A theoretical framework for the management of knowledge as an asset within a global organisational context: Pathways for navigating Inter-Organisational boundaries

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A theoretical framework for the management of knowledge as an asset within a global organisational context: Pathways for navigating Inter-Organisational boundaries

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Abstract

This doctoral study aims to build on extant theory within the area of knowledge management. Specifically, the need to gain value from knowledge consumed from outside of the typical organisational boundary, consider the internal value of knowledge as an independent asset and continuous enrichment via a cyclic process. By focussing on specific elements of knowledge management processes, extant literature has not addressed gaps within the knowledge domain that bring together key capabilities to introduce an effective cyclic enrichment framework. Gaps in previous research fail to address issues on the value of knowledge as an independent asset and as part of a cyclic framework of enrichment. Extant literature has investigated knowledge as a directional flow supporting key organisational processes such as supply chain or value chain capabilities. Such approaches limit opportunity for growth in both the value and richness of knowledge. This is due to focus being moved away from enriching the knowledge asset itself and moving it onto the success of the processes it supports, thus missing opportunities to gain a richer knowledge environment. Furthermore, a lack of empirical evidence to address how external knowledge resources are consumed as knowledge assets internally and the impact on knowledge processes.

This study uses a qualitative methodology to address the research environment and get a deeper insight into the research problem. The research environment limits scope to operations within the UK, consisting of 450 locations. Data was gathered using semi-structured interviews with 19 participants throughout the UK. Participants who agreed to be involved were selected based on their role as knowledge workers. The questions posed focused on issues faced by the organisation relating to issues impacting knowledge processes. It was determined that this approach would give a more in-depth view of underlying issues allowing the researcher to probe deeper into knowledge workers experiences. Findings extend the work of extant research by addressing key issues of knowledge management from a different approach than those considered previously. An inductive approach during the data analysis identified five key contributions, including a) a theoretical framework called the KSC (knowledge supply chain), b) de-coupling of knowledge from other organisational capabilities, c) capability to consume knowledge from a large number of sources, d) knowledge relationship types for the consumption of knowledge e) a consumer knowledge provider type to address issues in making the approach cyclic in nature.

Rather than focusing on organisational determinants or technological capabilities, this research highlights the importance of types of knowledge providers and their associated relationships.

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Acronyms

AC: Absorptive Capacity/Capacities

BCS: British Computer Society

CKP: Core Knowledge Provider

DC: Dynamic Capability

EKA: External Knowledge Acquisition

KLC: Knowledge Life Cycle

KM: Knowledge Management

KMT: KM Technology

KP: Knowledge Provider

KSC: Knowledge Supply Chain

LED: Light Emitting Diode

NCKP: None Core Knowledge Provider

NHS: National Health Service

PIF: Product Innovation Flexibility

R&D: Research and Development

SME: Subject Matter Expert/s

TPO: The Physical Organisation

UK: United Kingdom

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Most of all, to my wonderful wife Beccy who has supported me fully throughout this journey and suffered with me on the path to success. She is my ever-shining light and reason for always working towards a better future.

Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Faculty Ethics Committee on 28/10/2015

I declare that the Word Count of this Thesis is 84,863 words

Name: Colin Richardson

Signature:

Date:

CHAPTER 1: INTRODUCTION

1.1 Introduction

This Chapter introduces the primary focus of the research and lays the foundation for the overall thesis. Here the researcher will discuss the research target or problem that will be researched and identify a proposal to offer as a theoretical outcome.

The primary focus of this research is based on the concept of defining a framework for the knowledge life cycle and how this can become an effective contributor to an organisation's ability to consume knowledge from external sources, effectively process, manage and re-distribute such knowledge as part of existing organisational processes. Furthermore, identifying mechanisms for managing knowledge as a physical asset within the organisation. This research explicitly defines the knowledge life cycle as a separate theoretical framework and not part of any existing organisation process such as supply chain etc. which is currently used within organisations today.

The journey begins by defining the research question that will be used as the foundation for this research project. The research question is:

"How can the KM life cycle be detached from existing organisational processes as an "autonomous entity", taking into account the knowledge acquisition, physical organisation and technical factors required?"

The discussion will focus on the knowledge management life cycle framework as an entirely new concept that can be used as in independent mechanism for effective Knowledge Management (KM) within the context of this research but also as a potential contributor to many other areas of industry, academia and the private sector. The consumption and re-distribution of knowledge is not a topic that is related to a single domain but has roots in other areas of research and these will be covered during the literature review in greater detail.

