project is a really good example of productisation and out of that is actually an efficiency to the works manual as well because the works manuals now will just be a couple of lines added

> in because everything else is standards, it shouldn't change. Rather than rewriting every time. Bespoke manuals for bespoke assets every single time."

John supports the view the productization reduces the need for customised solutions, which in turn reduces cost and increases efficiency. Furthermore, his comments highlight how standardisation enables productization by referring to the 'works manuals' and the ease to which they are updated. The standardised approach to them prevents knowledge being held in specific locations and by particular people, it liberates the knowledge while providing a detailed history of the incremental changes in it. John's comments support the understanding that the productization process requires continual feedback and collaboration amongst actors to ensure the manuals are up to date and that it is not always linear (Artz et al., 2010). The ongoing management and collaborative efforts adds to Andreini et al. (2015) who stated that it is an internal process that should be standardized, not the external relationship activities.

Martin, a Standards and Specifications Manager, contextualises the difficulties the public utility firm was having with regards to reproducing work.

> "When you look back over that time period, we had 200 different designs of kiosks, some of them only being 5mm of a difference in size, some of them being green, some of them being blue, ridiculous. So every single design, say a kiosk cost £20,000 to design and install, 20% of that was going to a designer to actually design it… Well, this is ridiculous, we've just spent X amount on 200 different designs", so they brought in something called Productisation."

Martin's reference to kiosks varying by 5mm highlights the outcome of not presenting designers with clearly defined standards and specifications. It comes across as a contentious point that exemplifies waste and a lack of efficiency at the pre-productized way of operating (Simula et al., 2008). It offers that there is no justification for having two hundred varying designs and 'attempting to reinvent the wheel' (Skålén and Hackley, 2011). Standardising and productizing the offering was seen as a proactive step for the utility firm. If inbound productization for one firm equates to outbound productization for another then it is possible that designers may have presented the public utility firm with their own productized offering as they utility firm failed to succinctly and uniformly offer varying designers a unified set of standards and specifications.

Figure 24 below represents a visual example of a productized kiosk developed by the public utility firm.

Figure 24: Productized Kiosk

Source: Adapted from internal source documentation

6.3 Standards and Specifications and Productization

Stephen, a Technical Team Leader, is a chartered engineer and responsible for the management of Standards and Specifications. Stephen highlights how developing standards and specifications was viewed as one of the initial steps in the productization process.

> "My embedment plan was to get it all into the standards and spec so that it was our specification. It was also embedded by us saying - right we are going to set up a framework and it is a one stop shop, rather than getting the telemetry unit from that supplier the actual green GRP from that supplier, the control panels form that supplier, the actual green GRP from that supplier and the commissioning on it all from that supplier we said - no, one stop shop."

Stephen's comments highlight how the public utility firm sought to take control with regards to standards and specifications due to the belief that this would allow them the most amount of control and efficiency.

Stephen adds:

> "We will give them the order for a standard one and they will have to get it from another supplier and they will be responsible for testing it, commissioning it, making sure it works before it comes to site - plug and play. So it is one stop shop

> for the contractor. It is also 50% cost savings on the unit from previous, even not considering the design costs and remedial costs."

Stephen's view of how productization will work for the public utility firm, is grounded in an understanding that they will be buying highly stabilised products and that the responsibility for the research and development will be taken on by the supplier. This view underpins those of other respondents, in that the public utility firm believed that external firms were being opportunistic with regards to the public utility firm's culture of not knowing its own baseline knowledge and requirements. Stephen elaborates further:

> "…because of the way the public utility firm has historically been delivered. They have driven it by saying right we have a problem we want a CSO screen and that was the brief to the designer so the designer would maybe have half a dozen jobs and they would design everything to scratch… the vision is to have two catalogues - one being the public utility firms' standard designs and one approved supplier designs - products you can get off the shelves like B and Q. And then only 20% of cases should we go back to first principles for the specs and say - we have to design this for scratch, so it will be very much .... 80% of what we do we have done before multiple times. We might as well standardise it all."

Stephen's comments elude to a belief that standardisation and productization are different. Standardisation implies a completely dictatorial way, whereas productization offers a systemised (Chattopadhyay, 2012; Valminen and Taivonen, 2012; Nagy, 2013) way that still provides flexibility for unknown solutions to be presented to the public utility firm. The vision to develop one approved supplier design catalogue of products, highlights the public utility firm's commitment to continual collaboration and recognition of the value in external expertise. For the approved designers, this would allow them greater insight into the specific needs and wants of the public utility firm. Pyron et al. (1999) stated that all the activity undertaken priority to having a commercially ready product could be classified as productization. However, in the case of the public utility firm, they expand productization beyond purely the development stages via continual collaboration, which aligns with Rautiainen et al. (2003) who cautioned that productization extends beyond developing new products.

6.4 Productization in Procurement and the Supply chain

When discussing the impact of productization on the supply chain Stephen states:

> "This will require coordination of various kit suppliers, so they have an integrated approach. The aim is to deliver a fully fabricated kiosk to site including the black board, screen control panel and remote telemetry unit. It is not just kiosk design where a standardised solution will be employed."

Similarly, Paul the Procurement and Supply Chain Manager, considers the role of productization on the public utility firms supply chain:

> "…in procurement because then we can go to market with more details on what we're actually going to be spending and they are going to be spending, and that helps the supply chain all the way through for continuity and it brings more efficiency throughout it, so there's a lot of knowledge out there, and people do know it's going on, but they've all got their own project agendas, so you're always…not fighting, but you're always kind of scrambling internally to try and get hold of that knowledge."

Paul's comments highlight the stabilising nature of productization in the marketplace with regards to procurement, as it reduced the ambiguity in terms of the framing and quantity required. Paul's reference to the internal 'scrambling for knowledge' illuminates a fragmented internal way of working, it also alludes to potential conflict as actors pursue the success of their own projects. The productization process of the public utility firm acts as a means to attempt to ease this potential conflict by providing a space for knowledge to be stored and accessed by all employees. This finding aligns with and adds to Valtakoski and Järvi (2016) who found that employee involvement and cross-unit collaboration, alone were not adequate precursors for effective productization. Effective service productization was achieved when project objectives were in sync with the employee promoting trust between the project teams facilitated employees sharing knowledge.

Paul adds:

> "Now there are two routes in implementation that we're doing, especially in productisation. We're actually changing a culture within the public utility firm as well as the marketplace. The marketplace supply chain to the public utility firm was quite Jurassic, so the control panels, nobody's ever attempted that before, and we're trying to educate the supply chain and changing their way of thinking and we're also trying to change the way of thinking in public utility firm as well. You have to start internally before you actually mushroom out. If everybody turns around and says, oh, the supply chain is going to be this, going to be that, blah-blah-blah, the supply chain can be what you want, but we have to utilise it and work with it, so we have to change internally."

Paul's statement reveals the complexity and size of successfully implementing productization. Internally, standardisation, standards and specifications were used as mechanisms to guide cultural change. As much as productization relies on internal collaboration, the role of external suppliers is crucial to its successful implementation. To

change the culture of the supply chain, towards an integrated supply chain the public utility firm must strongly articulate the value in doing so to the suppliers and not just make it seem individually beneficial. To suppliers, an integrated supply chain embeds them in the public utility firm's core processes across organisational boundaries giving them a unique insight into their customer's requirements and way of thinking. The suppliers can align their expertise in order to provide the required cost efficiency to the public utility firm. Furthermore, Paul's insights underpin the importance of collaboration between supply chain and the public utility firm. Paul's description of an archaic supply chain suggests that the notion of collaboration would be new to suppliers and they would not necessarily have a collaborative culture. Jehn et al. (1999) viewed that some conflict can spark innovation however, recognise that too much is counterproductive. Lehtonen et al. (2015) found that productization encourages reflexivity in service development but may reduce it in service operations. If productization disagrees with the organisation's cultural norms and values, it enhances the structural reflexivity of employees (Lehtonen et al., 2015). The culture and relationship of the supply chain with the public utility firm is further revealed by Stephen:

> "I think the innovation has been driven by the public utility firm. We try to get the supply chain to drive but they weren't really coming up with anything that creative. Perhaps the incentivisation model was wrong. There was an expectation on suppliers to provide so many ideas per month and there was a league table and all that…"

Stephen discloses attempts by the public utility firm to encourage supply chain innovation, that had little effect. The incentivising efforts adopted were not taken seriously by suppliers and failed to offer value for them to do so.

> "…but it didn't really work. They were putting down silly things in order to get the numbers up. Nothing that was really earth shattering that we didn't already know about in house… and also I think fundamentally one of the problems was that we had a supply chain that was working in the commercial directorate rather than in the delivery directorate and the procurement should have sat either in the end user space - operations or in the capital delivery space. It should not have sat in commercial because they were just commercially driven - cheap is good."

Stephen comments further that in uncovering the contempt that the supply chain had for the incentivising efforts, treating them as a quantity over quality exercise. Including the supply chain in the productization process and revealing the developed standards and specifications would provide suppliers with the public utility firm's baseline of knowledge. This would prevent the frivolous attempts at innovation offered by the supply chain. It would also permit supply chain partners the ability to view the real issues that are facing the public

utility firm. With the public utility firm's willingness to collaborate supply chain partners, would not be left to innovate alone if they the value of the innovation was sufficient.

The second point to note from Stephen's insights is the misalignment of the procurement department within the public utility firm. Stephen's suggestion is that the most value for the public utility firm was not being achieved due to a commercial focus on finding the cheapest solution. His understanding is that by being aligned with operational or capital delivery business units they would be better placed to effectively innovate, and as a result Procurement would have a real sense of the day-to-day needs of the utility firm.

Stephen provides the example of the telemetry (automatic equipment that measures and transmits data from object with remote access) specialist subcontractors contracted by the utility firm's Procurement team.

> "We had made the assumption that the TSSs - the telemetry specialist subcontractors knew what they were doing. But again, because procurement was in commercial, they had TSSs which maybe weren't the best, not the most competent."

Stephen offers that the selection of the telemetry specialist subcontractors was driven by the procurement team. Questioning the telemetry specialists' level of expertise suggests the public utility firm's technical experts were not involved in the selection process or that they were not able to accurately assess the telemetry specialists' expertise at the time, ultimately resulting in an exchange that was stabilised incorrectly. This type of decision making would now be determined and stabilised by the standards and specifications developed, where the public utility firm's baseline knowledge would be much easier to exchange. Following the developed productization process could account the individual teams or employees lack of knowledge. It would also ensure that the internal teams, in this case, Procurement, Operations and Asset Delivery were collaborating to achieve the best outcome.

Stephen's assertions highlight the internal and external conflict that arises within business-to-business relationships from this type of decision making.

> "…And they hadn't been policed there was no consequence to the fact that it wasn't working at the end - we set it up, it must be your top end that is wrong, and telemetry is such a complex thing that because of all the electronics involved. My dad used to have the three Bs - bullshit, baffles, brains. So a lot of people were just baffling others with science. No one was sure what the problem was. But when you go and talk to the experts and you put in a productisation process that makes sure you get what you want and puts in the safe person and the checks and it works - first

> time. While it is slightly more expensive doing it this way, but when you compare it to two years of remedial work on the last program work to get all the telential? Working we paid for it twice last time, so that was a lot more expensive than just a wee bit expensive."

Stephen's frustration over the situation is apparent from his use of language and tone. The researcher noted that although Stephen was laughing and smiling, it was more so from a position of disbelief and frustration at the situation, than that of joy or happiness. Stephen's initial contention is with the lack of accountability with regards to the decision making. The reflection he provides is that by having a Procurement team focused on commercial elements, such as cost, the decision making was likely to be unstable from the beginning. These findings add to Spring and Araujo (2017), who found that products are often unstable elements, that are not always positioned to facilitate the delivery of a service and are not simple to manage (Spring and Araujo, 2017). Additionally, the productization process works with complex issues that are solved for customers by utilising specialist expertise and knowledge (Gummesson, 1978; Jaakkola and Halinen, 2006; Jaakkola, 2011), here the public utility firm struggled to gauge the required expertise and knowledge.

With regards to managing the conflict itself, Stephen puts forward that the discussion centred around technical language that would require a certain level of expertise to interpret and digest appropriately. The telemetry specialist subcontractors were experts in telemetry, the Procurement team of the public utility were not, and the other technical teams did not have the same level of technical expertise as the specialist subcontractors. Adopting a scientific language for the discussion only resulted in escalating the conflict, by blaming each other. Stephen proffers that by now following the productization process established the public utility firm would be able to clearly articulate what they want, even if they cannot state how this should be achieved, which is the reason for seeking external expertise. Additionally, productization would assign an employee who would be responsible for managing the work. They would be required to test solutions against the set standards and specifications. In the context of the public utility firm, decision making in productization is a way of achieving efficiency and then scalability for repeat products. Adding to the work of Simula et al. (2008), the findings show the importance of rationalisation which is required before the output of creation, or the delivery process will produce an unambiguously defined offering. The public utility firm's struggle with the management of the TSS suppliers meant efforts lacked scalability (Simula et al., 2008). It shows that the public utility firm did not invest enough time resources, at the early stages to modify the

product into a shape that is easy to understand and use (Simula et al., 2008), as such they miscalculated the supplier's enterprise and understanding.

6.5 Realising Productization

Bob, is an Alliance Manager within the Capital Investment business unit who has worked at the public utility firm for approximately fifteen years. Bob is a commercial expert whose knowledge is underpinned by a master's in construction law and BSc in Quantity Surveying. His role at the public utility firm is to ensure that the capital programme is delivered effectively, and he was part of the productization steering group. Bob and the researcher were discussing productization when Bob stated:

> "…there is stuff I could pick at around the productization… but on the whole, he's done a good job and you're better doing something maybe imperfectly than sitting and doing nothing, waiting to get perfection… There are bits that are not done particularly well."

This prompted the researcher to explore the criticism of the productization work further:

Researcher: "Have you seen any of the fallout from when that happens, for example, so if operations are saying we can't use this?"

Bob answers:

> "We're about to see it, because we're going in the first days of these productised products, we're about to see. We're about to go and say, here's the new utility booster pump stations that you're going to get, and we're going to get all of the shit coming back from ops, going that's a piece of crap, don't like that, because they've not had that level of … they've not had that engagement. What I said to the productization team is if you have somebody … what actually the ops guys are looking for is for somebody to say, who signed that off, and you go that was Jimmy in Dundee. Oh right, Jimmy's… knows what he's talking about, I'm happy that he's signed it off. But if you go, it was Harry, but Harry doesn't know what he's… about, never worked one of these things in his life so I say they're looking for somebody to go … a trusted person to go, aye Jimmy's okay, I get it, he knows what he's talking about. If it's good enough for them, I'll run with it if he said it's fine."

Bob's example here is centred around expertise, and how reliant operations staff at the public utility firm are upon their networks. Jimmy and Harry are fictional actors that he utilises to exemplify his point, whereby the operations employees trust the opinion of other operations employees, they share similar expertise, knowledge and perform similar jobs

across varying sites. If they do not associate the person's expertise with the product they are immediately sceptical. Bob's criticism eludes to ensuring that when seeking to productize, the employees who will be using the final solution must be involved.

Bob comments on the productization work of Stephen, the Technical Team Leader who was a previous participant:

> "The other bit from the productization group is that they had a really good example of how to do this, do the stuff that Stephen did in terms of having a pilot, actually commissioning a pilot unit so the CSOMCC unit, what Stephen did was he went away and commissioned a real-life working build of one of these remote control centre kiosks and installed a sewerage treatment works and everybody was invited to come and play with it, poke it, we'll open that, the light shines there but I can't see what's under there, and from that over 200 people I think, went to have a look at this thing and there was about a dozen modifications that came off the back of it."

Bob views piloting as an effective stage and key process to ensure that the operations staff are able to provide feedback on the products developed. Taking the time and effort to pilot reinforces Stephen's previous point, that productization is not always about the speed of the solution, and more so the stability and effectiveness of solution itself. Within the literature, productizing has been seen to accelerate the diffusion of the productized service throughout the firm (Den Hertog et al., 2010; Winter and Szulanski, 2001). However, the findings show that the public utility firm is concerned with productizing attempting to improve the implementation of the service (Menor et al., 2002). Harkonen et al. (2017) affirm that piloting can be utilised to garner comment from the productized service. It permits the firm to learn from the initial productized offering by adapting where required. Additionally, piloting can provide the firm with additional opportunity to promote success to other customers. From this stabilised position, further exchange is simpler throughout the public utility firm which is exemplified by Bob's comments:

> "You can guarantee that when that thing gets delivered to the next site, nobody will even give it a cursory look because it's, that's one of them, I know I'm happy, that's going to be fine. Doing more of that would be good so for these other products that they've put together, actually having a real-life pilot put out there that people could poke, and prod would be great, but that's money dependent and it's time dependent. I think we probably should have said which ones are we going to do that on, so if you've got big high volume, big numbers then we should have gone actually that's worth investing in a pilot."

The stabilising of exchange as it relates to productization is further examined:

> "What we then need to do is to sell it to everybody else, sell it to the ops guys and say, unfortunately you've got version number one and it isn't going to be perfect, there's going to be issues, but unfortunately, you're the guinea pig here. It's going to go into service and if there's anything that needs a fix then we'll do our best to fix it but this is it. What that means is that version number two that we roll out to other sites will be better. And iteration number three etc., until we get to a product which actually is pretty well developed."

Therefore, productizing allows the emerged idea to materialise into something workable, which can then be touched and tested. Simula et al. (2008) use the example of prototyping to explore inbound productization commenting although the prototype highlights functionality and viability to the customer. The findings show the public utility firm going one step further with piloting, seeking use of the perceived commercial readiness to enable 'selling' within the public utility firm (Harkonen et al., 2015).

The importance in gaining acceptance of the product is the ability to convince operations staff that they have the opportunity to provide valuable feedback on the usability and performance so that the next version will be refined from being used in the field. This also effects the operations staff expertise as they learn how to operate and fix each version of the product, it shows that productizing contributes to internal organisational learning (Sundbo and Toivonen, 2011).

The instability of standardised products is recognised by Bob below:

> "Again, we've not really conveyed that to the productization team, I don't think we've really conveyed that out to the general population to say here's the standard products but don't expect them to be perfect because actually we've not poked and prodded them and tested them like we have the MCC, you're going to have to live with the fact … that's a really difficult sell to say to someone, here's a shiny new product and we know that it's probably not right but we want to avoid… it'll avoid throwing the baby out with the bath water, it'll avoid people going, I'm not having one of them again, go back to the conventional (bolt the pump on, bolt the pipework on, deliver a kiosk, because that thing you gave me was rubbish. We're giving you it, it's the best we've got but just view it as it as a learning exercise, the next one will be better. We'll do what we can"

The recognition and communication of the instability is fundamental to the success of the offering. Bob's perspective suggests that anything other than full transparency with regards to the readiness or completeness of the standardised product will hinder, its development as an asset, and the wider use within the public utility firm. Productization takes the emerged

idea (Suominen et al., 2009) with the goal of packaging the offering, technology or service, so that a customer can understand the content of it in advance (Simula et al. 2008). Stabilising and having accepted the intended value, is key for a service firm (Edvardsson and Olsson, 1996) to reduce uncertainty (Mitchell, 1994).

Paul adds that despite all the efforts to stabilise and test the product, problems occur and persist when attempting to communicate and appropriately train the wider workforce:

> "One of the problems we have seen in the past is that they don't communicate very well with each other, you know? For example, the productisation, one of the end results of that, and the first outcomes, was the control panels, they standardised them and just recently we went through workshops and training courses, we went all over Scotland with these things to show people and we went through a whole process training and yet you've still got someone within an organisation phoning up and saying is this live, how do I use it? You know, because they're not communicating properly within themselves. So we do do it, we do share the knowledge with them through that, we give them all the documentation and, as I said, that particular one is loaded up into documenting so they can get full access to it. It's also lined up with the standards and specs, so all the information is sitting there waiting for them, the knowledge is sitting there waiting for them to use. It's the old saying, isn't it? You can take a horse to water but you can't force it to drink."

Paul's discussion highlights that despite the various efforts at aligning with the standards and specifications, including pilot testing, implementing the feedback, communicating the standardised product, and developing appropriate training, there is still difficultly in communicating throughout the public utility firm. This finding adds to Vaast and Levina (2006) who argued that effective service productization requires the ability of the employees to perform during the service. Further Vaast and Levina (2006) argue that it can limit an employee's ability to improvise and prevent their ability to act in the moment to satisfy customer needs.

6.6 Managing Productization through Service Level Agreements (SLAs)

The above findings and discussion has highlighted how the public utility firm initially developed standards and specifications to create standard products, then to productize its offering. Following this process allowed the public utility to diligently stabilise any exchange, both internally and externally. The following sections detail understandings as to how the public utility firm manages productization when actors question or challenge the standards and specifications that are presented. From the literature, productization increases the ability to delegate work (Leoni, 2015), which is evident in the case as the Standards and

Specification team were assigned the responsibility, due to their knowledge and expertise to manage the public utility firm's waiver system and develop service level agreements. Martin is the first respondent to provide an insight into the waiver system that the public utility firm uses to manage productization:

> "We have things called 'waivers' that come in, so we have suite of documents, our specifications and you have to build a utility treatment works or whatever to that specification. If you for some reason can't comply with that spec, you could submit a waiver and ask ourselves if you can cut that corner or whatever it is. So I don't know off the top of my head how many of these waivers we get in, but probably I alone must get 10 or 12 a week, so as a group we must be getting 40, 40… If we say 40-50 a month I wouldn't be too far off it, and that's waivers coming in, that's actually specific spec waivers."