"Engaged scholars often aim to see organizational life from the perspective of a specific participant or stakeholder within the process" (Van d Ven, 2007:206). This researcher is pro-actively involved within the research domain and as such, access and engagement with key stakeholders is more easily available. However, positionality needs to be considered to minimise the impact of the researcher within this study. Further discussion about how positionality was approached is discussed in chapter 6. As complete impartiality has been discredited previously (Popper, 2007), this research will assume a level of impartiality as the researcher themselves is within the frame of reference being a

knowledge worker. The approach will be to derive the interview questions from the literature as opposed to forming them based on beliefs or prior experience to minimise the influence of the researcher. Steps will be taken to try and minimise this impact as discussed in section 3.

1.2 Research Parameters

The aim of this research is to explore the theoretical concept of a knowledge processing framework consisting of capabilities within the target Organisation and its ability to consume, manage and disseminate knowledge within a complex environment. An organisation's ability to change and adapt to its environment, whether this be for competitive advantage within a marketplace or to continually improve the quality of their services is what makes an organisation remain relevant and successful. Garvey *et al.* (2002) discussed that competitive search based on the consumption of new knowledge can positively affect profit and market position. This is driven by an organisation's need to remain competitive, and the environment being researched for this thesis faces these very real issues daily. The research environment must consume knowledge, enrich and re-use information from a vast number of external organisations. Much of this Information is either dis-regarded or re-stored with little value being gained except for re-distribution of physical products. Knowledge and information have been deliberated as a way of gaining competitive advantage, with more organisations taking it very seriously and as a key factor in crucial decision-making processes for organisations within the marketplace (Wang and Noe, 2010; Lee and Choi, 2003; Gupta and Govindarajan, 2000; Nonaka, 1994). This is important to allow an organisation to remain competitive but also continue to enhance their understanding of knowledge within their explicit domain. This could allow an organisation to understand how external knowledge impacts the organisation over time.

However, effective KM between different organisations beyond the organisational boundary is complex. This being due to so many exceptional difficulties facing people beyond their own organisational boundaries. Including environmental forces like the emergence of new technologies, globalisation, operating processes and procedures, regulatory requirements, political influences, the impact upon fiscal markets and the ability to find human resources with sufficient knowledge and experience (Cuffe, 2007). These many factors have meant that previous literature and knowledge frameworks have been explicit in their focus. Predominantly considering on a specific domain of interest or only on a certain aspect of knowledge management. This research looks at which of these

factors are affecting the ability to consider an effective end-to-end theoretical framework. Looking at what is required for introducing cross-boundary knowledge into an organisation and what this means from the perspective of the initial context of external knowledge acquisition through to re-distribution. Montazemi *et al.* (2012) highlight, that effective sharing of organisational knowledge is particularly relevant for multi-national companies in gaining competitive advantage through global strategies. Although this is a key factor, the ability to share with all knowledge providers (KP) or consumers is fundamentally more significant for the organisation, as opposed to only international boundaries. Furthermore, it is important to gain a clear understanding of the processes and practices an organisation adopts to consume externally acquired knowledge (Arvanitis *et al.*, 2015). An organisation's internal knowledge processing capabilities differs from the capabilities required to consume externally acquired knowledge. However, both need to work synchronously if an effective framework is to be established. The ability to consume and integrate these two streams into an effective knowledge framework will advance what is currently perceived as knowledge management. Furthermore, the ability to share enriched knowledge among potential third-party consumers in an effective way, but without introducing information bleed is an important element of a complete knowledge life cycle. Therefore, to advance our KM processes effectively, it is crucial that consideration is given to the requirements of a theoretical framework and capabilities to support it. Focusing upon the key areas of a) initial consumption of knowledge, b) integration of externally acquired knowledge, enrichment and management within the organisational boundary and c) sharing beyond the organisation boundary.

1.3 **Research Aim and Objectives**

The main direction of this research is to develop a framework for the complete life cycle of knowledge as an asset for the organisation. The existing knowledge gathering, and management methods will be initially discussed as they are limited to only an explicit area of the whole life cycle process rather than a complete approach. Then the consumption and distribution of knowledge utilising the key concepts of dynamic capabilities (DC) and absorptive capacity (AC) will be considered and analysed. Previous research will be discussed and suggestions for a proposed framework to overcome the existing technical / business knowledge boundaries will be proposed.