The waiver system, as explained by Martin, is effectively a challenge to the standards and specifications that have been developed and communicated internally and externally. Martin asserts that groups who are given agency as the technical experts with the public utility firm are responsible for managing the waivers. The waivers are a way of actors challenging in terms of being able to offer a different solution than anticipated, and also a way of formally stating that they cannot comply with the standards and specifications. As a public utility firm who is concerned with risk and public health, this is an important part of the process to manage. The waiver system is an example of the public utility firm using productization as a service to add flexibility to its efforts to systemise its productization efforts (Jaakkola, 2011; Lehtonen et al., 2015). Additionally, the waiver system allows the standard and specification team to specify the services that they offer and how challenges to the standards and specification can be made (Jaakkola, 2011; Lehtonen et al., 2015).

Paul comments on the challenges of dealing with products that are currently not meeting the standards and specifications that have now been created.

> "At this moment in time, a lot of suppliers, especially in the capital world, a lot of equipment will get put in that's not to standards and specs so you do run a risk then, but the productisation group, yes, we've designed these products now, so we know everything that's going into that, so they can't deviate away from that, so we know what we're putting in is good quality kit which takes away that risk element."

The explanation illuminates productization as a way of internally stabilising risk, it ensures that suppliers cannot diverge from standards and specifications, which permits exchange to occur, as it is seen as a commercial good or service viable in the market (Suominen et al. 2009). From a procurements perspective, it provides greater confidence in exchanges that happen out-with their immediate line of sight.

Brian S, who is a Senior MEICA (Mechanical, Electrical, Instrumentation Control and Automation) Strategist has over approximately forty years' experience in the utility industry. Brian's role is centred around standards and specifications and the development of these both in the UK and within the utility firm. Brain S who was interviewed immediately after Martin, provides further insight into the waiver system:

> "The document holder can call upon stakeholders from other business areas to assist should we have a, we have, for example, if I had a query on a portable utility question I would go to the public utility firms' regulation and discuss it with them and that doesn't mean to say we pass the decision making to them, the, the team that we work in have the final say and waivers, whatever waivers they approved or rejected."

It emerged that document holders are selected based on their technical expertise such as Mechanical or Electrical engineering. Brian S underlines that the ultimately the responsibility of approving or rejecting a waiver, sits with the Standards and Specifications team. The Standards and Specification team will collaborate with other internal teams if they require additional expertise or guidance. Brian S adds:

> "We have a process for queries, for waiver requests, for change requests, for innovation, for document review, all these processes are ISO9001 documented, Mark will tell you more of that because he was involved in it all. So, we've got these processes in there and we've also set ourselves KPIs, as I said, we'll try and respond to waiver requests, for example, within three weeks."

Therefore, the waiver systems job is to repackage and stabilise the challenges in a more tangible way that can be acted upon by the Standards and Specifications team. Martin provides further details regarding responding to the waivers:

> "With the regards to the waivers, we've got SLAs set in place for them, Service Level Agreements that we'll respond to them within 21 days, so if you send in a waiver, that you're wanting to put a square pipe instead of a round pipe, I've got 21 days to tell you not to be so stupid."

Service level agreements are what the public utility firm use to help stabilise the waiver system, they are created by the Standards and Specification team. Martin highlights the tensions and difficulty of implementing standards and specifications, and standardised products, and productization throughout the public utility firm. Martin's jovial quip "…I've got 21 days to tell you not to be so stupid" exemplifies this.

Brian S adds how the Standards and Specifications team manage the waiver system and communicate this to the wider business:

> "We produce a, we have team meetings every two weeks and they've given us an improvement advisor, cracks the whip and she produces all these pie charts and graphs and tells where we've succeeded and where we've failed and we publish some of these on our website as well to let people know how many waivers we've managed to respond to within time, how many we've approved, how many have been rejected and all of the other stats like that that people might find of interest."

> "What we're trying to do is dispel the myth that waivers never get approved in the public utility firm which was getting passed around at one time (laughter) and when they actually published the stats, we could show that just over 90% of waivers were actually getting approved if all the information came in with them and they could show that there was a benefit public utility firm and people have gradually got the message after a number of years that if they discuss things with us, they've much more chance of getting something accepted at the end of the day when they've come to sign the handover papers if it's been discussed with us and agreed with all the stakeholders then they've much more chance of getting it through quickly and easily than they have if they get, if they have a non-compliant design or non-compliant description and they try and get it passed through at the last minute, they've got a problem."

Brian S seeks to address the potential misconception that the Standards and Specification team do not accept waivers. He attempts to communicate that as a team, they view waivers as a way for anyone to collaboratively approach a problem, with the Standards and Specifications team. The team do not expect waivers to be submit without any prior knowledge of there being an issue. The Standards and Specification team act as safeguards for the public utility firm, in terms of risk and regulatory compliance, their ultimate concern is what is best for the business and public health.

Paul provides granularity to these insights of the waiver system, in both a commercial and technical sense:

> "There are two waiver systems. Procurement only really get involved with the commercial waiver, so for example, you're on the framework and you give us a price for £100 for a Dictaphone or whatever, and you come in and go I can give it you for £50, then we need to look at that commercially. So we'll get involved in that waiver but there's a lot of background work that we would do before we even approve it or reject it, do you know what I mean? So, for example, right, how genuinely does it meet the standards and specs first of all, because we'd be questioning why is that 50 per cent cheaper than what they're getting? Or is it just that you're coming in just as a blitz to bust the market and then…so you can't continuously give us it for £50, so we would do all that kind of thing. And the technical waivers, we tend not to get involved in, however, like myself, I'll ask the guys in standards and specs if there's anything, so I could see them, just for knowledge only, just for knowing development, to see why are we going to this guy,

> that's five waivers that we've accepted from this guy for this product, and our challenge is…you know, I would go and challenge the standards and specs and say to them."

This finding starts to show that from a procurement perspective, productization permits exchange and stability by making pricing easier (Leoni, 2015) and various mechanisms (Valminen and Toivonen, 2012), as such the procurement team have a greater understanding of the value proposed (de Brentani, 1991; Valminen and Toivonen, 2012).

Procurement emerges as the main concern is in the commercial waiver, and they do not generally involve themselves in the technical waivers, unless there is an unprecedented amount of waivers beings accepted. Paul adds:

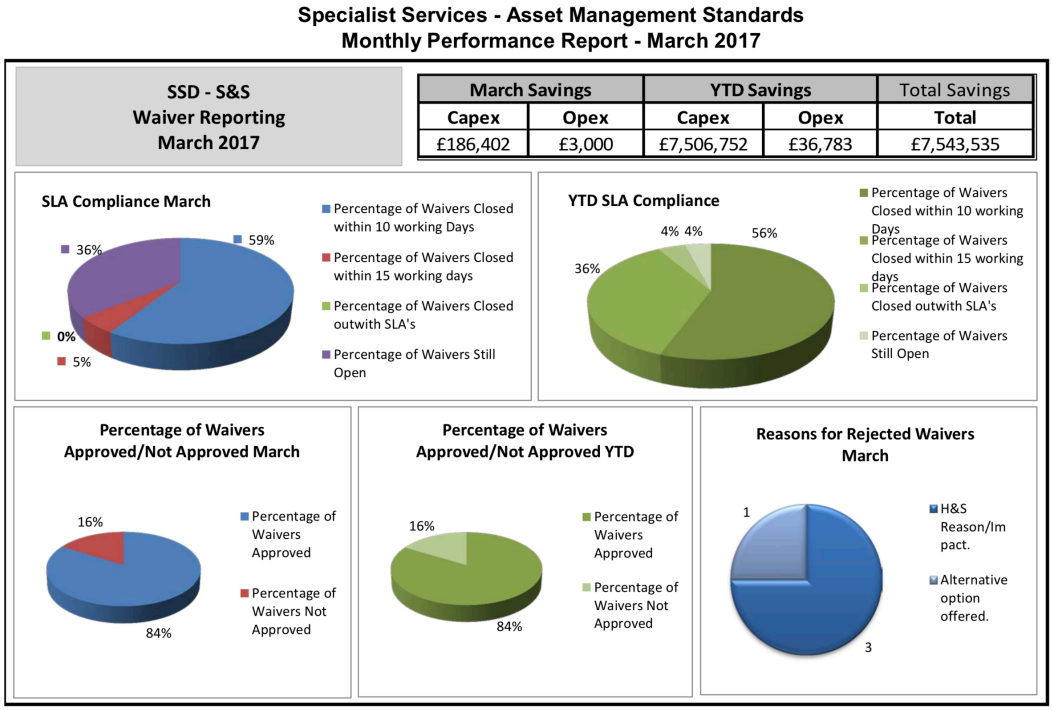
> "Aye, what's going on? Is your standards and specs not good enough for what we need? It's different if it's a one-off, and by the way, we've never reached that level yet, but if they did do that, then that's what I would be saying to standards and specs, well done, guys, we need to change the standards and specs. But I've got a good stakeholder group within standards and specs, I'll ask them questions, not challenging but just saying, well, why do we do it this way? Why are we stuck with this? That there is strangle-holding us from development as far as process kit is concerned. There might be good modern technology out there that is far superior to what we use, but it doesn't meet our standards and specs, so gradually I've seen a change in standards and specs over the years, they're now starting to look."

Procurement plays a role in helping to moderate the standards and specification, as Paul states it is not confrontational, or to challenge the standards and specifications expertise. Paul's assertion that the Standards and Specification team have started to look more extensively for modern technology, is exemplified by the process that was followed to productize. When they are not able to seek new technology the waiver system can be considered as pulling innovation towards them.

Source documentation provided by the public utility firm, and subsequent document analysis, provides a more nuanced understanding of the waiver system. This reporting represents part of what is communicated to the wider public utility's teams. Figure 25 show the total savings achieved through productization for the year to date is £7,543,535. The figure shows that for the year to date the Standards and Specification team close fifty-six percent of waivers within ten working days, the team offer a service level agreement of twenty-one days to respond, and close waivers. The primary cause of rejected waivers is due to health and safety concerns. The source documentation added to the researcher understanding as it reveals that the waiver system helps manage inertia, as the Standards and Specifications team are not rigidly uncompromising in defending the standards and

specifications that they develop. The waiver system highlights that the team functions as custodians of standards and specifications, and are ultimately concerned with the development for the benefit of the public utility firm.

Figure 25: Waiver Monthly Performance Results



The year to date (March 2017) the saving figure provided does not portray the entire benefit of productizing to the public utility firm, as Paul states:

> "Aye, most of it is theory just now, right? But I'm more than confident that the benefits case that we put forward will come to fruition, right? … Not just on cost but on understanding, and their cultural change, because you're not just looking for the cost-benefit as in pound for pound, you're also looking for the benefit of more efficient on site, so these panels now are going from a 16-week lead time down to anything between six and eight weeks, so that's massive. That's a lot of cost saving on site, plus health and safety, quality, all that disruption to the customer, we need to look at all that as well. So there are benefits there. The real benefit will come in SR15 because the productisation is for 5.0 standards and specs, not 4.1, and 4.1 is what the company is working at this moment."

Paul's comments provide detailed insights into the further benefits expected such as: health and safety, quality of service and customer satisfaction. Paul's final insight here discloses that for standards and specifications version 5.0, productization will be fully embedded. This finding adds to Suominen et al. (2009) who stated that the starting point of productization is produced information, and reusing earlier information is efficient but should focus on new exploratory technology.

The waiver system is an example of the public utility firm engaging in outbound productization (Simula et al., 2008) as it allows the standard and specifications team to manage the relationship of multiple stakeholders. This allows the team to stabilise the offering, provide visibility, and importance to continual productization (Simula et al., 2008) as the Standards and Specification team must collaborate with internal and external actors to investigate if a waiver should be accepted or rejected. Simula et al. (2008) found that resource is predominantly directed towards the inbound (development) stage and that the applying the correct amount of attention to the outbound stage is often neglected, suggesting it causes a firm to over-engineer. This finding highlights the public utility firm's attempt to balance the inbound and outbound productization processes. Delegating responsibility of the waiver system to the Standards and Specification team ensures continuity, and acceptance of the developed standards and specifications, as the team were the actors who diligently developed them initially.

Additionally, in considering the recent literature, Flamholtz and Randle (2016) argue that the productization process involves not only the ability to design a product or service, but also the ability to produce the product or service. For a service firm, the ability to produce a product involves the firm's service delivery system the mechanism through which services are provided to customers (Flamholtz and Randle, 2016). The waiver system represents efforts to stabilise the productization with a service delivery system mechanism.

As previously identified in this chapter, from observations and highlighted respondents including Karen, Stephen and Paul, the public utility firm is attempting to change its culture by implementing productization, as such they are shifting their efforts internally and externally, to focus on relationships. The waiver system represents a way to manage these relationships and counters the perceived inflexibility of the productization process (Hellström et al., 2016), which is permitting easier exchange through demonstrating value (Simula et al., 2008; Harkonen et al., 2017) and providing those who wish to submit a waiver with a voice.

The waiver system acts as a mechanism for increasing the public utility firm's productization level as the maturity of their offering raises, which also removes abstraction level and the outcome of productization, be it service or a product, it will be easier to communicate to an end customer (Simula et al., 2008). The findings show the public utility firm used productization as a process that exploited specific cross-functional resources at an

early stage (Suominen et al. 2009) and that through the waiver system, and the outbound productization efforts, they are committed to exploiting cross-functional resources.

6.7 Chapter Six Conclusion

This chapter has introduced the first empirical chapter of the thesis with the objective of exploring the first research question.

1. How is productization organised to stabilise exchange?

This chapter builds on the literature contained in chapter two which demonstrated a belief that productization and service productization, is under-research, an assertion that is underpinned by a strong body of researchers (Davies et al. (2007; Simula et al., 2008; Suominen et al., 2009; Jaakkola, 2011; Skålén and Hackley, 2011; Atler, 2012; Andreini et al., 2015; Harkonen et al., 2015; Leoni, 2015). This empirical chapter has contributed to the theory underpinning productization by examining how the public utility firm organised to stabilise exchange.

As such, the first conclusion drawn from the empirical findings is that the public utility firm utilise productization to manage the quality and efficiency of their assets, to organise and stabilise effective service delivery. The public utility firm viewed productization as a mechanism to develop their internal expertise and knowledge. Additionally, the public utility firm had to help lead the development of the supply chain, so it could understand their productizing process. This permitted the public utility firm to articulate their needs, and for the supply chain to understand in greater detail these needs, resulting in a more stable and effective exchange. To facilitate this exchange the public utility firm developed standards and specifications, and then standard products to that ensure it met its regulatory requirements, reduced risk and promoted trust internally throughout its internal teams.

Secondly, the findings, show the public utility firm used productization to manage its business-to-business relationships. Standards and specifications were developed utilising internal (various teams and directorates) and external (suppliers and alliances) expertise. This allowed the public utility firm to capture emerging knowledge and expertise from multiple sources. Productization could then be represented as something tangible and understandable to internal teams, and external suppliers and alliances, through the product catalogue, and standard and specification documents. This facilitated the effective

management of the firm's business-to-business relationships as it portrayed the public utility firm's baseline knowledge and any gaps, which organised and stabilised exchanges. The collaborative approach taken by the public utility firm demonstrated to suppliers and alliances, its commitment to transparency, and willingness to trust their expertise. Moreover, the waiver system acted as a way for the standards and specifications to be challenged, as such it was suggested that the public utility firm could manage these conflicts systematically.

Thirdly, the findings conclude that productization was a process that embedded continual improvement internally (in team and directorates) and externally (suppliers and alliances). The waiver system allowed the public utility firm to balance the need for customised solutions, and the ability to be prepared to seek productizing opportunities of any customised solutions. Delegating the management of the waiver system to the Standards and Specification team ensured that any changes to best practice, regulation or innovations would be feedback into a further iteration of the standards and specification. Furthermore, it provided ownership and accountability of the standards and specifications to a team that is recognised internal and externally as industry experts. Service level agreements acted as the service delivery mechanism for the productization process. The continual feedback loops of productization not only ensured internal and external collaboration, but effectively allowed the Standards and Specifications team to ensure the ongoing communication and dissemination of benefits. It provided the means to embed the cultural change required for continued success.

As discussed in the second chapter of this thesis, productization is viewed as the contrasting paradigm to servitization (Aurich et al., 2009; Durugbo and Riedel, 2013; Durugbo, 2014; Leoni, 2015). Servitization seeks to integrate services into traditional product offerings (Vandermerwe and Rada, 1998; Davies et al., 2006; Evanschitzky et al., 2011; Ulaga and Reinartz, 2011; Turunena and Finne, 2014). De-servitization (Turunen, 2011) and reversed servitization (Finne et al., 2013) question the dominant focus of firms moving forward and unidirectional towards service focused stance.

The public utility firm, in part due its unique governance structure, is only concerned with being a service firm, they are not seeking to servitize or be able to deservitize their offering. Therefore, there is no blurring of the boundaries between products and services (Davies et al., 2006) to the public utility firm's customer. Productization is viewed as the evolution of services to include a product or a new service component (Baines et al., 2007; Harkonen et

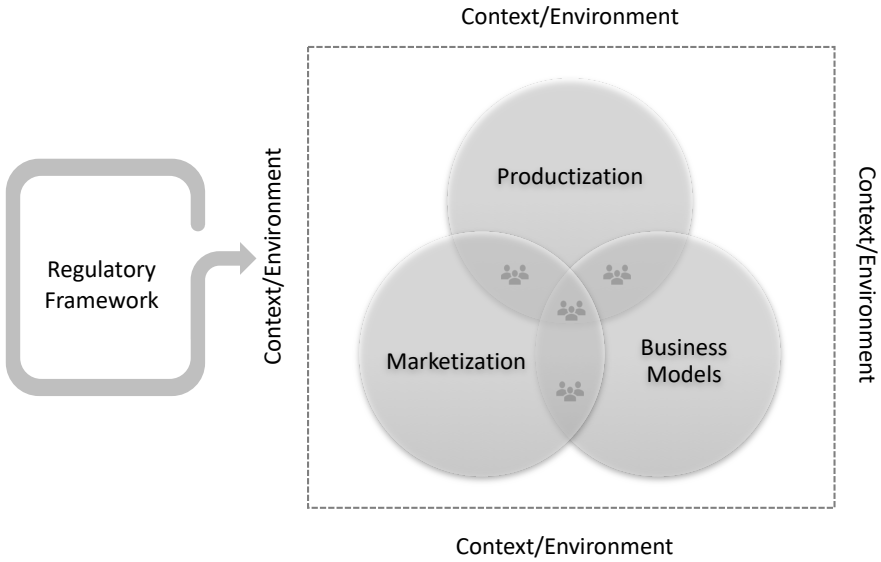
al., 2015) seeking to make services more product like in their nature (Simula et al., 2008; Skålén and Hackley, 2011; Chattopadhyay, 2012; Valminen and Taivonen, 2012; and Nagy, 2013). Spring and Araujo (2017) argue that the servitization literature disregards the viewpoint that products are chronically instable. Productization as a service, acts materially with respect to a product, and its more widespread use and socially as service in offering additional value to users by being more useable. It allows for the alignment of value creation of both products and services (Neyer and Moeslein, 2011; Velamuri et al., 2011), and it seeks to integrate the benefits of both products and services (Jung and Nam, 2009).

The findings indicate that productization drives the transforming of business relationships within a firm and with its suppliers and alliances. This requires novel combinations and connections between business teams in decision-making and implementation. By managing both inbound (seeking to enhance the process of product delivery within the firm) and outbound (improving the focus and value of the product or service) productization (Simula et al., 2008) a firm can manage conflict and has the ability to provide scale, but balance the need to be flexible with customised solutions. Standards and specifications, and standard products play a key role in both deploying productization and in managing relationships between teams and suppliers (Andreini et al., 2015). Standards and specifications allow a firm attempted to productize their expertise by putting it into a tangible object such as creating a catalogue based on that knowledge. Embedding these standards and specification as a process can be productized into marketable products and services.

Flamholtz and Stanford (2005) argue that the success of productization is ultimately underpinned by one of marketing's core functions, understanding the market and the customer. If a firm adopts productization, and uses it like a service, they can become the customer. They are effectively marketing to themselves, telling those who want to exchange with them the exact and most stable way to do so.

The first findings chapter represents the earliest opportunity to examine the conceptual framework that was developed at the end of the final literature chapter. The figure 26 below signposts towards a revised conceptual framework. The empirical data presented above introduced the importance of a regulatory framework. In the case of the public utility firm the regulatory framework is noteworthy as it is where the firm and its regulatory framework agree the service levels and budget for that coming period.

Figure 26: 1st revision of the conceptual framework



The following findings chapter introduces the second empirical chapter of the thesis, to address the second research question.

Chapter 7 Findings Marketization and Shaping the Marketing Object

7.0 Introduction

The second empirical chapter of this thesis examines the practices and exchanges of the market actors. It responds to the claim that there have been insufficient attempts at studying the intricacies of a market, fundamentally what it is and how it works (Helmsley-Brown et al., 2006; Diaz Ruiz, 2016). Geiger et al. (2012) assert that expanding understanding with regards to the extent and effect that various market practices on shaping market practices is of central importance.

Callon (1998b) suggests that markets are formed via an array of practices that utilise and enhance the knowledge and expertise of those involved. This statement is underpinned by researchers who view markets as assembled, positioned by phenomena, that is affected by the practices of actors that are underpinned by actors' knowledge and experiences (Araujo et al., 2008; Azimont and Araujo, 2007; Callon, et al., 2007; Fligstein, 1996; Harrison and Kjellberg, 2010). Therefore, the central contribution of this chapter is to understand how actors shape and reshape the market of the public utility firm. Market practices are considered as bringing together a variety of market actors acting in accordance with different market representations, and engaging in divergent market practices, each trying to shape the market in a different fashion (Azimont and Araujo, 2007).

The chapter is concerned with addressing the second research question derived from the literature:

2. What effect does marketization have on market shaping practices?

In order to approach this question thoroughly, the chapter will be organised as follows: Firstly, it will discuss the process of marketization at the public utility firm. Secondly, it will examine how market objects are used to facilitate exchange. Thirdly, it will assess how actors develop the market object into a marketing object. Finally, it will explore the relationship between the marketing object, and the market devices used by actors to calculate, stabilise and facilitate exchange.

7.1 Marketization of the Public Utility Service

To respond to Kjellberg et al. (2012) who called for further research into how markets are affected by multiple contexts and (potentially conflicting) market views, the findings of this empirical chapter, illuminate the unique context of the public utility firm, and the wider market that it operates within. Brian S, comments on the utility industry:

> "We don't just share knowledge internally, we share it externally, very openly as well now in the utility industry so there's not the, go back a few years, we, there used to be barriers there between water companies who were competing against each other and even more so since Mrs Thatcher decided to sell the English and Wales utility companies off (laughter), put up these commercial barriers where we're all competing against each other but the mechanical electrical aspect of the Pump Centre, the WIMES specifications served to bring down those barriers and when we sat round a table it's just engineers all with similar problems trying to find an acceptable solution and we forget about commercial competitiveness and we just look at a what's going to be the best engineering solution for the UK utility industry and we also bring in when we produce these documents the main European manufacturers because our market, where we procure it, what is now the products, it's European wide, in fact, it's worldwide but mainly they come from Europe because of the certain costs from elsewhere but we bring all these people in at the end of it and say."

In considering marketization viewed as a process (Araujo and Pels, 2015; Callon, 2016; Mason et al., 2017; Findlay et al., 2017), Brian's comments reveal the varying stages of the marketization process that the public utility firm interacts with. To note, other utility firms in England and Wales have been fully marketized. However, in the case of the public utility firm, it has experienced some marketization to date. The legal environment that the public utility firm functions within was seen to be fundamentally altered, which has affected the socio-technical arrangement (Caliskan and Callon, 2010) of the market and the market practices deployed. This is highlighted in comments of Brian on the removal of commercial barriers as facilitating greater knowledge sharing across utility firm actors. Brian's comments align with Callon (2016) who argues that political and moral reflection is at the heart of markets and should not pushed out to their fringes. Brian views that "it's just engineers all with similar problems trying to find an acceptable solution and we forget about commercial competitiveness…" emphasising an honest connection to the market and

its actors. However, Jenny raises concerns with regards to the lack of competition within the market:

> "So the three issues I think that the public utility firm has is that it's not a company, doesn't need to compete, it has a low turnover of... Well four issues. It has a very low turnover of staff and the geography is... you can get in a car and just drive, and they don't have a direct relationship with their customers. So competition isn't driving them, customer demand to move faster harder, be competitive, you know, get there first. The customers' expectation of their technology and their ability to do things, it's not being exposed to the customer so there's no customer pressure to bring in technology to get communities together. The staff turnover is so low that the downside is they have very little new-thinking expertise and expectation to push the organisation through and they can sustain themselves on the knowledge and relationships that they already have. And what was the other one, the geography, they can get in a meeting, the staff don't leave, they don't have to compete... You get the idea."

Jenny's comments point towards the notion that inertia impacts upon the public utility firm's ability to improve by being removed from its consumer is a barrier. She points towards complacency due to low staff turnover, which is stifling new knowledge and expertise entering the business. Jenny's comments give the impression that employees at the public utility firm are relatively secure in their employment. Irene adds to this by stating:

> "I've got gaps all over the place, I'm not as knowledgeable here in my team as I was here, and I think that's wrong with the public utility firm, we're all within our wee comfort zone, our wee silos, everybody knows everything they need to be done, you've got a squad that goes out to an asset every week, the squads don't change for 20 years, so knowledge maybe isn't high up in their radar because there's never really been a gap."

Irene underpins Jenny's concerns regarding the lack of new knowledge and expertise entering the business due to the length of service from its employees. Irene develops this by suggesting that the public utility firm operates within silos where new knowledge is rarely sought. The findings further uncover the stage of the marketization process that the public utility firm is exposed to. Bob states:

> "The public utility firm is run as an international team. What they do is they sell expertise, think it was under Skylines, certainly a subset of Skylines, so you're in the right place. They sell our expertise around the globe. We've got a team working in Qatar and got a team working in Canada, got a fairly small team in Australia. What they said is we need to be able to identify subject matter experts that may be able to help us in pitching to foreign clients. The international one's probably a good one. I was asked to join a delegation that went to Irish utility so Irish Utility funded. Myself and a colleague went across to talk to Irish Utility about our experience on how the public utility firm came to be in the clever stuff we were doing so that's one example."

Bob highlights that the public utility has parts of the business that have been fully marketized, that is to that they have been fully exposed to competition with markets. Here marketization moves away from a being considered as broad-based accountability on multiple fronts to multiple actors, and towards more narrowly defined accountability based on market transactions (Callon, 2016). The public utility firm extrapolates the stable knowledge and expertise that is utilised in the public side of the business and exchanges it in a competitive marketplace. Bob was asked to provide work for the consultancy business unit of the public utility firm in addition to his current role. Further, Jim reiterates the duality of roles that the public utility firm actors undertake:

> "Well the public utility firm International piece was just I had a specific time when I was in charge of the Data and Analytics team and so I had an understanding of data and information from that data analytics piece, and they needed somebody who could cover that but who also had grey hair. In other words, they wanted someone who'd been in the utility industry, had a good understanding of the utility industry and who could apply what they were hearing from the client who was another utility company in Canada... apply what they were hearing from the client, had a good enough knowledge of public utility firms journey to be able to take that and apply it to the... So there was a specific thing about having done the data and information piece and there was a wider bit about having been here long enough in a management position to understand the journey that we've been on and translate it to another organisation. So those things. And, again, that's a people thing, okay, it's not a document or anything else, any of the documents, any of the diagrams, any of the things we used when we went across there, it was all of us going, "I've got something that'll cover that" and go away and finding that in our bits and bringing it

out. But if we hadn't been there nobody else in the team would have been able to find it."

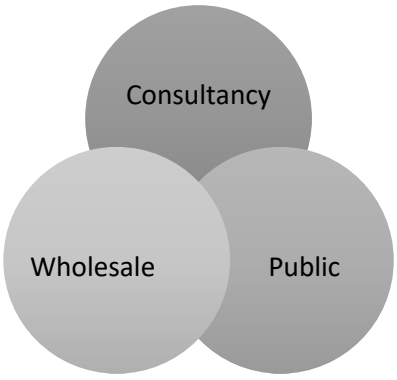
Jim's insights reveal how he uses the knowledge and expertise he has gained from working in the public utility firm to exchange in the consultancy part of the business. He also notes the importance of the social interaction in stabilising the idea to exchange it, which is important as markets create the social instead of deconstructing it (Geiger et al., 2015).

With regards to the marketized wholesale side of the public utility firm Dougie comments:

> "If I look at a different aspect of our performance on the wholesale side of our business, there's been some really good planning work and execution around the transfer of supply points from business stream to handling utility on the back of change in the public sector and contract. Our focus is on financial outperformance, we generally did an extra £35,000,000 in savings and on top of that, we generated an additional £11,000,000 of wholesale revenue and a lot of that additional saving we're going to plough back into boosting the funds we have available for capital maintenance thereby boosting investment we can make to support in the managing of future service to our customers."

Again, the finding starts to reveal the varied stage of marketization that the public utility firm works within. The wholesale side of the business is commercially focused and the success of it can be utilised to support investment for the regulated aspects. Adding to Callon (2016) it is leading to the creation of a functioning market system by operating under market pressures as state-owned commercial enterprises. Figure 27 below highlights how the employees within the public utility firm can overlap with the other parts of its business, the non-regulated areas.

Figure 27: Employee connect to regulated and non-regulated areas



This finding highlights the complex nature of the environment that the public utility firm operates within as different parts of the business are at different stages of the marketization process.

7.2 Market Shaping Practices

The following sections seek to understand the practices that actors within the public utility firm deploy to shape the market. This involves bringing together a variety of market actors acting in accordance with different market representations, and engaging in divergent market practices, each trying to shape the market in a different fashion (Azimont and Araujo, 2007) as well as performing Araujo et al. (2008) in markets Kjellberg and Helgesson (2007). Due to the heavily regulated environment that the public, knowledge and expertise play a crucial role in actors establishing agency. The following section will focus on actors use of Post Project Appraisals (referred to from here on in as PPAs) as a market device.

Actors at the public utility firm could be seen to use several market devices in order to shape the market and its practices. The researcher also observed and considered common market devices including: PowerPoint, Excel, Regulatory Reports, Access Database and Word/PDF documents. In conceptualizing these as market devices, they were seen as particularly stable, and used frequently by the actors. However, during the interviews participants highlighted post-project appraisals (PPAs) as a market device that were seen as instable, and problematic to exchange. This forms a key focus of this chapter and is expanded upon below.

7.2.1 Post Project Appraisals (PPAs) as Market Devices

The researcher was discussing with Stephen how the public utility firm manages its knowledge in an attempt to tease out if it was facilitated by any particular market devices. Stephen H explained:

> "There are terrible problems with knowledge management and a lot of it is down to ownership. If you give someone the ownership of it then he is expected to deliver and he will deliver that. If you don't make it part of someone's accountability - people will say - file under too difficult, I am not getting measured on this anyway.

> A lot of it gets lost and in the past the ....we have always had a PPA procedure that has never been policed, there has been no consequences of doing it so it is rarely done, in my experience anyway… but it does tend to sit best with reviewers that are involved at specific points in the product lifecycle to actually capture knowledge and then it needs someone to manage that knowledge and so the process at the moment is that the technical design authority will own it, an admin duty of taking the information from the form or linking it to a register or something and then having a forum every quarter to review the list of knowledge and any learning points and then it is also linked to how do we actually get these messages out to the business so is it a change to the spec, it has half a dozen potential routes - an alert, we have health and safety bulletins, we have engineering bulletins so there are various different ways, whether it is just telling people, whether it is actually embedding in into the spec, whether it is doing this and that, how do you actually embed it so that people do actually do it."

Stephen H suggests there is no effort by the public utility firm to shape market practices with regards to knowledge. He offers that clear ownership is not assigned to tasks and that actors seek to avoid tasks that are deemed difficult, or not likely to succeed, in order to protect their own reputation. In starts to highlight a viewing of Post Project Appraisal (PPA), in what could be conceptualised as market device terms, as he offers that the PPAs are supposed to capture knowledge during the product's lifecycle but there is a difficulty in assigning someone to manage and capture the overall knowledge.

Further, internal source documentation from the public utility firm was analysed by the researcher, to understand more fully the use of the PPAs within project teams, the documentation highlighted the purpose of conducting a PPA is to record the positive, as well as any negative, experiences of the project so as to improve in the future. It was seen as a narrative in the firm, that this was an important process and activity to move forward having learned lessons of what could be improved upon, and what was deemed successful and the rationale surrounding this assessment. Actors were asked to comment and give details under a selection of headings including: Health and Safety, Design, Construction, Commissioning, Commercial, Governance and Partnership. As such, team members have to actively reflect on their experiences, and then score each section using a RAG (Red, Amber and Green) indicator. From a practical perspective, the PPA documentation, then asks team members to state: 'What went well, what didn't go so well or could have been done better'. The PPA also contains the capital expenditure stages (one to five) and the expenditure for each such as wages, design, survey/ investigation costs etc. They PPA also

has a list of relevant participants and a distribution list (often to one or two members of teams only), with no contact details attached, and often the researcher noted that they were hand-written or scanned (which led the researcher to question the accessibility of these documents for team members in the field, as to how they were optimized for use on devices or off site). Initially the PPA was only carried out by team members at the end of a project to review the project from start to completion, this process was augmented by the firm with the introduction with a staged process (Stage-Gate) which tasked team members, over the life of a project, to continually review learning and best practice. Current practice is that the PPA is encouraged within the practices of team reflection and assessment, but significantly it is not mandatory, which the researcher observed from the outset as a potential strategic opportunity. Within the PPA document, whilst there is a focus on risk and CAPEX (capital expenditure) and an overall calculative focus as noted above, the document also provides team members with open-comment boxes that encourage qualitative feedback of the partnerships and collaborations and to expand upon what went well/did not go well. From analysing the available PPA documents, the researcher noted the comment boxes were infrequently used to elaborate on specific details, for example, PPA document (dated February 2014), under 'partnership', the response indicated '*Good collaborative approach and integration between all parties involved in the project*' and this was scored as a 'green 1'. This led the researcher to question what had led to this being viewed as a successful collaboration, how was cohesion integrated and achieved successfully? The ongoing analysis of the PPA documents started to highlight the ad hoc approach of the feedback and the use of the forms as a potentially valuable resource was varied.

In approaching a more nuanced understanding of the PPA and the functioning of the reflection of team members, the PPA was considered as qualifying as a market device for several reasons. Firstly, as a market device it is used by the firm actively and intended to stabilise practice (Doganova and Karnøe, 2015), with a potential consequence of transforming the market and allowing for organisation, which can contribute to and harvest innovation (Mason et al., 2017), as it captures best practice and strategic lessons learned (Muniesa, et al., 2007). Secondly, it clarifies the features of a product, and how it should and could be utilised (Pollock and D'Adderio, 2012), it also seeks to enable actors to gauge the efficiency and effectiveness with which they act (Fligstein and Calder, 2015). Thirdly, as a device, the PPA acts as a design that highlights the relationship between objects and agency, or from a Callonian perspective, devices do things, 'they act or make others act' (Callon et al., 2007). The PPA extends beyond recording the variety of the objects needed to form the device, and that are examined as part of the device, these analyses share a

common focus on the materiality and the agency of market devices (Doganova and Eyquem-Renault, 2009).

Within the case, Lloyd extends this understanding of the role and potential of the PPA, complementing Stephen's earlier comments:

> "…when I've gone around the businesses, they don't want to engage with you really because they don't know what it is that you want to get out of them. It's like almost "I'm guarding this because if I tell you then I'll be out of a job." It isn't like that, and the other thing of course is it's very, very hard to put a concrete business case together that demonstrates savings. It's hard to do it because what are the savings of knowing things, well I don't know. If I said, "Well we could save 1% of your business capital spend over the next five or six years"... And we're talking £10 million because if you look at a billion-pound programme, you know, 1% is... you know. No, it's £100 million, isn't it? No, it's £10 million, is it? He'll say, "Well that's a lot of money but how can I prove it, how can I...?" I can say, "Well on this job we didn't do that because you did it before therefore we saved £700." It isn't a lot but you multiply that for every single project and it does build up over years and years. You know, projects are delayed because of lack of information perhaps, but it is there, they can't find it or they don't know who to ask or go."

The public utility firm is concerned with efficiency and providing customers with the best possible value at the lowest price. Lloyd's comments point towards a difficulty in accessing information on previous projects. He suggests this is hindering the public utility firm from embedding learning. The difficulty in adopting this practice is the social aspect of convincing actors of the need and the longer-term benefit. In addition to Lloyd's comments, the researcher noted that many of the completed PPAs were scanned documents and handwritten. Which led the researcher to question if they were approached as ad-hoc, and how this scanned or handwritten information was shared and cultivated moving forward to access and embed the learning.

Karen offers insights into the individual actor's approach to PPAs by stating:

> "So I took the process that we have got and suggested as part of the process that we need to put a step in here to say any project manager coming in you need to go here, wherever here is, to look at lessons learned on previous projects, or just observations, knowledge, things we have gleaned as we have gone through this

> process. You must go there and be able to demonstrate that you have looked at that and taken on board anything that might be relevant for your project before you really get started on that project. So again, I suggested a change to a process to do that. So I think that is valuable and it is getting people into that mindset that a Post Project Appraisal is not just something that happens at the end of a project. It is also a feed in to the start of the next project, and getting that to happen."

Karen's comments demonstrate that as a potential market device the PPA is currently and insufficiently, used once at the end of a project. In her view, the PPA or a market device should be used throughout a project at certain stages. This would accurately capture the knowledge at the point of occurrence, instead of waiting until the end when the details have been forgotten, or actors have left or moved onto new projects. This finding compliments Fligstein and Calder (2015), who argue that once working or ready to work, market devices become very large, important, and or hard to control. To be successful as a market device the culture of usage by the actor requires evolution.

Shirley, a Senior Risk Manager, is responsible for the Risk Intelligence Team within the Capital Investment Delivery Programme, as can be seen as a key actor in the shaping of the market device, she explains:

> "I am interested in the best practice. At the end of the day that is derived what they write ideally, but at least we are getting the best practice. The other part is about getting reference material to future projects. That is within the gift of the areas themselves, they can only do that. There are compliance areas to make sure they have got a document. But do they make sure that document has got good information? No, that is not their role. They just make sure they have got a document. It is up to the areas and that is what I have been going back out telling them. It is up to you to embed that within your area that part of that document. My document for the best practice I will be all over."

According to Shirley, another potential failing of the PPA, as a market device, is in its inability to convey the quality of a document's insights. When presented with a completed PPA, actors are unable to calculate its value (here value is considered both at the individual level, whereby an actor could reflect, hone and mobilise new knowledge, and also at an organisational level, whereby the organisation can translate, curate, and capitalise on prior experiences), which is a crucial element of a successful market device (Muniesa et al., 2007). Additionally, qualifying the market device can be seen to include objectification and singularization. Whereby, objectification of the object consolidates the framing of something as an object, and singularization augments it into a thing whose properties are adjusted to the buyer's world (Callon and Muniesa, 2005; McFall, 2009). It emerged that

the PPA has struggled to be singularized by actors. Shirley suggests that the accuracy, and richness of the information provided is something that should be stabilised for future exchanges, by recognising best practice, and assigning it to those who have the expertise to leverage it. In contrast in terms of compliance and regulation actors ensure that this part of the PPA is actioned.

Kevin further comments on the difficulty of embedding and updating what is considered the market device:

> "Partly because you back into this knowledge capture and sharing. I am set up intuitively to help this process, there is no penalties for not capturing the information. So, people become very focused on the here and now and I've got a pump replaced, or I've got money for that, I've got it installed, the last thing they think they should do is go in and say update the system to make sure the pump manufacture model, serial number and date are installed and modified, it is correct."

His comments add to the position that the market device is not necessarily utilised efficiently or 'correctly' by actors. Kevin adds to the assertion that once the product has been developed and installed, the PPA is forgotten about, or seen as a distraction from moving forward with the next project task. It can be seen that the failure to input the required details to capture the specifics of the developed product, will affect the future ability for stable exchanges to take place, as the information required to calculate outcomes will be missing or incomplete, which may result in actors abandoning, or having to requalify, the product. Here the lack of sound calculative abilities results in qualification, as actors have to use quality based rational judgements (Cochoy, 2002; Callon and Muniesa, 2005; Muniesa et al., 2007). Bob adds:

> "…my concern is that there's a massive amount of overlap so we need to consolidate tall of these lessons learned activities that we're doing throughout the process, but even once we've done that we're not learning the lessons. All we're doing is gathering knowledge and gathering information. Yes, we're storing it. We've not found a way yet of getting that learning back into the organisation. It's a knowledge storage, we've not got the learning just yet."

Bob highlights that part of the ineffectiveness of the PPAs as a market device is that they intersect and repeat similar activities performed by actors. He offers that the PPAs are successful in shaping market practice, to the extent that the market device captures knowledge, but that no actor takes responsibility for then effectively disseminating and embedding it into the public utility firm's knowledge base. This lack of backward and forward learning may affect the ability of actors to make informed calculations, as they have an incomplete view. Furthermore, this may impact on actors' ability to offer, debate

and challenge the normalisation, representation and exchange conditions linked to the market device (Doganova and Karnøe, 2015). Bob expands:

> "Yes, so people are looking for different things out of it. The technical guys are looking for technical learning. The project management guys are looking for learning around how well was the project run. The planning guys obviously they are asking questions, now that we've delivered this new asset is it actually meeting our service need, so everybody is looking for something slightly different from it."