To address the research aim, the following objectives are established:

1. Critically analyse the literature on the initial consumption of information into the organisation via external knowledge acquisition. (Section 2)

2. Critically Analyse the literature on the organisational, cultural and technical impacts affecting KM within the organisational environment. (Section 2)
3. To investigate and initiate an appropriate research methodology base to allow an effective result for the primary research aim. (Section 3)
4. To Analyse knowledge worker's experiences via the outcomes of the research methodology to understand the impact on an organisation's ability to consume, enrich and re-distribute knowledge. (Section 4)
5. To introduce a new theoretical framework (KSC) to manage the knowledge life cycle as an independent concept (Section 5)

1.4 The Research Problem

The research target is defined as the problem, and the problem area will be further investigated for this research. The research target for this thesis is based within the professional environment and will be used as the primary context. The study environment is complex in that it includes knowledge relating to both internal manufacturing processes as well as significant dependency upon external products, services and knowledge acquisition.

The ability to consume knowledge from external sources and be able to effectively manage and re-distribute has an impact upon an organisation's position in the marketplace, but also looking beyond the marketplace where knowledge availability plays a crucial role in adding any value to the end consumer (Al Saifi, 2015).

For this study, any data which could be processed and stored by an organisation is defined as a potential Knowledge Asset. A knowledge asset, is information or knowledge that has been gathered and enriched into a re-usable object. The knowledge asset can be thought of as the object that will move through the knowledge framework to be utilised by knowledge workers.

This research will look at the end-to-end life cycle of the KM process and focus upon three core areas:

- Knowledge Acquisition
- Organisational and Cultural Factors
- Technological Factors

These high-level core areas cover the whole context life cycle and are the target of the proposed direction for further research. Figure 1.1 below, shows the environment and the context that this research will address.

Figure 1.1 below highlights the problem area under investigation, and the dotted black line depicts the typical organisation boundary. Previous research has focussed within the dotted boundary whereas this research is focussed on both the knowledge entering the organisation. Then how that knowledge is consumed and re-distributed back beyond the dotted organisations boundary to the consumer.