Bob's extract shows the varying degrees of calculation and qualification required, based upon the knowledge and expertise of the actors involved. As a market device, the PPA is attempting to satisfy the complex needs of multiple market actors to shape practice. This results in the PPA being over-populated, and as such, actors struggle to find the information that they need. Additionally, to accessibility, the knowledge and expertise of actors, results in them actively interpreting the PPA differently, for example engineers view the PPA through an engineering lens and focus on perceived relevant information only, while project managers seek project management relational information and do not extend beyond this focus. This results in the calculation of the market device being impact upon by the actor's organisational remit and viewpoint. This leads to a lack in cohesion, and an inability to successfully access and utilize potentially relevant knowledge for the next project.

Bob offers that key organisational actors had ineffectively reshaped the practice of using the market device within the firm:

> "If you go back eight years, PPA was something that we did on every project, regardless of the size, complexity, etc. That was just what the rules said. Every project finished with a PPA. What Capital Investment Delivery (CID) did is they developed this matrix whereby if it was a high value project then it needed a full PPA, it was a low value project with multiples then you could do a PPA by programme type, so you didn't need to do it for every project. They had this really good way of streamlining that PPA process. I think it was pretty good, what they'd done. Subsequently, now we've gone in and the risk guys have devised the process, they've thrown that all in the bucket and gone back to every project now needs a PPA and it needs an extra thing and it needs another extra thing so I think we've gone backwards. We had a process that wasn't great to start with and I think we've regressed and now we've gone backwards".

Bob states that the PPA process was previously viewed as compulsory for actors to access and use, and in increasing the calculative nature of PPAs, the firm developed a matrix, so that the device was more tailored, and practiced differently depending on where the project was calculated on the matrix. Bob argues that in doing so, and by requiring the same level of detail on the PPA for all projects, it has lost its effectiveness. He suggests that through

this shift with the PPA usage, the risk team who have agency over the PPA process, have destabilised what was viewed from Bob's perspective as a stable process. In considering this in line with the remit of the risk team, they are actors driven by the strategic goal of ensuring their devised risk toolkit is rooted in the PPA rhetoric to mitigate risk pertaining to regulatory compliance. Further Bob argues:

> "People like to start with a blank canvas, like to start with a blank piece of paper, I know what I'm doing, I don't need any of that, I don't need to be contaminated by other people's mistakes, they were just idiots and they didn't know what they were doing. I'm really smart, I'm going to start with a blank sheet. That's the failing in the PPA process. Whilst we draw it as a feedback loop, we never have been able to get that feedback loop to connect properly. It's a theoretical feedback loop, it's not a real feedback loop. Project manager B who's just picked this thing up and goes chlorine dosing, what's that all about, he doesn't want to go and say … you're basically rubbish, that guy was useless, didn't know what he was doing, I know what I'm doing, instead of the first question you'd be saying is, who's done one of these, what can I learn from how this was done in the past. It's not in people's nature to do that because they just say, he was an idiot and I'm really smart. I'm starting with a blank piece of paper. I don't want to start with don't do this, don't do that, don't do that, you're better to do this, you're better to do … that doesn't help me, but that is what you should be doing."

Bob forwards that within 'this blank canvas' actors want autonomy to calculate their own knowledge and expertise, and that there is a perceived lack of trust in relying on other actor's previous work as a project basis. From this individualised perspective, he offers that the PPA does not truly complete a feedback loop, instead it is seen as a spurious feedback loop, due to the insistence of actors starting from scratch with each project. It is an example of knowledge actors purposefully destabilising the market device to qualify it for themselves. For the risk team, they are tasked with attempting to reshape these practices based on the complications of the PPA. Bob states:

> "At the end of a scheme, yes. One of the new bits that's been turned on recently is something called projects, stages and summaries, this is the bit the risk team rolled out which says at each 'Stage-Gate', you need to do a review of what's gone previously."

Bob offers that the risk team are further attempting to change the use of PPA in an attempt to stabilise them further, they are doing so by seeking to disentangle the market device. This aligns with an understanding from Muniesa et al. (2007) who understand the dynamism of market devices as adjusted and calibrated beings, that require vibrant modification between the model and reality (Callon, 2007). As related to the case, the understanding is that this disentangling of the PPA, will encourage actors to spread the feedback of information, and knowledge throughout the life of the project, breaking it down into more manageable units. This partly addresses Fligstein and Calder (2015) and Mason et al. (2017) who argue that the marketing discipline knows very little as to how market devices are generated, or replaced in practice. The case findings suggest that actors attempt to address the limitations of the market device of the PPA in small radical changes, they accept the device had some attractive calculative qualities, and sought to further utilise feedback to strengthen it instead, of replacing it.

Shirley reflects on the risk team's attempt to share PPAs with the alliance partners:

> "Yes we get people coming to us asking about different types of information in fact. I spent quite a long time trying to get the alliance partners on board. Now contractually they are all in slightly different places and some of the organisations didn't want to engage with us straight away. So, we said fine, OK we'll roll it out to everyone else and we will do it. But now actually they are coming to me and saying can we tell them more about post project appraisals and what we do with lessons learned etc. It is one of the alliance partners. So, our commercial team have done a communication with our alliance partners. And they have come back, their own project managers have come back and said can we tell them what we are doing. So now they want to engage with me and I have a meeting with them on Friday."

Shirley reveals the initial difficulties in gaining acceptance of the PPAs with alliance partners, with contractual restrictions impacting the willingness to engage in exchange. It required the commercial team undertaking additional tasks to stabilise the contracts in line with the PPAs. Actors from the alliance partners would be concerned with the risk of commercial implications of the PPA as market device, if it was critiquing their work. The removal of this barrier has allowed the risk team to be able to start re-engaging with the alliance partners. This represents what Kjellberg and Helgesson (2006) refer to as 'normalizing practices' as they are concerned with the formulation and reformulation of rules and norms concerning market behaviour. This raised questions as to how a market

should work, and become normalized, or how (some group of) market actors should act with the market device. Shirley adds:

> "The ones we have engaged with have been pretty good. The ones that weren't so engaged are, interestingly, doing it. Although when we tried to sell it they kept saying they have got their own system. But when I actually sent the thing and said your own system isn't giving me what I am really looking for they have done it. This month bit we are only in month two. I know, there was a bit of resistance to start with. Not from the point of view of not wanting to do the thing but from the point of view of not wanting to duplicate what they were doing themselves. But actually, they are just doing it now. That might be a success. I hope."

Shirley reveals the difficulty with regards to alliance partners having their own version of a PPA. However, as Shirley states the market device of the alliance partners did not have the correct calculative ability that the heavily regulated actors of the public utility firm require. Additionally, the alliance partners similar market device is not accessible to the risk team. The purpose of the PPA as a market device was to embed information and knowledge from previous projects so that actors from the public utility firm could easily access them. Attempting to clarify the economic facts in each case, the firm could then mobilise the market device through normative discussions and assert moral strength (Roscoe, 2013). The alliance partners existing similar devices suggests they are performing part of the calculative steps offered by the device and utilising qualculation to judge the future steps (Callon and Muniesa, 2005). The engagement by alliance partners with regards to this device is in part due to actor's desire to embed themselves in the public utility firm and strengthen their own commercial position.

Thus far this section has examined how actors have unsuccessfully used the PPA as a market device in an attempt to shape market practices.

7.3 Inherited Market Objects

The researcher was discussing with Kevin the nature of how standards and specifications were first created, when he stated:

> "No, the original specification as it stands. At the moment, it stands from the creation of the public utility firm in 2003, but it was an amalgamation of the previous utility boards... Yes, and all these organisations had specification

> management and controls and stuff like that, and all our contracts had been bought using these specifications that have been developed over a number of years. So, I would say the specifications are probably as old as the utility industry in Scotland, going back to 75, 76, and I would say the majority of treatment works in Scotland are low technology, I like to call them green, green septic tanks and read beds, there is only really a small percentage of your assets that has complex treatment. The technology has not varied that greatly over the period. Some of the kits got a bit better."

Kevin reveals that the standards and specification were initially inherited market objects. Whereby a market object is considered They were inherited when the public utility firm was created by the merger of the three independent utility authorities into one utility firm. The standards and specifications of the three independent utility authorities were also combined, creating standards and specification version 1.0, as revealed in the first empirical chapter, the public utility firm is now on version 5.0 of the standards and specification. The creation of the public utility firm resulted in actors from the independent utility authorities being merged into one team. The creation of standards and specifications version 1.0 required actors to be destabilised across the three separate versions, and arrange them together. It required actors use of qualification as they sought to create the new stable and exchangeable version. The merger of the three independent utility authorities radically altered the boundaries of the market by distinguishing objects available in the market (Finch and Geiger, 2010). The initially inherited market objects were becoming one market object as it was disentangled from its three prior owners, and evaluated individually (Diaz Ruiz, 2013). The successful development of the first combined version of standards and specifications represent what Reverdy (2010) called 'the learning process' and lead to actors learning how to perform and calculate in a hybrid fashion. The combining of standards and specifications also allowed actors to pacify the market objects (Çalişkan and Callon, 2010) as the market actors were able to use technical knowledge and cultural relationships to permit stable exchanges. This adds and extends to Reverdy's (2010) work on gas market liberalisation, by showing an example of inherited market objects being used to shape new market practices. As discussed above, the inherited market objects underwent an initial agencement (Callon, 2016) from three separate market objects into one and then further agencements from version 1.0 to version 5.0 of the market object. The acceptance and purposeful, planned practices that the actors take to review standards and specification underpins Finch and Geiger (2010) who argued that marketers and allied professionals consider it their mission to continually unsettle markets and marketing objects. The inherited market objects

required performative aspects of knowledge, and expertise to adjust, calibrate and combine them (Callon et al., 2007). Therefore, the practices are performative as they create the phenomena they describe (Araujo, 2007).

These findings provide insight into the development of arrangements over time and movement as actors exchange them (D'Antone and Spencer, 2015). The market object was being successfully exchanged by actors in various iterations (version 1.0 to 4.0), until version 5.0 was arranged to allow for productizing. This highlights how actor's understandings have been informed by objects, and that objects are used to inform ideas (D'Antone and Spencer, 2015).

This section has examined the empirical data surrounding the inherited market object and examined its impact on market practices.

7.3.3 Marketing Objects

The first empirical chapter examined how the public utility firm had purposefully developed and refined standards and specifications and standardised products in order to productize its offering. Productization of a service was shown to act materially with respect to a product, and its more widespread use in offering additional value to the service and end users by being more useable. The following discussion identifies the market object, and then the trajectory and transformation to marketing object, which is used to shape market practices. The following empirical data will build towards examining productization as a marketing object.

Building from the extant literature in chapter three, this thesis defines marketing objects as, any work product or service that is developed, and reused by actors as part of their marketing activities. Finch and Geiger's (2010a) seminal work argued that marketing objects facilitate a market's relationships and practices, so that market actors have power to act through the object, this is exactly what productization offers actors. The packaging of the market objects of standards and specifications, standardised products and productization create the marketing object. This is in line with the work of Finch and Geiger (2010a) who proposed identifying goods and services first as market objects, and then as marketing objects. As a marketing object, productization is the thing that is exchanged, it merges the elements of the public utility firm's and external partner's world (Finch and Geiger, 2010a). Productization permits actors to facilitate their relationships and practices and act through the object (Finch and Geiger, 2010a). Additionally, the marketing object in question

provides agency as it shows the relations concerning the concepts and categories in the market. Thus, the marketing object is produced through the productized offering, and utilised as a resource by actors. Underpinned by Finch and Geiger (2010a), productization resists attempts by actors to transform it into a disentangled market object. Disentangling productization removes its ability to over-stabilise. Finch and Geiger (2010a) argued that positioning practices can simultaneously have supportive, and also disruptive consequences for the calculative order of markets. Here productization works hard to have supportive calculative properties that control and direct disruptive calculations of actors. The context of the public utility firm's market, that of one that is not inherently commercially focused mediates the attempts of actors to destabilize and re-stabilise market boundaries, and product definitions as they do to work within existing, stable definitions (Slater, 2002) that are purposefully embedded with regulation. Activating the marketing object occurs when the object is released to the environment, and any change to the agencement (Callon, 2016) of one of these will in turn affect the marketing object.

When speaking of standards and specifications, and the standard product catalogues, as Brian, states:

> "We do have a requirement to make them available to contractors externally that'll do work for us but some of our delivery partners and subcontractors that they use, etc., will come up looking for copies."

Brian offers that external actors actively seek to exchange with these marketing objects and that the public utility firm are required to do so. Actors that seek the objects may not be directly using them, they are captured and stored. Further, Martin reveals how the various forms that the object takes on:

> "Yeah, if we, for example this issue of 5.0 that we've just updated all the specs, that got sent out on a, and it really, really bugs me…I know, but really, but why are we sending out a CD when you can go buy 30 flash drives off of eBay and stick them on a flash drive and send it out. Do you know what I mean, you can even password protect it, if you really wanted that precious about it. But no, CD with a nice wee CD label laid on it, stuck on it and sent out to a contractor who then has to then send that round everybody else that he uses, just seems really antiquated to me, it just seems daft. Ideally, I'd love, love it to be a log in on our web page, we could give a contractor a log in, he logs in, that gives him the rights to go in and I

> view our standards and specs, maybe only certain ones of them, depending on the level of access, that's where I want to go with it ultimately, this sending out a CD is ridiculous, and a covering letter. Send out a CD and covering letter, it's Ian, seriously, is that what you want me to do? Yeah, yeah, yeah, so that's like 700 pages, massive thing, loads of drawings. A, where on earth do you store it? You can't email it, you can't even put it on a CD, it's that big, do you what I mean [laughing]. But maybe you can actually I haven't tried, but yeah that's the type of the thing that we're doing more and more of just now, that is one thing that ICC catalogue is one thing we're not developing other products which are going to be exactly the same, it's all going to be catalogues. So, we need to give it information out round the business."

The marketing object here is exchanged with actors as a product catalogue, Martin discusses the catalogue being stored as PDF files on CD ROMs that were then exchanged with actors. Through tracing the source documentation, the researcher discovered that the product catalogues were also sent as hard copies to actors, and stored on individual actor's personal and restricted, in terms of access, hard drives.

Finch and Geiger (2010a) argued that the marketing objects framing can be rejected by consumers by undermining, ignoring or misinterpreting the goods in the world, where they can translate the marketing object into their own networks and attachments. The findings suggest the unique regulatory context that the public utility firm operates within attempts to control actor's ability to do this. Simply, for those wishing to engage in commercial relationships with the public utility firm they have little choice but to accept, perhaps even grudgingly, the marketing object.

This section has outlined the justification for considering productization as purposefully created, and the role in the developed marketing object.

7.3.2 Performativity of the Marketing Object

This section will now examine the effect marketization has had on the market practices, by considering how the performativity of the marketing object. The academic discipline of marketing has been understood, and has been designed to be performative (Mason et al., 2015). The case study findings illuminate that the market shaping practice of creating standards and specifications, and standard products was designed to create a robust and

stable exchange, by providing strong calculative elements within a clear frame. It ensured that the public utility firm was able to exhibit that its regulatory requirements were met. Performativity assumes that an entity is 'in-the-making', indicating that those involved are acquiring agency and encountering uncertainty as they plan actions (Finch et al., 2015). However, viewing productization as a marketing object would suggest that at the point of activation is that the object is made, which is what provides that stability. As discussed in Chapter Six, actors utilise a waiver system and service level agreements (SLAs) to manage the service and social element of productization. To reiterate, the waiver system had commercial and technical waivers that could be rejected or accepted. The waiver system utilises performativity to help socialise the service of the marketing object. The service level agreements underpin the actor's commitment and to the actor's engagement in the waiver exchange, it accepts and attempts to manage that markets are socially constructed with recurrent exchanges happening between buyers and sellers (Fligstein and Calder, 2015), instead of deconstructing it (Geiger et al., 2015). Waiver and SLAs represent a formal agreement that manages competitors, suppliers, manufacturers and consumers/customers (Fligstein and Calder, 2015). It recognises the practices of humans (Shove and Araujo, 2010), as both can be carriers and observers of practices (Ingram et al., 2007; Reckwitz, 2002). Therefore, waivers and SLAs are used for coordinating interaction with others (Finch et al., 2015; Onyas and Ryan, 2015). McFall (2009) argued the role of performativity and its emphasis on enabling things to become true or false, or more precisely in the case of market forms, to succeed or fail. Understanding the relationship between having the agentic capacity to establish and organise productization between actor's worlds, requires a performative action which indicates how these connections result in acceptance or rejection (McFall, 2009). The analysis of the source documentation revealed the efficiency at which actors over-delivered on their intended twenty-one-day response to waivers. This addresses D'Antone and Spencer (2015) who considered the notion of acceleration, and the speed with which different agencement sub-sets of entities change. Actors demonstrate that despite the strict regulatory framework they operate within, they can reach consensus on decision making quickly and act.

Once the waiver is received it requires that actors who had originally stabilised the marketing object to conduct qualifications to decide if the waiver can be accepted or rejected. If accepted this new knowledge is embedded back into the marketing object and it stabilises it again. Additionally, accepting the waiver might not be considered as complying with existing regulations and the case would have to be made to conduct agencements of the regulations. Rejecting the waiver supports and reiterates the marketing object's previously

stable position as ‘made’. Adding to D'Antone and Spencer (2015) view on representations and knowledge of market objects, the marketing object considers its material embeddedness which is informed by a specific world view that regulations are stable and induce a certain way of doing. Additionally, the waiver system encourages performative reflexivity and critical thinking in practice about the production and use of marketing knowledge (Brownlie et al., 2007; Maclaran et al., 2009; MacLean et al., 2002; Mason et al., 2015; Tadajewski, 2010). Further it facilitates actors to consider the circular relationship between cause and effect, or accepting and rejecting waivers.

Finch and Geiger (2010a) put forward that marketing objects retain their entanglements with producers, and also anticipate being entangled with consumers. The findings presented here extend this notion by illuminating that the waiver system anticipates and builds on the action that should be taken by actors when attempting to disentangle. Subsequently each time a waiver is rejected or accepted, it could be viewed as providing further calculative strength to the marketing object. Rejecting the waiver implies the product is already stable, whilst accepting the waiver adds strength to the marketing object. The productization waiver system works to accept that markets encompass multiple and often conflicting efforts to shape them (Kjellberg and Helgesson, 2006). Whilst Finch and Geiger (2010a) argued that the overflows of market boundaries are porous, the case study findings show that the waiver system acts as a way of absorbing overflows, so they can be integrated back into the productization process.

This section has explored the empirical data to examine the role of the marketing object in shaping marketing practices. Whereby marketing objects are seen to produce effects simply by being used (Finch and Geiger, 2010a; Mason et al., 2015).

7.4 Marketing object and market devices that shape practice

It can be stated that marketing objects still need the devices of the market to provide richness and depth of calculations of the marketing object (Finch and Geiger, 2010a; Mason et al., 2015). From discussions with multiple participants and building on the researcher observations, the table 45 depicts and consolidates the central market devices:

Table 45: Market Devices used by actors

Market Devices used by Actors			
Participant	**Device**	**Function**	**Purpose**
Martin	Documentum	document storage and management	Document storage. Assigns documents to owners. Tracks changes to documents.
Angus	SharePoint (Microsoft Office)	is a web-based, collaborative platform that integrates with Microsoft Office.	Document management and storage system. Can be used between organisations.
Brian	EQS	Quality management system	To control standards and specifications.
Stephen	PowerPoint and Intranet	Presentation program. Private network accessible only to an organization's staff.	Communicate expectations.

The market devices depicted in the table highlight actor's reliance on multiple document storage devices. The use of similar devices enables a thorough calculative practice and stabilisation. This was demanded by actors due to the accountability that is placed on them. As Martin explains:

> "We do use EQS, as well, which we understood EQS was going to be the next step for us, where you have documents, you could make a change on a document, that document wouldn't get approved until six people out of the pool identified 12, signed it off, but we've never went down that. We've talked about it, but never went down that route. So, there's always talk about it, but I know for example, if I want specific things done, there's no point in my trying to do that, a knowledge share system because it doesn't work. I have to actually physically go out and do it."

Martin's comments reveal that the actors view EQS, or as is conceptualised as the market device, as flawed and that it provides an incomplete calculation as it is not used to its full calculative capacity. Martin acknowledges the devices perceived stability but that it is integrated into practice, despite its shortcomings (Araujo et al., 2010). When discussing his PowerPoint presentation Stephen states:

> "And I went out to the whole supply team of designers and contractors, and delivered this presentation right at the start of the programme so the expectation were set early and what I did as well was I developed....after every programme it was - oh we used to have this template for this or we used to have guidance has anyone got it and you would find it on someone's C drive, so I collated all the stuff to do with UIDs (User identifier) and I put it into this document."

In this instance, due to EQS and Documentum being relatively restricted in terms of the ability for external actors to access, Stephen uses a PowerPoint presentation to exchange the marketing object. This suggests that actors cannot easily access the device of the market devices, even though they may hold the ability to perform the required calculations to facilitate exchanges.

7.6 Conclusions

In conclusion, this second empirical chapter has sought to address the second research question:

2. What effect does marketization have on market practices?

This chapter has built on the identified call from an established body of researchers who called for the greater study of markets and marketing (Håkansson et al., 2004; Helmsley-Brown et al., 2006; Lusch and Vargo, 2006; Sheth and Sisodia, 2006; Araujo et al., 2008; Diaz Ruiz, 2016).

Firstly, this chapter has considered the processes and degree of marketization, and how this impacted upon the firm's market. Building on the understanding of marketization as a process (Araujo and Pels, 2015; Callon, 2016; Mason et al., 2017; Findlay et al., 2017), this chapter explored that the public utility firm was revealed to be exposed to various stages of the marketization process. In so far as the legal environment of the public utility firm functions within was fundamentally altered, which has affected the socio-technical arrangement of the market (Caliskan and Callon, 2010). Through regulation, marketization has moved away from a broad-based accountability on multiple fronts, to multiple actors and towards, more narrowly defined accountability based on market transactions (Callon, 2016).

Secondly, a central market device of post project appraisals (PPAs) was considered as a market devices that fundamentally shaped market practices. This focus addresses the claims that there is a lack of research addressing how market devices are generated, or replaced in practice (Fligstein and Calder, 2015; Mason et al., 2017). This chapter has shown that PPAs acted firstly as a market device, as they intended to transform the market, capture knowledge and organise for harvesting innovation (Mason et al., 2017). The PPAs were highlighted as enabling actors to gauge the efficiency and effectiveness with which they acted during a project (Pollock and D'Adderio, 2012; Fligstein and Calder, 2015).

Importantly as a device, from a Callonian perspective, the PPA was designed to be agentic, and/or make others act (Callon et al., 2007). The case showed the complexity of the varied success of the PPA as a market device, due to its size and complexity of use (Fligstein and Calder, 2015), and importantly actor's reluctance and inability to utilise its full calculative capacity (Muniesa, et al., 2007). Within the case, the PPA was found to have struggled to be singularized by actors. Here the lack of sound calculative abilities resulted in qualification, as actors had to use quality based rational judgements (Cochoy, 2002; Callon and Muniesa, 2005; Muniesa et al., 2007). This points towards the view that market devices are adjusted and calibrated beings (Muniesa et al., 2007).

Thirdly, this chapter explored the ideas of inherited market objects in the formation of the firm from the three independent utility authorities. This re-formation radically altered the boundaries of the market, significantly distinguishing the sorts of objects available in the market (Finch and Geiger, 2010), whilst actors actively disentangled, and evaluated them individually (Diaz Ruiz, 2013). The successful development of the first combined version of standards and specifications represent what Reverdy (2010) called 'the learning process,' which will facilitate actors learning how to perform and calculate in a hybrid fashion and allowed actors to pacify the market objects (Çalişkan and Callon, 2010). The market actors were shown to use technical knowledge and relationships to permit stable exchanges. The acceptance of purposeful, planned practices, that the actors take to review standards and specification, adds to Finch and Geiger (2010) who argued that marketers and allied professionals, consider it their mission to continually unsettle markets and marketing objects. Further, the inherited market objects required performative aspects of knowledge, and expertise to create (Araujo, 2007) adjust, calibrate and combine them (Callon et al., 2007).

Fourthly, this chapter explored the marketing object and its performativity in shaping market practice. This analysis sought to address the understanding that few empirical studies have addressed how marketing theories are used and performed in marketing practice (Kjellberg and Helgesson, 2006; Jacobi et al., 2015; Mason et al., 2015; Diaz Ruiz and Holmlund, 2017). This finding contributes that productization, as a marketing object, was purposefully constructed by actors packaging the market objects, standards and specifications, and standard products to shape market practices. Productization works hard to have supportive calculative properties that control and direct disruptive calculations of actors. It was shown that actors wishing to engage in commercial relationships with the public utility firm, have little choice but to accept, even grudgingly the marketing object.

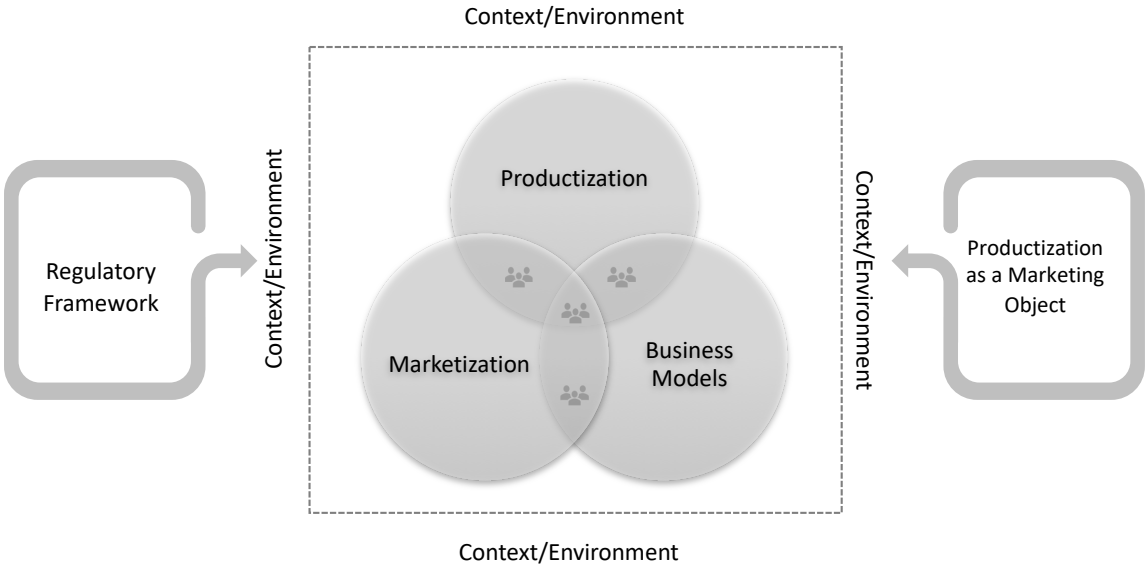
The findings also highlight the performativity of the marketing object, as it moved from being viewed as a complete entity, to consistently in the making (Finch et al., 2015). Therefore, viewing productization as a marketing object, would suggest that at the point of activation that the object is made and configured, which is what provides that stability. The waiver system utilises performativity to help socialise the service of the marketing object. The service level agreements underpin the actor's commitment to the actor's engagement in the waiver exchange it accepts, and attempts to manage that markets are socially constructed, with recurrent exchanges happening between buyers and sellers (Fligstein and Calder, 2015). This chapter depicted that waivers and SLAs were used for coordinating the social interaction with other actors (Finch et al., 2015; Onyas and Ryan, 2015), and are performatively mobilised by accepting or rejecting waivers (McFall, 2009). As such, the productization waiver system was shown to accept that markets encompass multiple, and often conflicting efforts to shape them (Kjellberg and Helgesson, 2006) and that the overflows of market boundaries are porous (Finch and Geiger, 2010a) but are significantly absorbed by the productization process.

Finally, the findings chapter analysed the marketing object and market devices of the firm. It was illustrated that marketing objects notably still need the devices of the market to provide richness, and depth of calculations, of the marketing object (Finch and Geiger, 2010a). Actors relied on multiple document storage devices to enable a thorough calculative practice and stabilisation, despite the device's perceived shortcomings (Araujo et al., 2010) which was shown to be in part due to the accessibility of the market devices.

The findings of this chapter unpack that actor's market shaping practices attempt to manage the plasticity of markets, by engaging in multiple reactive and proactive activities (Geiger et al., 2012).

The second findings chapter represents the subsequent opportunity to examine the conceptual framework that was developed at the end of the final literature chapter. The figure 28 below signposts towards a further revised conceptual framework. The empirical data presented above introduced the novel perspective of viewing productization as a marketing object that is performed by actors. Therefore, productization as a marketing object had been positioned to the right of the revised conceptual framework. The placement of the marketing object here is to draw out from the current context and environment of that regulatory framework as the marketing object is carried forward into the next regulatory framework.

Figure 28 - 2nd revision of the conceptual framework



The next findings chapter introduces the final empirical exploration of the thesis.

Chapter 8 Findings Establishing Co-Existing Business Model

8.1 Introduction

This chapter forwards the final empirical analysis of the thesis. It is concerned with addressing the final research question:

3. How does a firm's business model facilitate its ability to organise and capture value?

To examine the empirical case data the question will be considered in three broad areas: firstly, from an organisational perspective, how is the public utility firm trusted to deliver its services? Secondly, how does the public utility firm arrange its collaborative efforts? Thirdly, how do these efforts guide the development of the firm's relationships and business models?

8.2 Organisational Structure

The literature review on business models in Chapter Four, highlighted the established complexity and ambiguity of clearly defining a business model (Chesbrough, 2010; Chesbrough and Rosenbloom, 2002; Teece, 2010; Zott et al., 2011). However, form the literature it was identified that a business model was seen as a means to create value for its customers (Chesbrough and Rosenbloom, 2002; Zott and Amit, 2010). Therefore, the starting point of this findings chapter, is to consider how the public utility firm is organised. Stephen, elaborates on the organisational culture:

> "…our director here, he is very much of the opinion no investment without evidence, evidence based investment, because for too long we have had people with their own wish list as it were, rather than having real need in the business, saying - I have always wanted a new one of them. They raise it and get it delivered, but it is not really a business priority."

Stephen's comments highlight how the public utility firm has been trying to change the culture of how it previously operated. This conscious strategic decision is underpinned by the responsibility of trust, placed on the public utility firm by the regulator.

Further Karen adds to this understanding stating:

> "… working with the business making sure that suits the businesses needs and it means they are going to get something they can use that is sustainable and of value going forward."

Karen points to the sustainable nature of the public utility firm's decision making, and the need to create future value for the business, absent from this is any mention of the customer. After the initial phase of interviews, the researcher reflected that the respondents had often referred to the 'customer' during discussions, which seemed to refer to an internal customer not the consumer of the final utility service. During one of the first interviews, the researcher sought to explore this initial insight further. Lloyd, a Commissioning Manager, was responsible for delivering a technical knowledge management system that can be used for technical support. He is a qualified engineer who has expertise in managing large projects at the public utility firm:

> "To me anybody within the business is a customer… If we can get our own customers up to speed and sorted then the output will be better for the 'end user', if you like. So, you're a customer, I'm a customer, we're all customers of one another, we all have something that we need to offer one another, so we're all customers, and that's the bit that's been missed, I think."

Lloyd's use of terms, encouraged the researcher to seek further understanding in the following interviews, whereby respondents frequently referred to customers in terms of the business customer, and the end-user, interchangeably. This illuminated that a key aspect of the business model employed by the public utility firm, is the emphasis on delivering value to the layers of business units, to provide the final service, but that the understanding of the 'customer' lacked specificity.

8.2.1 The Customer Forum

Stephen introduced the role the customer plays within the public utility firm's organisation by stating:

> "We now have a customer group that is made up of actual customers whether they be business customers or private householders and they meet regularly. They are the forum to set the public utility firms path."

Stephen reveals the importance of 'actual customers' and the influence of the customer panel, as outlined prior in the thesis, as part of the public utility firm's regulatory framework, it influences what and how value is created for customers. The source documentation that the researcher analysed, on the customer forum, provided further details on the purpose and who is involved. As such the researcher came to understand that the forum embodies the customer's perspective to structure the regulation, and to orient the future service of the public utility firm. The customer forum is viewed as the main regulator ahead of the government. This significantly highlighted that the public utility firm must communicate and justify its investments and developments, in terms of need and of value, to the customer. For the public utility firm, the customer forum acts as a direct and partly organic relationship with the its customers. The customer forum members are selected based on their knowledge and expertise of the utility industry. Backgrounds include areas such as: consumer affairs, law and regulation, business, strategy and policy. The varying degree of knowledge and expertise was designed to represent the extensive variety and strong challenges that the public utility firm encounters, the members have the required agency to uncover biases or unfounded assumptions. Forum members participated as personal customers and not as stakeholders representing an organisation or a group of customers. For example, some forum members are Professors at different, and potentially competing, Universities. In considering the role of the forum and the regulatory framework, it emerged as providing legitimacy to the activity, and to the attempts of the utility firm to embed the customer, in this respect it could be considered as a move towards embedding the customer as a co-creator of value (Vargo and Lush, 2006).

To unpack this consideration further, Dougie, a Qualified Chartered Accountant who is responsible for developing and implementing the strategic direction of the public utility firm, provides an insight into the public utility firm's focus on the customer:

> "…over the past couple of years and particularly the past year customer satisfaction with us has continued to increase period on period and secondly, relative to the economy as a whole, customer satisfaction with the public utility firm has risen by a greater extent from the satisfaction with other companies supplying them. So, it's not just my view that we're doing a better job, it's our customers' endorsement that the service you're delivering, the satisfaction with what you're doing is continuing to rise year on year and rise more quickly than the other companies they're buying from and that's absolutely fantastic affirmation of all that we're doing."

Dougie's comment reveals that the public utility firm's relationship with the customer forum, results in them providing a higher level of customer service, and achieving higher customer satisfaction scores. It demonstrates that the exchange undertaken by the public utility firm, is resulting in value provided to its customers.

In considering the customer forum as a strategic endeavour, it drew attention to the understanding that strategic decisions taken by the public utility firm are dependent upon the role and agreement of its remaining regulators: including the government, economic regulator. For example, the business plan of the firm is implemented for a six-year investment period, and the public utility firm is trusted to then implement that business plan. Dougie, comments with respect to the public utility firm achieving targets set by the regulators:

> "…I had no idea as to whether we were going to actually hit that overall measure of delivery (OMD) target or not and frankly, that is no way to run a multi-year investment programme and because we're off the until the very last days of the year, the regulators and the Utility Industry Commission in particular, gave us the opportunity to reset some of the dates in our programme and at one level that was a great opportunity but let me assure you, it was a once in a lifetime or certainly a once in a regulated programme opportunity but as a consequence, we used up some of the goodwill we'd built with the regulators and the pressure and the scrutiny is actually on us in the future, not just at an OMD level but at a programme level and a project level by milestone and by every quarter. The microscope is going to be out on our future performance on the capital programme. So, from my perspective when I look at this whole area of risk management, some really great progress…. the topic of stakeholder confidence. How well have we maintained that? Well, I think unfortunately this has probably rather more at amber and I don't want to overplay this and overall, we still have good support from government and from our regulators but there's no doubt a slow start to investment programme and we baselined that dented confidence slightly."

Dougie's comments start to uncover the pressure put on the public utility firm with regards to achieving targets set. His reflection that the public utility firm could 'pushback' some of those key deliveries was unique, and would place more pressure on future performance. It also serves to highlight the unique regulatory framework which the public utility firm

operates within. Jim provides further clarification into the relationship between the public utility firm and government and regulators:

> "Yeah, government and regulators, you can have a good information sharing, good relationship with a regulator, but when you turn up at a meeting he might have to be a regulator at that meeting and you might have to be a utility company… And he has specific things he's legally required to do you're legally required to do and you have to do them. You can still work in a relationship with people that allows you to understand each other's position, and one of the things you should actually do with a regulator is understand where the regulator is coming from, so it's good to really understand his position. The more you can do of that, the better but there are times that, especially with correspondence and meetings, when they have to formally be a regulator and you have to be a utility company."

Jim illuminates the importance of managing the relationship with the regulators and government. The comments highlight the frequency and the open nature of exchanges between the public utility firm and its regulators. Significantly the relationship was frequently portrayed as hierarchical and ordered. With regards to the future success, and trust of the public utility firm, Dougie adds:

> "If you look at it through the perspective of our shareholder government ministers, they must celebrate our success. They want to have opportunities to talk about our programme being delivered ahead of time and under budget. Just think for a moment about the new Forth crossing. How often have you heard government ministers talk about having delivered £1,000,000,000 under budget? Now, I've no idea whether that budget was a tough budget or was a really soft-budget but from a government angle, it doesn't matter, it's a great news story, £1,000,000,000 under budget and I want government, I want to be able to give government ministers, if you like, the stories to tell how great the public utility firm is at delivering its capital programme."

Dougie highlights the interwoven nature of the public utility firm's success and that of the governments. The findings extend Dahan et al. (2010) who suggested a business model must go further than economic value to produce social value. The regulatory framework is how the public utility firm's business model is interwoven with external partners, and how it undertakes exchange with them to create value for all (Zott and Amit, 2007). The

regulator develops frameworks and standards of service provision to guarantee positive market outcomes. This drives the value actors needed to develop business models, as a mechanism to guide and formalise the collaboration practices.

8.2.2 Risk Management and Trust

Due to its regulatory framework, the public utility firm is concerned with regards to risk and how that is considered within its exchanges both internally and externally. Shirley further comments on the responsibility of the alliance partners in terms on risk:

> "I would say probably the reason for the role being created was that vision statement we have of CHECK scope and cost certainty. And in order to do that we need to understand risk. And there is a risk team which is being built within the capital investment programme. That is looking at trying to get a generic risk process and a generic risk toolkit out to not just the public utility firm but all of our partners, all our alliance partners. So we are putting in place a very robust and consistent process for the whole organisation it relates to. There are different splits on risk because of the commercials around it. So the public utility firm obviously plans a certain amount of risk. The alliance partners are there and are carrying other types of risk. What we are trying to do is make sure that the risks we are identifying, we are learning from that and making sure that future projects, if they have that risk, should be capturing it and using it. That is the focus for us."

Shirley highlights the responsibility that the public utility firm has, whereby a certain amount of risk is tolerated and expected but identifies the role of alliance partners in carrying risk, as the public utility firm is so reliant upon the alliance to deliver its services.

Brian provides further insight into the organisational view on risk management:

> "We have to make sure that any response we give doesn't endanger public health and complies with the regulations so we go to public utility firm's regulation but there are some areas like any other business which could be looked upon as grey. There's not a clear-cut black or white answer to it so there's a bit grey and we can, because of our sort of technical expertise influence the way that that decision goes in a way that will keep everybody happy and if it means, for example, trying to quantify the risk that the public utility firms in the case of regulation, if we can

> demonstrate to them that it's small enough to be negligible then they might approve something that they would have, because they tend to be very risk averse and they might say, you know, they wouldn't normally have gone for that but if we can demonstrate to them that it's negligible then they would sometimes take us on our, or take our advice on that subject and allow the project to proceed."

Brian offers that within 'grey areas', the public utility firm can use their technical expertise to suggest that the risk is minimal they can guide the regulator's views and ensure they are able to deliver.

8.3 Standards and Specifications

Standards and specifications play an important role in demonstrating the public utility firm demonstrating trust to its regulatory framework. The public utility firm works to create standards and specifications using multiple sources of expertise and benchmarking on best practice. These are then used by the Service Quality Regulator to hold the public utility firm to account. Kevin highlights:

> "The Service Quality Regulator say you must put in whatever… We have done a lot of work with The Service Quality Regulator in terms of challenge up front so it is not covered by the specification per se but effectively the view would be that before you come and ask us to invest millions of pounds is there defueled? pollution in the catchment, is there other factors in there that are causing the downgrade that even if we do this you might not achieve good environmental status or whatever the objective is they are trying to achieve. Basically, you judge your performance against your consent. Your licence to discharge. The Service Quality Regulator set the conditions of the licence to discharge so therefore they are setting the standard. Again, that was done on a trial basis, failed. It is quite hard because you can get quite cynical in trying new innovation. That is part of the reason I am normally in the environment innovation group, to - Come on Kevin, let's try something else."

Kevin's comments disclose that the utility firm operates within the standards and specification set out by the Service Quality Regulator. The public utility firm can challenge those standards with technical expertise. The findings suggest that there is an impact on the public utility firm to innovate as they are cautious of deviating from the standards imposed. Kevin further outlines the role of the alliance partners:

> "So that involves our delivery partners including… of their involvement… they have all had involvement in specifications along with all the contractors and consultants that are working with them. It is interesting because I see the specifications being used more and more by designers of consultants as a - this is what I must deliver, and I always felt the specification is for the guidance of the wise and the observers of the fools."

Kevin reveals the tension between actors adhering to the standards and specifications in terms of delivering the required value. Stating "specification is for the guidance of the wise" highlights that Kevin views specifications as a crucial element to public utility firm's business model. The ongoing challenge that the public utility firm faces, is getting alliance partners, consultants and contractors to utilise the specifications. Which could be approached by involving them in the designing of the specifications which has increased the compliance with regards to them.

The Industry Commission act as the economic regulator to hold the public utility firm to account over the charges set, and notably reports on costs and performance. From the analysis of the source documentation, started to reveal how the Industry Commission was trusting the public utility firm to take on more risk and to innovate. For example, The Utility Industry Commission stated:

> "Most of us are fortunate enough never to have to think about the utility service that we receive. We take it for granted that the service safe and cleaned up before being returned to the environment. The utility industry prides itself on its role. It is therefore perhaps understandable that it is an industry which prefers the tried and tested. Critics suggest that the utility industry could be more innovative and has a bias towards more traditional solutions. They are right. But if current and future customers are to benefit from an affordable and sustainable utility industry, we should seek to address the root causes of any such biases and provide incentives to change. There appear to be three principal issues: Firstly, the industry has, for understandable reasons, sought to be a 'silent service'. However, in so doing, the industry may have become too conservative and insufficiently open to new approaches. Secondly, the governance and regulatory framework has not helped. A short- term focus on cost targets was important to improve efficiency but it has tended to discourage more innovative, sustainable and lower whole life cost

solutions. Thirdly, there has been an adversarial approach to regulation, with a lack of trust between regulator and regulated. This has stifled the opportunity for joint working to deliver innovative and collaborative solutions."