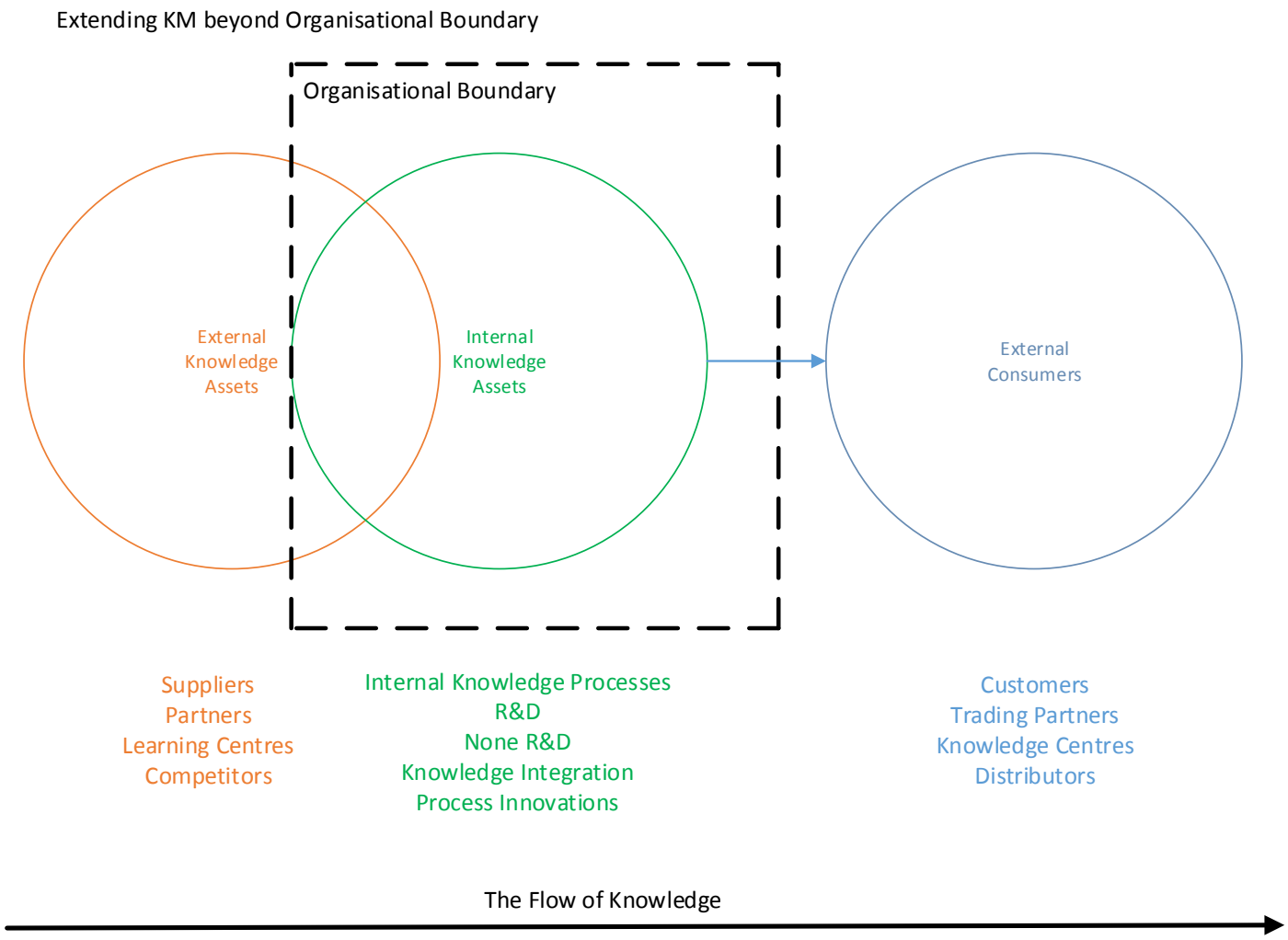

Figure 1.1 ***The Contextual Boundary of the Research***

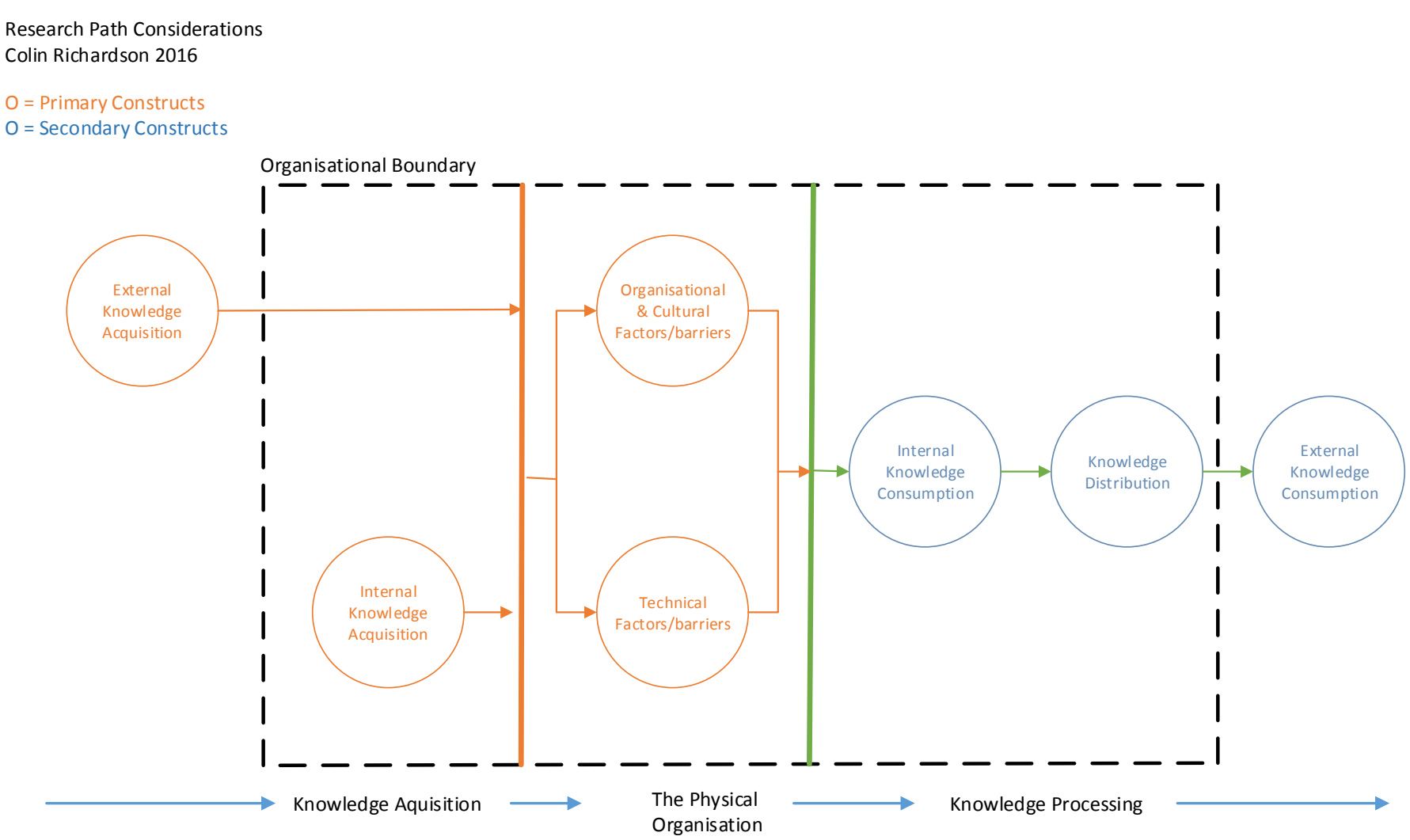

Figure 1.2 Research Path Considerations

Figure 1.2 above highlights the key areas to be researched further and how the constructs are beginning to group into three key areas, 1. Knowledge Acquisition, 2. The Physical Organisation and 3. Knowledge processing and Distribution which is expected to be impacted by Knowledge Management Technologies. These groupings are the primary areas of investigation for the literature review in section.

Because this is a cross boundary study looking at certain factors that would be outside of the control of the adopting organisation, the following constructs will be used since they might have an impact on the development of the theoretical framework.

Table 1.1 Constructs and their Definitions

Construct	Definition	Sources
External Knowledge Acquisition	External Knowledge Acquisition can lead to increased speed in developing new concepts and ideas. Relation specific knowledge can also benefit all parties with a greater understanding and enhance capabilities.	Yli-Renko, Autio and Sapienza (2001); Dyer and Singh (1998)
Knowledge Sharing	Knowledge sharing is the process of sharing to others an organisation's knowledge and furthermore, the ability to consume knowledge from other sources. Knowledge diversity is argued to increase an organisations ability to learn.	Davenport and Prusak (2000), Zahra et al. (2000)
Organisational Culture	Cultural factors are a complex set of assumptions, enhancements and beliefs that when used together can define an organisational culture. Typically, what a new person would see entering the organisation.	Schein (1985)
Organisational Factors	Knowledge-based processes are affected significantly by social environments. Organisational culture can also be defined as a set of beliefs, values and best practices that are shared by members of a given organisation.	Alavi *et al.* (2006); Robbin (2004)