The above statement from the Utility Industry Commission is a call for the public utility firm to develop more collaborative relationships that push the boundaries of what the regulator has previously deemed, safe and exchangeable. It calls for greater risk taking in innovation to achieve value for the customer. Such strong statements provide the public utility firm with a clearly defined frame to deliberately define, organise and manage its collaborative and innovative efforts.

8.3 Collaboration through Alliances

The following section explores the findings with regards to how the public utility firm organises its alliance partners. The public utility firm relies on a complex set of alliance partners to deliver services to customers. Jenny, a Collaboration Change Consultant, with a background in banking, and who has expertise in collaboration platforms, social intranets and social risk management provides a deep insight into the alliance partners that the public utility firm works with:

"So, Bob looks after the alliances, and in the public utility firm we have the capital alliances and we have the operational alliances and obviously, the operational alliances look after operational things, keeping things going, and the capital alliances deliver part of the capital delivery for the public utility firm which is the investment and the strengthening of infrastructure, etc. And the delivery of capital interventions of their core projects is looked after by these three alliances as well as the public utility firm itself so it's almost like you've got four delivery vehicles you've got us doing our own and then according to various algorithms they decide how to divvy up the rest of it."

Jenny's insight begins to draw out how the public utility firm organises it business model to deliver value. The public utility firm has three alliances that consist of six independent companies. In addition to the alliance partners the public utility firm as its own internal delivery mechanism, it is responsible for allocating the workload to the alliance partners. Jenny adds:

> "So, these three alliances deliver these types of interventions made up of multiple partners that have formed a joint venture specifically to deliver that kind of intervention. So, I've got diagrams and things I can show you to help it come alive but the alliance... One alliance *(Alliance number 2)*, for example, is company 3 and company 4. Another one is Alliance number 3 that's… so there's three partners in that but what's interesting is in that one alliance *(Alliance number 3)* there is a company that is in more than one alliance."

From the empirical data provided by the respondents and the internal document analysis, it was possible to construct table 46 below to demonstrate the public utility firm's alliance partners, the configuration of the alliances and their overall purpose.

Table 46: Public Utility Firm Alliance Partners

Public Utility Firm Alliance Partners				
Alliance Number	**Type of Alliance**	**Alliance comprised of**	**Number of Employees**	**Business Model Value Delivered**
1	Partnership	Company 1 is a UK based Utility Services Firm	3,000	Delivery of construction projects and improve utility networks
		Company 2 is Multinational Engineering Firm	90,000	
2	Partnership	Company 3 is a Global Engineering Firm	11,500	Infrastructure services
		Company 4 is a UK construction Firm	500	
3	Joint Venture	Company 5 is a UK construction Firm	5,700	Non-infrastructure
		Company 6 is a Global Engineering Firm	7,000	
		Company 3 is a Global Engineering Firm (same firm as in Alliance 2)	11,500	

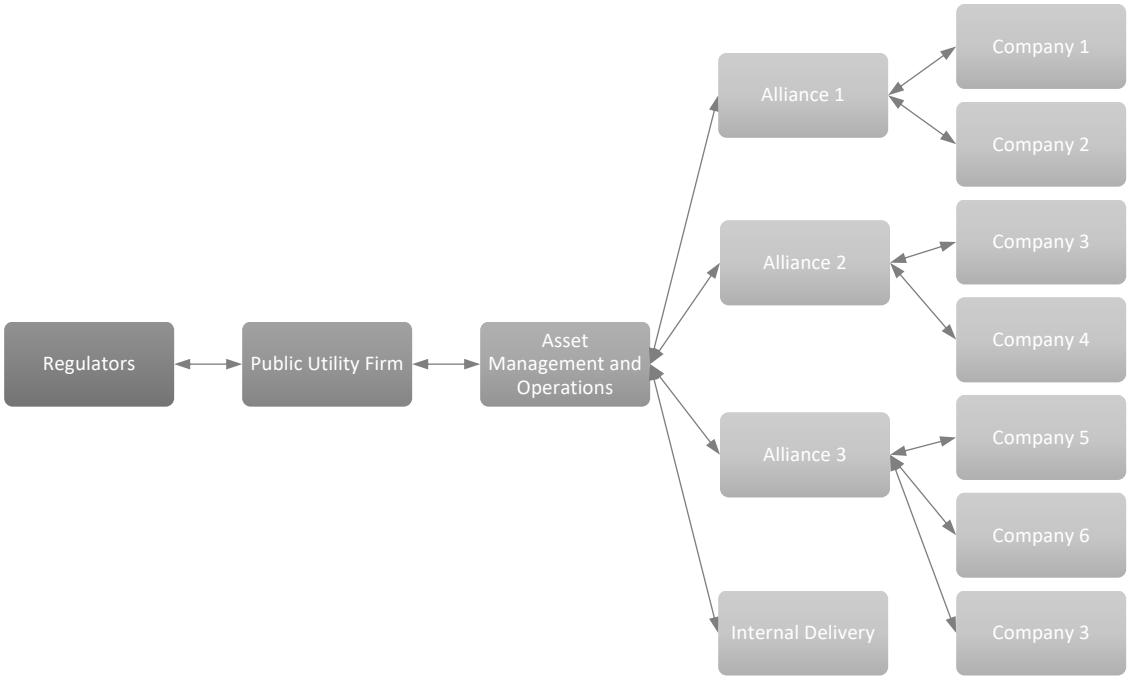
Table 46 highlights that the organisations that have collaborated to create the alliance partners of the public utility firm are competitors of each other within the UK utility industry. As illuminated in the quotation above by Jenny, company three is in two Alliance Partnerships: Alliance Number 2 and Alliance Number 3. Design and construction is delivered in house and by alliance partners with smaller Tier 1 contractors being used to support them. The figure 29 below visually illuminates the organisation of the alliance partners. The public utility firm utilises the alliance partners to direct problem solving in relation to specific problems based on their knowledge and expertise (Mason and Mouzas, 2012), which then permits the utility firm to frame (Mason and Mouzas, 2012) how they stabilise exchange with actors. The business models are designed considering the type interactions and relationships of between all actors (Ferreira et al., 2013), that is to say they are required to be transparent, accountable and cautious of risk to the greater environment.

Figure 29: Alliance Partners Structure

Creating alliance partners allows the public utility firm to the successfully develop formal collaboration relationships (Bock et al., 2012), and provides the ability to find to knowledge and increase the accurateness management decision making (Combs, 1999).

Table 46 and figure 29 add to the complexity of viewing the public utility firm as having one overarching business model, adding to Benson-Rea et al. (2013) who argued for the plurality of co-existing business models within a single firm. The business model of the public utility firm transcends it boundaries, to capture an appropriate a share of that value with partners (Zott and Amit, 2010) and in an attempt to create and capture value, with regards to the structural and contextual customer need (Smith et al., 2010). The public utility firm is successfully embedding internal and external factors regarding customers, suppliers, and the broader business environment (Teece, 2010). Each company (numbers one to six) that comprises the three alliance partners has its own business model to operate, each alliance has its own business model to deliver the required value, and the internal delivery of asset management and operations conveys value as a business model. These business units therefore operate separately but complimentary methods of delivering value to the public utility firm. Figure 30 visually represents the how the utility firm organises the its alliance partners. The business models of each business units are not linear (Mason and Spring, 2011), value is created independently for each business unit, through horizontal and vertical strategies, and the sharing of knowledge and expertise (Acur and Bititci, 2003). The findings show four patterns of exchange in which collaboration is taking place. The alliance partners work with a greater intensity with the asset group, the asset group delivers projects for the operations group, and the customer forum aligned with the regulator sets pricing and quality standards for the operations group and permit investment programmes for the asset team.

Figure 30: Detailed organisational layout with Alliance Partners



Jenny reveals how embedded the alliance partners are in the public utility firm:

> "So these companies have been formed as independent entities so all of the staff are sponsored by one of the host organisations so you have three sets of people sitting in one office and multiple other offices. Some of them are co-located in the public utility firms own office in Glasgow and some have their own offices on campus. And they're not even from the same organisation and yet they have to work to one culture and one structure, one set of delivery, one set of processes and so we spend an awful lot of time about integrating them with the public utility firm. Well they're barely integrated with themselves; they have different intranets, some have no intranet, they have different home organisations, different comms coming from home, as well as their internal comms which is not delivered by comms specialists so it's a bit plinky-plunky at times, and you have different knowledge management systems, different everything. So, two people can't even necessarily use the same instant messenger to talk to each other so the experience of those people is really diverse and disconnected. And they are having to work as one and as one with the public utility firm, and not only that but they're using a different process that they've ever used before, and the whole philosophy is that you bring these guys in to consult really, really early with the designers. So, the public utility firm people are not only having to work differently with their suppliers in a way and have to be so much more open in sharing with their information than culturally they've ever been before

but they're also having to change the style of working with them, so to engage with them at different times and stuff. And they're strangers, they don't know who each other is, there isn't a database, you can't search someone."

Jenny's comments reveal the public utility firm's attempt to facilitate the ease of exchange in delivering value through business model innovation. The public utility has changed the way in which they perform an activity (Amit and Zott, 2012), as they have disrupted the previous business model (Khanagha et al., 2014), such as Jenny offers it as less integrated and more independent of its suppliers and partners. The public utility firm's alliance partners have played a crucial role in the business model innovation process (Amit and Zott, 2001; Cortimiglia et al., 2016) by agreeing to enter partnerships with competing firms and share knowledge and expertise.

Jenny's comments highlight the difficulties of the alliance partners exchanging with each other and the public utility firm. Spatially the alliance partners share the same location as each other and the public utility firm. However, the business model innovation conducted by the public utility firm has been prohibited by inertia (Chesbrough, 2010; Doz and Kosonen, 2010) and from the existing arrangements of assets and processes (Bouchikhi and Kimberly, 2003; Chesbrough, 2010). The difficulty of changing the corporate culture (Demil and Lecoq, 2010) is as Jenny states: "they're strangers, they don't know who each other". The employees of the public utility firm have been not used to openly sharing knowledge and expertise in this way.

It became apparent that the regulatory framework imposed upon the public utility firm was seen as risk averse, whereby embedding the alliance partners, and using their knowledge and expertise, is seen as a method to adopt business model innovation without taking huge risks, as the exchanges are seen as stable (Amit and Zott, 2012; Gambardella and McGahan, 2010). These findings extend that of Amit and Zott (2012) who contend that changing one or more of the content, structure and or governance of the business model, equates to business model innovation. Therefore, the utility firm governance structure was changed with the creation of the customer forum, and the structure was altered by the development of the three alliance partners.

This led to a questioning as to how deeply the alliance partners are embedded within the public utility firm, it was expanded upon by Angus:

> "There'll always be external people involved because, you know, and we have to always use the partners that are inside the public utility firm."

By describing the alliance partners as inside the public utility firm, Angus reveals how the relationships developed. The public utility firm relies of the expertise and skill of the alliance to exchange effectively with teams across the public utility firm, and externally with its environment. The researcher reflected upon the make-up of the alliance partners and how they had collaborated with competitors to form the three alliance partnerships. Lloyd, further comments on the possible tension of this:

> "Yeah, because I suppose what you have to remember is that the alliances and all the various contracting elements are here for one sole purpose, to make money, and they'll find any way possible to do that. That would mean better integration, better commonality, better collaboration. They will find every possible mechanism in the world to make more money. But in the public utility firm they don't want to make money, they just want to be more efficient, in other words they want to lose less money, if you like. So, the exact opposite ends of the spectrum; there's one wants to make loads and loads and the other one that doesn't want to lose any."

Lloyd's comments highlight the complexity of commercial focused firms collaborating with the public utility firm. The public utility firm is seeking to provide its service to customers in the most efficient manner, while being concerned with risk in terms of public health and its accountability to its regulatory framework. However, the alliance partners are commercially focused, concerned with profit margins, market share and market growth. The alliance partners are a key part of the public utility firm's business model and are responsible for delivering value. These findings highlight the complexity of the companies that comprise the alliance partners, running parallel commercially focused business models.

Jenny remarks on how the public utility firm has attempt to manage this tension:

> "So, they've tried to counterbalance that in the contracts, the pain gain, and the shared objectives and the way that rewards and incentives work. And there's some really lovely examples where... For example, the two, the partners imagine they're brought in to do specialist type of work but think about who's inside them, they can all pretty much do anything. Where in some of the islands they've got a heavier presence than another so they're actually swapping work and sharing work out

> because it's... One of the guiding principles is 'best for project, not best for partner' and so that might even be bringing in a whole new project manager from the supply chain to run it and all sorts of different things. And that is happening and there is a desire there and you're supposed to be recruiting based on personality types and... you know, it might be on paper the best person for the job but if they don't have the right attitudes for it, for instance. So, they are trying to drive that kind of mentality where... you know, being seen to do the right thing more. So, it is happening. And it's a very delicate ecosystem to keep that contract cash neutral and it's one of the fundamental principles is that the contract must remain cash neutral."

Jenny highlights how the utility firm carefully selects alliance partners based on their culture and understanding that when working collaboratively, the firms that create the alliance partner should be focused on delivering for the utility firm. The public utility firm is attempting to embed knowledge and expertise sharing that the companies possess, into their specific alliance. The findings show that the public utility firm sought to base its collaborative efforts on mutual value, transparency and trust (Nooteboom, 1996).

Bob, who was identified by Jenny as the 'expert' within the public utility firm with regards to alliance management, states:

> "Because we're a small enabling team, the majority of problems that we encounter are in other areas of the business so we'll act as the conduit and say, there's an issue over here and actually the person who can fix it is over there. The problems we have within alliance management within our control, generally we can fix it, but because we enable the alliances and their effective working, most of our time is spent fixing their problems with other people and likewise other people having problems with alliances, our role is to try and get…. We've got an issue where we find … within alliances we carry with us quite a diverse range of expertise, when something doesn't happen within the public utility firm we end up plugging the gap, we end up doing it ourselves because we can."

Bob views the public utility firm's alliance management team as a channel between the public utility firm and the alliance partners. The alliance management team is often reactive to alliance partner problems which requires the team to use its expertise to resolve it. Reflecting upon Bob's insight, "when something doesn't happen within the public utility firm we end up plugging the gap" provides understanding into how he views the positioning

and purpose of the asset management team. He appears to view the asset management team as out-with the public utility firm, almost operating as its own consultancy firm, which has interesting implications for agency.

Further, Martin reveals the nature of the longevity of the alliance relationships:

> "And each of them are getting about £300m worth of work off us, over the next six years, and it's, if they do well they automatically get another six years after that, so it's be another £300m spend. So, these companies are coming in obviously wanting to make money, so I've already met with them, and again I'm looking to catch up with them in the next three or four weeks, so if I can get your details, I'm invite you onto them as well."

Martin's comments touch upon the commercial tension previously discussed by Lloyd. However, Martin further adds that the alliance partner's contracts were for six and then another six years. The alliance partners being actively embedded within the public utility firm for potentially twelve years is a key point in how the public utility firm ensures the stability of the service delivery, they avoid the viewpoint of short term profit maximisation, and promote a longer-term more collaborative approach.

The findings of this chapter have so far have considered how the public utility firm embeds its alliance partners within its business to collaborative, deliver and maintain its services. The discussion reveals the role of the supply chain and how it operates within the public utility firm. Jenny states:

> "And then they have the supply chain where a supplier from the Tier 1 supply, a contractor, could... And it's our tiers, our supply chain that they get. So, the Alliance Partner 1, will get their Tier 1 and then Alliance Partner 2 will get their Tier 1 and Managed Delivery, our own people, will have their own tier one, but some of the same suppliers will be in multiples, then you've got the rural and other frameworks. So, we're trying to work in this integrated way… actually so far away from what we're trying to achieve because we want to share more, deeper, earlier, we want to share tacit knowledge, we want to be able to have that real-time co-creation and all sort of other things around it; we want to have that deep context, not just a try document."

From Jenny's perspective, effective collaboration is seen as dependent on the ability to achieve high levels of supply chain integration, in particular the ability to rationalise, simplify and manage relationship are key (Fawcett et al., 2008). Developing the supplier framework and assigning Tier 1 suppliers to the three Alliance Partners, and the internal managed delivery, represents the public utility firm's attempts to manage supply chain collaboration. Jenny states that the public utility firm is aiming to collaborate as soon as possible with suppliers and alliances, this is achieved through encouraging knowledge sharing. The Tier 1 supply chain contractors undertake work horizontally and vertically within the public utility firm and the alliance partners. These findings again reveal the embedded nature of collaboration with the Tier 1 contractors.

Jenny adds:

> "But we're not showing trust to them so why would they show trust to us? But we don't even understand the legalities of it. So, Joe is critical because he's responsible for the integrated supply chain on-boarding so that whole piece around shaping and defining what that is, building up the commercial model that supports it, all that kind of stuff is being driven by Joe, and to me it seems there's a chasm of a hole where absolutely nobody understands what this means and yet people are already building solutions for it and nobody knows what the scope is."

Jenny exposes that despite the intention of real-time co-creation, the public utility firm are struggling to extract value due to a lack of trust in the relationships. The novelty of attempting to integrate the supply chain has created a disconnect due to confusion in thinking and approach. Jenny raises concerns with regards to the collaboration efforts of the public utility firm:

> "There's a really weird disconnect I think between the feelings and relationships, it's "Delivery, collaborate, you'll collaborate because its' in the contract," this kind of command and control, old-fashioned, hierarchical kind of way of working. So, it's that big joined-up thinking, big understanding and understanding that opportunity and buy into that and then effectively communicating that and enabling that… it needs to be not knowledge over here, not innovation over there and collaboration over here, because if nobody has sold the what's-in-it-for-me for the people... We're telling them that they need to do this because it's really good for the

company, it's really good for the supply chain, but it's the wrong way to... it's the tail wagging the dog all the time."

Jenny illuminates that the efforts by the public utility firm to establish collaborative alliance partnerships and integrate the supply chain does not equate to effective collaboration. Relying on the requirements stated within a contract is not deemed as a stable enough method, to facilitate exchange. West and Gallagher (2006) found that external support is restricted as collaborators might not fully understand the inner workings of the firm. Jenny portrays that the public utility firm has yet to find the most effective way to communicate the value in collaboration to them.

The findings add to Mason and Chakrabarti (2017) who view that business models are plastic and continually being moulded, to achieve transaction efficiency (Zott and Amit, 2007). The public utility firm use multiple exchanges via collaboration to shape the value that is delivered from its business model. Through each exchange the public utility firm attempts to fit the knowledge and expertise gained back into the next set of exchanges. The business model is wrapped in a spatial-temporal nature (Mason and Palo, 2012; Mason and Chakrabarti, 2017) due to the regulatory investment periods that are enforced upon the public utility firm. Each six-year review results in amendments to the revenue/cost model, and not to the value proposition itself (Bohnsack et al., 2014).

The public utility firm performs its business models through how it has deliberately organised itself. The organisation of the business model facilitates the creation of desired value. The findings extend that of Mason and Spring (2011) who argued that the business model reflects a firm's ability to command, control and direct actors, which is framed and implanted in strategy documents, targets, presentations, and reports. The initial framing of the business model is conducted with the regulatory framework. It collaborates to develop the acceptable pricing, service quality, environmental and economic benefits that the public utility firm must achieve. These devices and tools are credible at portraying the message and authority of the practices required by the business model across networks and markets (Feldman and Pentland, 2003). The public utility firm then organises its business units to perform distinct but complimentary business models in order to achieve the value required from the regulatory framework. The business units are represented by the alliance partners and the internal delivery mechanism. Through these exchanges the business models become a calculative and narrative device (Doganova and Eyquem-Renault, 2009) that are moulded and constantly materialised by the practices undertaken by actors (Mason and Spring,

2011). The public utility firm's business model is uniquely performed due to its regulatory framework, which adds agency by framing the way the business is developed and subsequently grown (Doganova and Eyquem-Renault, 2009; Mason and Spring, 2011). Taking the view that business models are performed by actors, objects and devices it would be difficult to comprehend that this could be easily replicated. These findings add to Baden-Fuller and Morgan (2010b, pp 159) who argued that a business model is something to follow, and not imitate.

8.3.1 Openness of Collaboration

The collaborative approach adopted by the public utility firm can be regarded as open, as Lloyd offers:

> "Our basic premise was that to work towards this, the view of George, that he could start looking at having more kind of an open innovation platform – that was our understanding – so bringing in the supply chain and our alliance partners and everyone else would be essential for that, so yeah."

Lloyd understands that the purposeful organisational activities undertaken by the public utility firm are to facilitate working towards open innovation. One of the first steps towards this for the public utility firm was creating and embedding the alliance partners and the supply chain. To achieve this the alliance partners and supply chain would also have to be actively willing to work towards an open innovation platform as well. Additionally, the companies that comprise the alliance partners are also required to be open and share knowledge and expertise with other firms that compete in the same markets. A key element of the open innovation paradigm is its relationship with the internal and external knowledge, which includes the serval actors and channels such as a firms' customers, competitors, academic institutions and unrelated industries (Tether, 2002; Coombs et al., 2003; Howells et al., 2003; Acha and Cusmano, 2005; West and Gallagher, 2006). The public utility firm is attempting to balance the knowledge flows across organisational boundaries using pecuniary and nonpecuniary mechanisms (Chesbrough, 2003a; Laursen and Salter, 2006a; Chesbrough, 2017). These attempts are in line with the public utility firm's business models that relies on collaboration from with external partners (Chesbrough, 2017). Irene states the attitude of her team with regards to boundaries within the public utility firm:

> "We've got a mantra on the team, well, we never let a boundary get in the way of doing the right thing, end of, just because it's not your job doesn't mean…if it's the right thing to do, you step over that line, and if anybody's going to criticise you for that…nobody, if you're doing the right thing for the public utility firm, how could anybody have an issue with that, you know? And it's a key thing, and taking ownership when something comes your way, you have to take ownership and I think we're probably quite lucky as well, because we know our business and we know so many people because of the services we provide, we always know who to pick up the phone, and we always know who to go, why? You know, so I think some more siloed areas that can be quite difficult because they don't know who. Who do I go to? And I've seen it so many times that things will happen and if somebody just picked up the phone, we could have not done that, or we could have saved that, or I could have said, well, I've got somebody here who can draw that for you in a day, you know? So it's that kind of…it's knowing who to go to, and knowing that just because you've got a boundary, that doesn't mean ignoring the problem."

Irene and her team seek to cross boundaries within the public utility firm, and with the alliance partners to ensure the effective delivery of its service. The position of her team within the public utility firm allows this to happen. The ability to cross and challenge any boundaries permits her team to connect the silos with parts of the business.

Further, highlighted by Peter who provides an example of competing contractors openly collaborating with the public utility firm:

> "Actually, a fantastic example… four competing contractors with no alliance partnership or anything between them, they were competing for work in the public utility firm, yet they willingly worked together on an improvement project with us. They instigated it, and invited us…"

The public utility firm is generally not concerned with issues of appropriability from competitors, which is evident through the firm's pecuniary position, is connected to its appropriability logic (Laursen and Salter, 2014). However, the example provided by Peter shows four competitors collaborating to innovate. The four competing contractors attempt to openly innovative and share knowledge and expertise to help the public utility firm research and problem solve. The example highlights the power of the public utility firm within the marketplace, the competing contractors were willing to collaborate openly in

order to be viewed positively. The potential of a pecuniary outcome for one of the contracts was a stable enough proposition for the firm to conduct exchange activities. Peter adds:

> "…for example, one of the things they looked at was manholes standards, pre-manufactured manholes. You know, they had some plastic ones and said, well, these are much easier to use than concrete. One of the contractors said we've got this type of plastic one, and the other one said we use this type of plastic one, which one's better? They shared knowledge amongst themselves on what they thought was better or is it better in situ, and they shared through a third party, they shared their cost information …on how much it was costing on each of those, and the conclusion was it doesn't make much difference which you choose but one of the contractors did have a far better deal with the pre-cast, they were getting their pre-cast for half the price everybody else seemed to be getting them, and therefore there was some potential for saving more money."

The competing firms revealed the inner workings of their business models to each other, how they create value, which highlights one firm could negotiate a more favourable price for the pre-cast. This is a huge risk for the companies to share such sensitive commercial knowledge (Enkel et al., 2009), it provides a high potential of appropriability from competitors. This finding acts to strengthen the argument that the public utility firm is seen as powerful within the marketplace and the collaboration opportunity was worth the associated risks. Furthermore, Peter states:

> "The conclusion we came to though was it doesn't cost any more, it doesn't cost any less on average, but it does save us time, it does save annoyance, and it's more health and safety friendly, and has the potential to save us more money in the future. But it was an interesting example of a bunch of contractors working together, and public utility firm was there, but wasn't driving it. They'd got external funding for this from a training body, CITB, the Construction Industry Training Board had funded the project, and it was the contractors who worked together to get that funding. So that was an excellent example, it doesn't happen very often for four competitors collaborating with information like that."

The work was funded by an external body, so this would have helped the contractor appease the research and development costs. However, only one contractor was selected going forward. Peter concludes that the collaboration highlights the importance of the promoting and fostering external knowledge sharing and acknowledge the novelty with regards to

competitors openly collaborating in such a manner. The public utility firm was able to learn that in terms of cost there was not much of a difference but they were able to realise additional benefits of a reduced installation time and reduction in health and safety issues. By self-organising, the competitors used non-pecuniary means as the motivation for knowledge sharing (Chesbrough and Bogers, 2014) with the view to achieve a pecuniary outcome.

The public utility firm's efforts to innovate openly address some of the key gaps highlighted from the literature review of open innovation articulated in the literature review. Firstly, the public utility firm provides two key utility services (Chesbrough and Crowther, 2006; Laursen and Salter, 2006; Muscio, 2007; van de Vrande et al., 2009), secondly it is a not-for-profit (Chesbrough and DiMinin, 2014; Chesbrough and Bogers, 2014) and as such they are required to create and capture value, beyond commercial success (West and Bogers, 2017). Thirdly, the findings show the public utility firm's reliance on the third core process of open innovation, the coupled process (Gassmann and Enkel, 2005). Acting as the centralised network partners, the public utility firm has created inter-connected alliances (Gassmann and Enkel, 2005; Chesbrough and Crowther, 2006), through partnerships and joint ventures (Inauen and Schenker-Wicki, 2011) that consist of competing firms entering long-term, stable relationships to facilitate internal and external knowledge exchange. Chesbrough (2017) asserted that the future of open innovation will be more extensive, more collaborative, and more engaged with a wider variety of participants. The public utility firm is embedding long-term collaboration, and openness into its business model, in conjunction with the demands placed upon it by its regulatory framework.

8.6 Chapter Eight Conclusion

This final empirical chapter of the thesis analysed the findings of the research and discussed them with respect the pertinent business model literature presented in Chapter Four. This chapter has sought to answer the third research question set:

> 3. How does a firm's business model facilitate its ability to organise and capture value?

The findings can be into three distinct but related parts. Firstly, the findings demonstrate how the unique regulatory framework impacts upon the public utility firm's business model, and how it purposefully arranges and manages it collaborative relationships. A key

regulator was identified as the customer forum. Whereby the customer forum represents the public utility firm's attempt to co-create with its customer (Vargo and Lush, 2006), and it sets the price and agrees the level of service that the public utility firm's customer should expect. The Industry Commission act as the economic regulator, to then hold the public utility firm to account over the charges set, and report on costs and performance. The Service Quality Regulator with input from the Environmental Protection Agency, then imposes standards and specification upon the public utility firm to operate within. It was also shown that the Utility Industry Commission called for the public utility firm to adopt greater risk to provide innovative solutions. This was seen to demonstrate the regulator's trust in the public utility firm to perform appropriately. The role of government is then key to develop strategic objectives with the public utility firm, based on the customer forum, the Industry regulator, the Service Quality regulator and the Environmental Protection Agency.

Secondly, the findings revealed how the public utility firm's collaboration efforts have guided its development of multiple business models to create value (Chesbrough and Rosenbloom, 2002; Zott and Amit, 2010). The public utility firm created three alliance partners to help deliver its two services to its customers. The public utility firm utilises the alliance partners to direct problem solving in relation to specific problems based on their knowledge and expertise (Mason and Mouzas, 2012), which then permits the utility firm to frame how they stabiles exchange with actors (Mason and Mouzas, 2012). The initial framing of the business model was shown to be conducted with the regulatory framework. The findings extend Mason and Spring (2011), who argued that the business model reflects a firm's ability to command, control and direct actors. Through these stable exchanges the business models become calculative and narrative devices (Doganova and Eyquem-Renault, 2009) that are molded and constantly materialised by the practices undertaken by actors (Mason and Spring, 2011). The public utility firm's business model was shown to be uniquely performed, due to its regulatory framework, which adds agency by framing the way the business is developed and grown (Doganova and Eyquem-Renault, 2009; Mason and Spring, 2011). Taking the view that business models are performed by actors, objects and devices, it would be difficult to comprehend that this could be easily replicated. In addition, the public utility firm has its own delivery vehicle that works in unison with the alliance partners. These are managed by the utility firm's asset management and operations teams. They are also supported by Tier 1 contractors who are assigned to specific alliance partners but can operate across alliances.

The key outcome of this chapter is that it highlights that multiple business models exist, and are performed (Mason and Spring, 2011) within the public utility firm, with each creating

its own value that is emerging and deepening as they interact (Mason and Mouzas, 2011). This finding extends the work of Benson-Rea et al. (2013), who argued for the plurality of co-existing business models within a single firm that spans boundaries (Zott and Amit, 2010). This chapter suggested that the business model is wrapped in a spatial-temporal nature (Mason and Palo, 2012; Mason and Chakrabarti, 2017), due to the regulatory investment periods that are enforced upon the public utility firm. Further, the multiple business models of each business units are not linear (Mason and Spring, 2011), value is created independently for each business unit, through horizontal and vertical strategies and the sharing of knowledge and expertise (Acur and Bititci, 2003). The identified business models go beyond durable and rich interactive business relationships, the expectations of the collaborations process have been clearly defined, and measured outcomes that have been set with the regulatory framework.

To achieve the level of stable exchange required through collaboration with alliance partners the public utility firm had to conduct business model innovation (Amit and Zott, 2012) from a less integrated relationship. The findings also highlighted the key role that the alliance partners and independent companies, that comprise the alliance in achieving business model innovation (Amit and Zott, 2001; Cortimiglia et al., 2016).

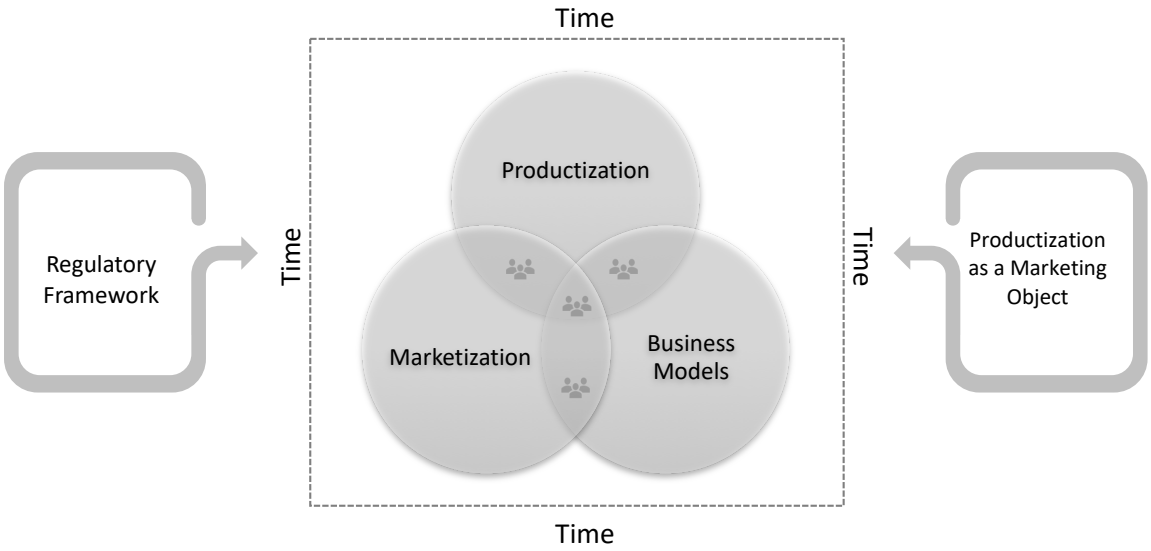
Thirdly, this chapter has gained an understanding of how open innovation is organised in a service firm focused (Chesbrough and Crowther, 2006; Laursen and Salter, 2006; Muscio, 2007; van de Vrande et al., 2009) that that is not-for-profit (Chesbrough and DiMinin, 2014; Chesbrough and Bogers, 2014) and are required to create and capture value beyond commercial success (West and Bogers, 2017). Through its collaborative partnerships (Chesbrough, 2017) the public utility firm is attempting to balance the knowledge flows across organisational boundaries using pecuniary and non-pecuniary mechanisms (Chesbrough, 2003a; Laursen and Salter, 2006a; Chesbrough, 2017). The findings show the public utility firm's reliance on the third core process of open innovation, the coupled process (Gassmann and Enkel, 2005). Whereby acting as the centralised network partners, the public utility firm has created inter-connected alliances (Gassmann and Enkel, 2005; Chesbrough and Crowther, 2006) especially through partnerships and joint ventures (Inauen and Schenker-Wicki, 2011) which consist of competing firms entering long-term and stable relationships, to aid internal and external knowledge exchange.

The findings highlighted four competing firm's openly innovating on behalf of the public utility. The public utility firm is generally not concerned with issues of appropriability from competitors, which is evident through the firm's pecuniary position and how it is connected

to its appropriability logic (Laursen and Salter, 2014). Despite the risk of knowledge loss to competitors, and a high potential of appropriability from competitors (Enkel et al., 2009; Laursen and Salter, 2014), the four firms self-organised using non-pecuniary means as the motivation for knowledge sharing (Chesbrough and Bogers, 2014), significantly with the view to achieve a pecuniary outcome. This finding act to strengthen the argument that the public utility firm is seen as a powerful actor within the marketplace and merited the associated risk.

The final findings chapter represents the decisive opportunity to examine the conceptual framework that was developed at the end of the final literature chapter and that has been revised in the preceding two finding chapters. The figure 31 below signals towards a closing revised conceptual framework. The empirical data presented above introduced the notion that time, notably the six-year regulatory period that is placed upon the public utility firm frames the exchanges that take place within the three overlapping circles and the collaboration and innovation that occurs in the four shaded crossover parts of the circles. The empirical data in conjunction with the analysis of the literature argues that the context and environment become part of the regulatory framework.

Figure 31 - Final revised conceptual framework



In bringing the empirical material to a conclusion, the following chapter provides an overall conclusion to the thesis and considers the aim of the thesis in line with the main contributions to both theory and practice, whilst identifying further areas for research.

Chapter 9 Thesis Conclusion

9.0 Introduction

The overall aim of this thesis was to examine how the productization of services is organised as a way of facilitating collaboration and arranging innovation. In this final chapter, each of the contributions will be addressed around the research themes of productization, marketization and business models, these emergent themes are explored and addressed in line with the research objectives that guided the study:

1. How is productization organised to stabilise exchange?
2. What effect does marketization have on market practices?
3. How does a firm's business model facilitate its ability to collaborate and innovate?

Therefore, this final chapter offers a summation and synthesis of the findings, offering the core theoretical contributions this thesis makes to business-to-business marketing through a Market Studies approach. Secondly, this chapter identifies the practical implications of the study. Thirdly, the limitations of the study are discussed, before detailing future directions for the research. Finally, the chapter concludes with the researcher's reflection on the study.

9.1 Theoretical Contributions

This section puts forward the theoretical contributions of the research. Firstly, it revisits the conceptual framework that was initially devised and offers a revised conceptual framework. Secondly, it presents the theoretical of each theme in greater detail.

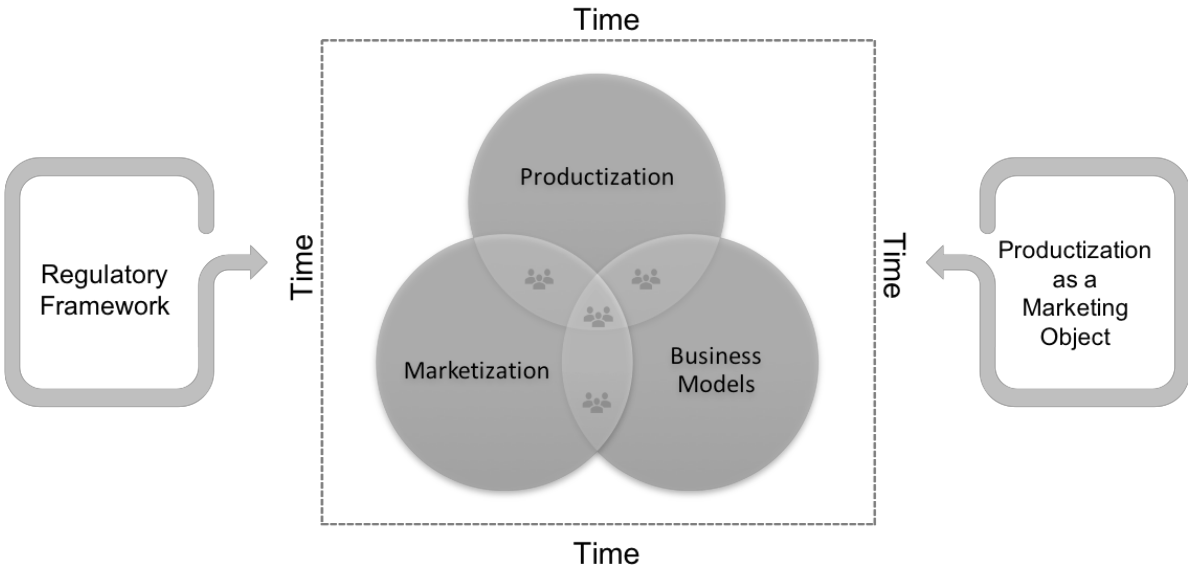
9.1.1 Revised Conceptual Framework

The thematic analysis of the interviews played an important role in the formation of the revised conceptual framework. Through the synthesis and integration of extant marketing literature with the semi-structured interviews the researcher developed a revised conceptual framework. The initial conceptual framework was first presented as figure 1 on page 5 of the thesis. Revising the conceptual framework is beneficial as it allows for the researcher to capture something real and do this in a way that is easy to remember and apply.

Figure 32, positioned below, displays the revised conceptual framework. The regulatory framework is situated as the chief starting point an engages the firm in the specific regulatory time period. Time represents the length of the agreed investment period with the firm and fixes the themes of Productization, Marketization and Business Models within it.

Within the timeframe the revised conceptual framework remains the same as the initial conceptual framework presented with actors collaborating and innovating in the four spaces between the overlapping circles. Here Productization, Marketization and Business Models work simultaneously and in harmony to facilitate collaboration and arrange innovation. To the far right productization as a marketing object, within the timeframe the marketing object moves between the four overlapping circles to stabilise and direct exchange. At the end of the regulatory timeframe the marketing object is carried forward into the subsequent regulatory framework and timeframe.

Figure 32 - Revised Conceptual Framework



The following sections are broken down by the three distinct but inter-related theoretical themes: productization, marketization and business models.

9.1.2 Towards the Productization of Services

This section outlines the thesis's contribution to the current productization literature and represents the theoretical contributions found within the productization circle of the revised conceptual framework.

This thesis adds to the position that productization is viewed as the contrasting paradigm to servitization (Aurich et al., 2009; Durugbo and Riedel, 2013; Durugbo, 2014; Leoni, 2015). It extends this by demonstrating that the large public utility firm, in part due to its unique governance structure, is only concerned with being a service firm, they are not seeking to servitize or be able to deservitize their offering. Therefore, the theoretical contribution here is to demonstrate that there is no blurring of the boundaries between products and services.

It questions the position that service firms are seeking to add products to their service offering. Productization is used by actors to stabilise and conduct exchange and not by final consumer of the product. This theoretical contribution demonstrates their interrelationships that shows how and/or why a phenomenon occurs'.

Additionally, Spring and Araujo (2017) argue that the servitization literature disregards the viewpoint that products are chronically unstable. Harkonen et al. (2015) state productization requires translating, combining and forming a suitable mix of both the tangible and intangible elements into a product. The thesis extends this by demonstrating that productization as a service, acts materially with respect to a product, and its more widespread use, and socially as service, in offering additional value to users by being more useable. Schatzki (2001) and Geiger and Finch (2009) who identify practices as materially and actors are able undertake exchange through various practices when materiality is clear. Productization through its deep engagement with knowledge and expertise of internal and external actors increases the materiality of the product. That is to say that actors view productization as providing quality, relevance and significance. Socially, productization organises for actors to communicate internally and externally with something that exists and can move freely.

Therefore, the thesis contributes to understanding the evolution of services to include a product or a new service component (Baines et al., 2007; Harkonen et al., 2015) seeking to make services more product like in their nature (Simula et al., 2008; Skålén and Hackley, 2011; Chattopadhyay, 2012; Valminen and Taivonen, 2012; and Nagy, 2013). The thesis underpins the view that productization allows for the alignment of value creation of both products and services (Neyer and Moeslein, 2011; Velamuri et al., 2011), and it seeks to integrate the benefits of both products and services (Jung and Nam, 2009). This theoretical contribution is drawn from the case study findings extend this by establishing that working collaboratively internally, and externally to develop standards and specification and standard products, blends and balances the value found in products and services, to provide a more nuanced stable exchange.

The findings contribute to the understanding of inbound and outbound productization presented by Simula et al. (2008). The case study develops the complexities of how the large public utility firm uses both inbound and outbound productization to manage conflict and has the ability to provide scale but balance the need to be flexible with customised solutions. Therefore, from a theoretical contribution position the thesis extends how an

organisation achieves inbound and outbound productization, by determining that resources must be balanced across both the ability to make (inbound) and the ability to sell (outbound). The public utility firm ensures that actors involved in the developmental stages are still involved in the marketing of productization. This is seen as a way of communicating the agency of productization as their knowledge and expertise is embedded within it.