Knowledge	Knowledge Management Technology are a	Hashemi, Khadivar,

Management Technology	class of technologies that describe the hardware, software and system platforms for the storage and retrieval of information, used to manage knowledge.	and Shamizanjani, (2018); Alavi and Leidner (2001)
Knowledge Assets	Knowledge Assets are less tangible than physical assets and need to be measured against the human element to be effective. Knowledge Assets can be seen to offer a competitive advantage to an organisation through the adoption of effective KM practices.	Skyrme (2011), Gonzalez-Padron *et al.* (2010); Liu and Lai (2011); Sulivan, (1998)

The key constructs shown above in table 1.1 make up the fundamental areas that are investigated in depth to define what is required for the theoretical framework. Figure 1.2 shows the organisational boundaries which need to be addressed as part of the problem and what needs to be considered. The dependent and independent variables will be further discussed in Chapter 4 as they emerge from the findings and furthermore in Chapter 5 as part of the discussion.

1.5 Research Process

After agreeing with the principal supervisor, the initial research question and definition, the research direction is steered by the definition of the research question and deciding upon the research objectives. The research question is defined as:

"How can the KM life cycle be detached from existing organisational processes as an "autonomous entity", taking into account the knowledge acquisition, physical organisation and technical factors required?"

With this question defined, the research process commenced and follows a pre-defined project plan. Figure 1.3 illustrates the main research path expressed in greater detail.