The thesis extends Andreini et al. (2015) who stated that productization helps manage relationships between teams and suppliers. The thesis provides a multifaceted understanding of how productization requires novel combinations and connections between business teams in decision-making and implementation, this is a continual relationship. This continual relationship extends Hellström et al. (2016) who argued that relationships allows firms to manage any concerns from customers with regards to the perceived inflexibility of the productization process. Furthermore, standards and specifications and standard products, play a key role in both deploying productization and in managing relationships between teams and suppliers. They offer clear and concise instructions on how actors should seek to exchange with the public utility firm. This encourages stable transactions as all actors can comprehend needs of the public utility firm. Valtakoski and Järvi (2016) argued that productization this is achieved by the elicitation and codification of the employees' knowledge and permits easier exchange through demonstrating value (Simula et al., 2008; Harkonen et al., 2017). The theoretical contribution here is that productization manages relationships internally between teams and externally with suppliers through its obsession with continually adjusting for changes in knowledge and expertise. To suppliers it demonstrates that knowledge and expertise is valued, encouraged and embedded in productization.

9.1.3 Shaping the Market Object and Marketing Object

This section outlines the thesis's contribution to the current marketization and market studies literature and represents the theoretical contributions found within the marketization and market studies circle of the revised conceptual framework.

The thesis adds to the understanding of market devices as calculative devices that shape market practices (Callon et al., 2007; Cochoy, 2002; Callon and Muniesa, 2005; Fligstein and Calder, 2015; Muniesa et al., 2007). The thesis contributes to the marketing devices literature by outlining how post project appraisals (PPAs) were able to make actors 'do things' (Callon et al., 2007). The theoretical contribution advances the discussion on the

calculativeness of market devices by demonstrating that devices still shape market practices, despite the perceived ineffectiveness of the market device. Furthermore, the thesis unpacks that the market device struggled to be singularized by actors due to the lack of sound calculative abilities resulting in attempts of qualification (Cochoy, 2002; Callon and Muniesa, 2005; Muniesa et al., 2007). This adds to the view that market devices are adjusted and calibrated beings (Muniesa et al., 2007). This contribution outlines that organisation's must actively asses the effectiveness of the market devices in play and monitor when devices are no longer performing as they should.

The second findings chapter presented the individual inherited market objects that were left over from the individual firms prior to the creation of public utility firm. The inherited market objects underwent an initial agencement (Callon, 2016) from three separate market objects into one and then further agencements from version 1.0 to version 5.0 of the market object. These individual market objects were evaluated individually (Diaz Ruiz, 2013) pacified (Çalişkan and Callon, 2010) and when combined actors learned how to perform and calculate in a hybrid fashion (Reverdy, 2010) by using technical knowledge and cultural relationships to permit stable exchanges. The theoretical contribution to the market objects literature of the thesis is that the market objects formation paved the way to create and present the marketing object. Productization, as a marketing object, represented the new market practice that actors were attempting to shape. The inherited market objects required performative aspects of knowledge, and expertise to adjust, calibrate and combine them (Callon et al., 2007). Therefore, the practices are performative as they create the phenomena they describe (Araujo, 2007).

The thesis develops a multifaceted understanding of the marketing object and its performativity in shaping market practice. It adds to the work of Finch and Geiger (2010a), who argue that marketing objects start as market objects. The thesis demonstrates that productization, as a marketing object, was purposefully constructed by actors packaging the market objects, of standards and specifications and standard products together, as a marketing object to shape market practices. The findings highlighted that the performativity of the marketing object moved from viewing entities as being made and in the making (Finch et al., 2015). The thesis contributes to this by teasing out that productization as a marketing object reached the point of activation, meaning that the object is made, which is what facilitates the stability of exchange. However, the waiver system developed by the public utility firm meant that actors could destabilise productization by having a waiver accepted, resulting in the marketing object temporarily losing its 'made'

status. This novel and useful presentation, of the marketing object, helps develop the theoretical understanding of the interrelationships between the market and marketing object.

Furthermore, the waiver system can be seen as performatively utilising socialisation to aid the service of the marketing object. This insight extends the work of Fligstein and Calder (2015), Geiger et al. (2015), Finch et al. (2015) and Onyas and Ryan (2015), who state that markets are socially constructed interactions with actors. Additionally, McFall (2009) argued the role of performativity enables things to become true or false, or more precisely in the case of market forms, to succeed or fail. The thesis develops the complexities of performativity of market objects, by exploring that the waiver system was performative, through rejecting or accepting waiver challenges. The productization waiver system was shown to accept that markets encompass multiple and often conflicting efforts to shape them (Kjellberg and Helgesson, 2006), and that the overflows of market boundaries are porous (Finch and Geiger, 2010a), and were absorbed by the productization process in an attempt to manage the plasticity of markets (Geiger et al., 2012). Further this thesis demonstrates that the performative power of a market object is contingent upon on its positioning, the wider business model it operates within, and the aptitude of market actors to demonstrate persuasive meanings concerning the market (Storbacka and Nenonen, 2011). This theoretical contribution provides a fresh perspective on the performative practices of actor and the performative capability of the marketing object.

9.1.4 Establishing Co-Existing Business Models

This section outlines the thesis's contribution to the current business model literature and represents the theoretical contributions found within the business model circle of the revised conceptual framework.

The thesis unpacks that the public utility firm's collaboration efforts that have guided its development of multiple business models, to create value (Chesbrough and Rosenbloom, 2002; Zott and Amit, 2010) and satisfy its regulatory commitments. This thesis extends the view that multiple business models exist and are performed (Mason and Spring, 2011) by revealing that within the public utility firm with each business unit is creating its own value, that is emerging and deepening, as they interact (Mason and Mouzas, 2011).

Firstly, through these stable exchanges the business models become calculative and narrative devices (Doganova and Eyquem-Renault, 2009) that are moulded and constantly materialised by the practices undertaken by actors (Mason and Spring, 2011). The thesis

adds to this perspective by determining that the public utility firm's business model is uniquely performed due to its regulatory framework. The theoretical contribution of this is that regulatory framework adds agency by framing the way the business is calculated, developed and augmented. Furthermore, the findings of the thesis agree with the view that the business model is wrapped in a spatio-temporal nature (Mason and Palo, 2012; Mason and Chakrabarti, 2017) this is exemplified through the six-year regulatory investment periods that are enforced upon the public utility firm.

Secondly, the theoretical contribution to the business model literature extends the work of Benson-Rea et al. (2013) who argued for the plurality of co-existing business models within a single firm, that span boundaries (Zott and Amit, 2010). The thesis teases out this position by stating the value that each business unit adds to the overall services provided by the public utility firm. Additionally, the thesis contributes to the stance that the multiple co-existing business models of each business units are not linear (Mason and Spring, 2011) by revealing that value is created independently for each business unit, through horizontal and vertical strategies and the sharing of knowledge and expertise (Acur and Bititci, 2003). The identified business models go beyond durable and rich interactive business relationships, as the performance expectations of the collaborations process have been clearly defined and measured outcomes created that have been set with the regulatory framework.

The thesis adds to the Amit and Zott (2012) position that business model innovation can occur due to a change in an organisation environment. The thesis demonstrates that to achieve the level of stable exchange required through collaboration with alliance partners the public utility firm had to conduct business model innovation to move from a less integrated relationship with suppliers, and no alliance partners. The public utility firm created three alliance partners to help deliver its two services to its customers and utilises the alliance partners to direct problem solving in relation to specific issues based on their knowledge and expertise (Mason and Mouzas, 2012), which then permits the utility firm to frame (Mason and Mouzas, 2012) how they stabilise exchange with actors. The findings extend that of Mason and Spring (2011) who argued that the business model reflects a firm's ability to command, control and direct actors. The thesis demonstrates this by showing that the public utility firm was able to convince competing firms to collaborate via partnerships, and joint ventures, that required competing firms to actively and openly exchange knowledge and expertise. This theoretical contribution advances how business model innovation can occur in multiple ways at a similar time and enhance how a firm creates and delivers value.

9.2 Practical Contributions

This section is concerned with putting forward the practical implications of the study. The advantage of immersing and being guided by a business-to-business marketing lens with a pragmatist approach, is that it is concerned with the real-world practices of actors and firms that shape exchanges in the market. This thesis highlights that practitioners would benefit from understanding how representations affect the way they understand their markets, and the relationship between their actions and results. The case study highlighted the intensity, resources and strategic approach that is required to productize, which was guided by the unique regulatory framework that the public utility firm had to work with. Practitioners seeking to productize should consider the context of the market, and the industry that they exchange within. Furthermore, commercially focused practitioners must consider the what value is desired by consumers and calculate if this can be achieved by productizing. Additionally, the case found productization was a way of increasing efficiency, and to stabilise their service offering, demonstrated by the public utility firm through their cost savings. Organisations seeking to productize (make a service more product like) or servitize (add products to services) must recognise the strength and vulnerability of a products and services individually and collectively. Adopting either will significantly augment the knowledge and expertise required by the business to deliver value to its consumers.

The findings illuminate that despite the perceived rigidness and inflexibility of productization, in part due to standardising elements, it helps to draw out the knowledge and expertise that is stored within the organisation. The case illuminated this through the development of standards and specifications and standard products. This process provides an organisation with a baseline of knowledge, so they can identify gaps in their knowledge and devise the appropriate actions required to satisfy them. This capability can help organisations innovate as resources are strategically deployed. This process helps the organisation to battle against inertia, as knowledge is not located in silos, and the growth of the organisation's knowledge can be accurately judged. This is particularly relevant for large organisation like the public utility firm. Moreover, with the productization of services, practitioners must consider the importance of social-technical relationships that exist in exchange and design mechanisms to manage this. The public utility firm allowed actors to challenge existing knowledge and expertise through the waiver system and supported this challenge with service level agreements.

The case findings highlighted that post project appraisals (PPAs) were viewed as inefficient in capturing the backwards and forwards nature of learning. They failed to capture the required knowledge, store that knowledge and allow for the knowledge to be easily shared internally and externally. Practitioners should recognise the importance of how actors exchange knowledge and expertise. The devices used by actors connected to the public utility firm were at times incapable of being fully evaluated by actors that limited the success of them. This resulted in actors not appreciating and dismissing the capability of the device. Organisations need to ensure that their market devices effectively equip actors to make calculated decisions. This requires acknowledging that knowledge and expertise are precursors for embedding, organising and enabling innovation. The case highlighted that actors struggled to communicate the value in extensively using the market device to its full potential. Therefore, organisations need to ensure they formulate, and effective and extended communication messaged with actors. This needs to be at an individual and organisational level.

The findings revealed that the public utility firm cultivated long-term relationships alliance partners to help delivery its services. The public utility firm had an open attitude towards collaboration which was exemplified by deeply positioning the alliances within the public utility. This openness was also apparent by the competing organisations that collaborated to create partnerships and joint ventures. The case evidenced the unique position of the public utility firm in the market, unrivalled and not commercially focused. Therefore, organisations seeking to collaborate in this way need to determine the appropriability of their organisations competitive advantage. This analysis will help establish the level of openness they are willing to accept.

9.3 Limitations of the Study

This section will discuss the limitations of the study. Firstly, as discussed in the research methodology chapter. This thesis has adopted a single case study approach, utilising qualitative data collection techniques. Focusing on a single case study, albeit in great depth, restricts the thesis from being able to generalise its findings to a wider population. The researcher shifting their role from an observer to a participant observer, potentially limits the findings of the study, as the researcher potentially becomes an active member of public utility firm, with the researcher developing close working relationships with some participants, unintended bias could have impacted the study. Furthermore, participants may have been worried about being implicated with research findings (Saunders et al., 2007) and therefore not given full or honest answers.

Case study research approach is often critiqued as it is lengthy, can be difficult, and can struggle with scientific generalisation (Yin, 1984). The same is argued with regards to qualitative research methods. In addition, qualitative research is critiqued for lacking scientific rigour, an ability to generalise, difficulty in replicating and external validity. The case study utilised solely qualitative methods of data collection to develop the findings and address the research questions. The study did not seek a statistically significant sample size. Therefore, the point of data saturation is a limitation relied on the researcher knowledge and expertise of the literature and conducting research studies. In terms of the sampling methods adopted, purposeful and snowball sampling, within which these sampling techniques require participants nominating other potential participants, and the researcher spending considerable time in the field, after further observing and developing relationships. Qualitative data analysis techniques were used to tease out understandings which formed the findings of the research. The study considered in depth the criticisms of selecting a case study approach and qualitative research methods, as these techniques can be considered to be time consuming, subjective and difficult to reproduce the process. However, to meet the aims of the study, this approach and methods set were deemed to be appropriate and the risks associated were mitigated in the research design.

The research was conducted with actors from the public utility firm, actors from the alliance partners or supply chain were not sampled, which potentially limits the scope of the findings to one firm perspective. Moreover, the study was focused from a business-to-business perspective, not from a business-to-consumer perspective. Considering the emergent importance and agency placed with the customer forum by the regulatory framework, and the public utility firm, this could represent a potential site of further enquiry. Additionally, the research focused on a Scottish utility service provider, which due to ethical considerations involved collecting and reports data in an anonymous way. This limits the scope of the findings geographically, and by sector. As utility services encompass: electricity, natural gas, water, sewage, telephone, and transportation, finally, the public utility firm was not commercially focused. The focus on efficiency and cost savings impacted upon the market shaping practices of the actors. Studying a commercially focused firm that was not concerned with being accountable to a regulatory framework could affect the conclusions drawn from the findings.

9.4 Areas for Future Research

The following section will outline the areas of future research emanating from this thesis. Suggestions for future research are based on the research contributions presented above and the identified limitations of the study.

In condensing and addressing the key limitations of the study, future research could adopt a quantitative research design and investigate other utility firms and sectors to provide a robust comparative case. Additionally, studying the multiple stakeholders could provide more holistic findings. Furthermore, future research could not limit itself to the utility industry and move beyond a public firm.

9.4.1 Future Productization Research

There is a sufficient body of researchers who subscribe to the viewpoint that productization is an under researched area of scholarly interest despite being widely acknowledged among marketing practitioners (Davies et al., 2007; Simula et al., 2008; Suominen et al., 2009; Jaakkola, 2011; Skålén and Hackley, 2011; Harkonen et al., 2015; Andreini et al., 2015; Leoni, 2015). This is underpinned by the absence of journal papers examining productization in top tier marketing journals. Avenues for future research include addressing the relationship between productization and servitization and examining unsuccessful attempts at productization of services. Furthermore, seeking more cases of how firms implement and manage productization would contribute to the development and construction of theory.

9.4.3 Future Marketization Research

The research is actively underpinned by marketization research which is much more developed, this is exemplified by publications on the subject in journals such as *Industrial Marketing Management, Marketing Theory* and *Journal of Marketing Management* and *Consumption Markets & Culture*. Which demonstrate that within the marketing academy there is an emerging body of researchers who have called for greater emphasis of markets and marketing (Håkansson et al., 2004; Lusch and Vargo, 2006; Sheth and Sisodia, 2006; Vargo, 2007; Venkatesh et al., 2006; Araujo et al., 2008; Araujo et al., 2010; Geiger et al., 2012; Kjellberg et al., 2012). However, the specific theoretical focus on the performativity of marketing is still viewed as being under-researched (Kjellberg and Helgesson, 2006; Jacobi et al., 2015). Future avenues of research would include further examining the effects of performativity on shaping market practices. Additionally, Mason et al. (2017) called for a

greater emphasis on how market devices are redesigned and used in practice. Extending the research with regards case finding of the Post Project Appraisals (PPAs) would go towards addressing if the calculative abilities of the market device exploring how they are stabilised over time.

9.4.4 Future Business Models Research

Coombes and Nicholson (2013) state that business models are under-examined by industrial marketing researchers and the term is widely used but not clearly defined (Chesbrough, 2007; Zott et al., 2011; Desyllas and Sako, 2013). Further Mason and Spring (2011) called for a greater understanding of the practices involved in business models and their agency in making markets. For Mason and Spring (2011) business models are performative as they play a crucial role in creating value. With Doganova and Eyquem-Renault (2009) adding that business models operate as calculative and narrative devices. Consequently, there is an opportunity to conduct future research to extend the theory surrounding the performativity of business models as market devices with the current case.

Additionally, there is a growing agreement that business model innovation is fundamental to firms' success (Björkdahl and Holmén, 2013; Chesbrough, 2010; Sanchez and Ricart, 2010; Zott et al., 2011; Massa et al., 2017) and the plurality of co-existing business models within a single firm (Benson-Rea et al., 2013). Therefore, future research would propose examining the business models operated by the alliance partners parent companies and seek to extend to other utility firm to develop deep insights into the utility industry.

9.4.5 Future Open Collaboration and Innovation Research

This emergent area of the research topic of open innovation has attracted considerable interest from both practitioners and researchers (Christensen et al., 2005; Gassmann, 2006; Vanhaverbeke, 2006; West and Gallagher, 2006). Research gaps exist in the practical application of open innovation (West et al., 2006; Gassmann, 2006). Research studies have consistently discovered that companies conduct more inbound than outbound activities (Chesbrough and Crowther, 2006; Bianchi et al., 2011; Cheng and Huizingh, 2010; Chiaroni et al., 2011). Furthermore, services are under-researcher (Chesbrough and Crowther, 2006; Laursen and Salter, 2006; Muscio, 2007; van de Vrande et al., 2009; Chesbrough, 2010; West and Bogers, 2017).

Therefore, future areas of research include examining the open innovation and collaboration activities of the public utility firm's alliance partners and their parent companies. This would contribute to theory by gaining an understand at how other organisations collaborate to produce knowledge and innovation. Additionally, there is less known about open innovation with regards to traditional industries, such as manufacturing and the service industries (Chesbrough and Crowther, 2006; Laursen and Salter, 2006; Muscio, 2007; van de Vrande et al., 2009). Consequently, there is room to expand the current research on utility service providers.

9.5 Final Conclusions

To conclude, this thesis has explored how the productization of services is organised as a way of facilitating collaboration and arranging innovation. The thesis has addressed three research questions with regards to theoretical and methodological underpinnings.

1. How is productization mobilised and exchanged by market actors?
2. What effect does marketization have on market shaping practices?
3. How does a firm's business model facilitate its ability to organise and capture value?

It is hoped from reading this thesis, the reader has gained insights into the three interconnected literature themes alongside the thesis's main contribution towards the productization of services, organised as a way of facilitating collaboration and arranging innovation.

Reflecting upon the thesis the researcher has gained an appreciation of the importance that scholars must assign to developing rich and meaningful relationships with industry. Researchers actively engaging in knowledge exchange activities ensures a productive connection between academia and industry that has the potential to create impact. The exposure to the market shaping practices of actors in the field will help develop more holistic researchers who see merit in and are able to navigate practice and theory.

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Appendix i – Example Consent Form

College of Social Sciences Research Ethics Committee

University of Glasgow | College of Social Sciences

Consent Form

Title of Project: Knowledge Management Processes and Organizational Impact for Scottish Water - Interviews

Name of Researcher: Professor John Finch

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I give my consent to interviews being audio-taped,
4. I understand that as a participant in the research, I will be referred to by pseudonym in any publications arising from the research.
5. I agree / do not agree (delete as applicable) to take part in the above study.

[redacted]	27/5/2014	[redacted]
Name of Participant	Date	Signature
John Finch	27/5/14	
Researcher	Date	Signature
GRANT HEMPLE		

1 copy for subject; 1 for researcher

Version 2: September 2012

Appendix ii – Discussion Guide

Seek examples of projects and products.
Do not ask every question.

Introductory Questions:

1. What is your current position at the public utility firm?

2. What are the main responsibilities of your position?

KS and KM Questions: (state this)

3. What is your role in knowledge management? (Authorising?)

4. How frequently do you engage in Knowledge Management?

5. What recent projects or problems led your group to interact with in terms of knowledge management?

6. Can you provide some examples of your uses of Knowledge Management Systems within the public utility firm? Seek to draw out examples from the within and across groups.

7. What was the topic / focus of the knowledge sharing activity (e.g. Project, product, service or activity?

8. Can you provide an example of knowledge sharing being utilised to develop a product?

9. What programs and/or systems does the group use in storing knowledge? Follow-up: Consider media as well Email, meetings, notes, etc.

10. What is your experience with the public utility firm's knowledge management systems and processes?

11. Does everyone within the group have the same level of access? Follow-up: Can other groups access the same knowledge?

12. Does your usage change with circumstances – ie., solving a problem quickly? Reflecting on standards? Product development? Product development cycle? Service?

Expertise Questions:

13. What is your individual expertise within the group?

14. What expertise does your group or people within the group possess?

15. How is your group's expertise communicated internally through the public utility firm? ie. qualified as expertise?

16. Can you provide examples of when you have been asked for your individual expertise?

17. Can you provide examples of when you have been asked for your group's expertise?

18. How many of these questions are resolved internally within the group? Do many spill over into the public utility firm knowledge management process?

19. Can you provide some examples of knowledge management from your group that impact upon the public utility firm knowledge management process?

20. How do you include externals, supply chain, suppliers, and contractors in your knowledge management?

Performance/Effectiveness Questions:

21. How do you measure performance of your group's knowledge management?

22. How do you measure performance of your group's knowledge sharing?

23. What in your opinion is the most effective part of the public utility firm knowledge management? Can you provide an example?

24. What in your opinion could be improved in terms of the public utility firm knowledge management? Can you provide an example?

Productization Questions

If required ask directly about productization.

25. How was productization developed?

26. How was productization managed?

27. What is your opinion of the productization efforts?

    - Probe for examples of productization.