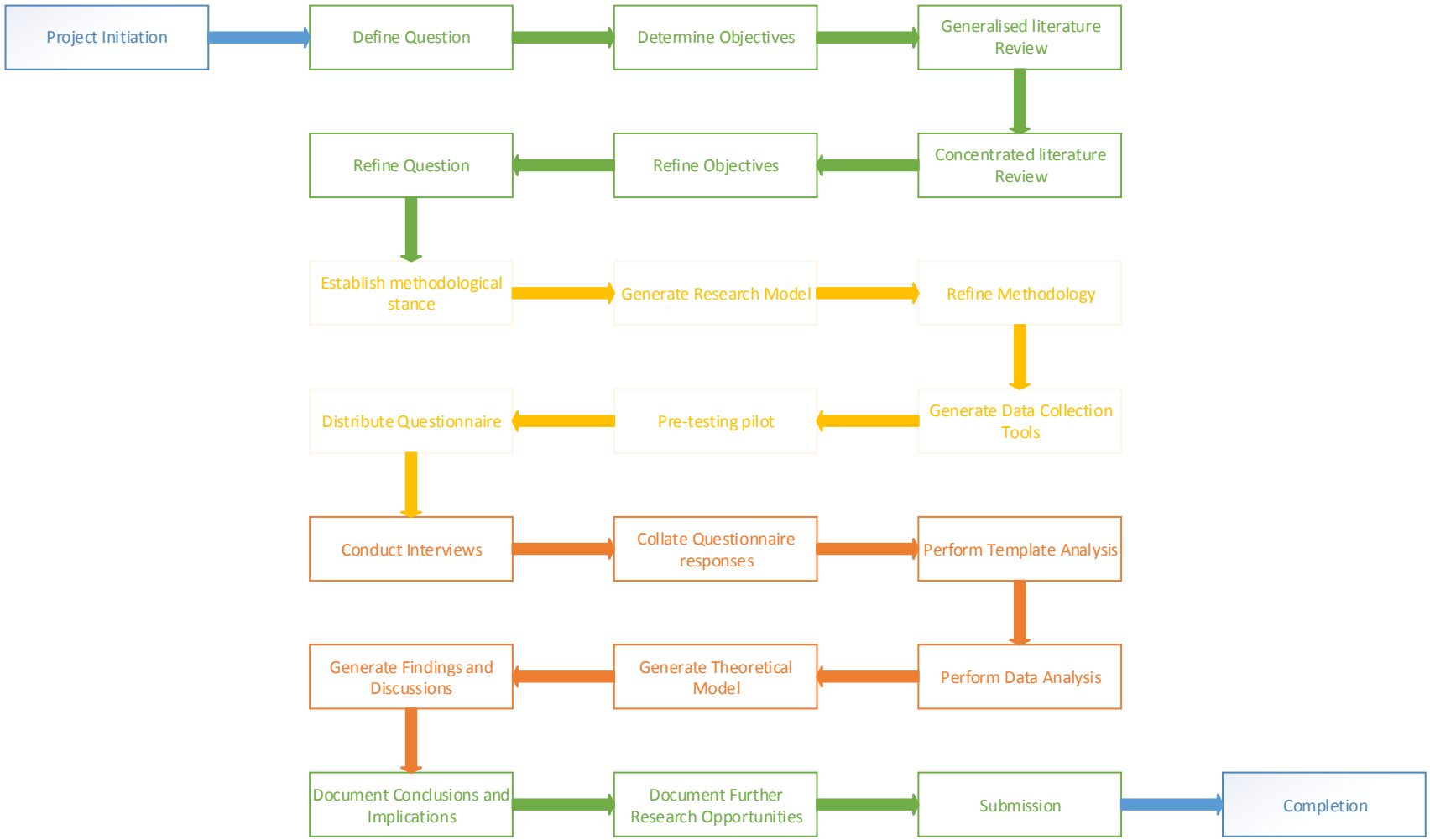

Figure 1.3 Research Path

This research, reviews some of the pertinent definitions for knowledge management and discuss these in more detail as part of the literature review in Chapter 2, relating them to this study where applicable. In addition to this, the impact and relevance of existing definitions within the context of the organisation used in this study will also be discussed further in Chapter 2. This approach will help to understanding the current issues faced from a KM Perspective, more specifically the knowledge transfer and transformation processes.

As well as beginning to discuss the definitions and extant approaches to Knowledge Management, a comprehensive literature review of the past publications will be provided to investigate relevant research which, have investigated this topic and some of the issues previously rose.

This research project consists of several stages depicted within their own respective Chapters, each of which used to build upon the next stage of the research journey. The first stage for this study was identified by a need to consider potential problems within the researcher's workplace and understand what research had been undertaken previously within these areas. Furthermore, to highlight a potential direction for a theoretical framework to address the research question. These initial requirements are covered within this Chapter of the thesis and are the basis to build the rest of the research journey on. For the second stage of this project, a review of the literature was undertaken to understand the concept of an inter-organisational knowledge framework and what research had previously been discussed or considered. There have been many previous research topics on supply chain management and KM within that environment, but nothing explicitly relating to detaching processes or the knowledge asset from any supply chain or KM activities but rather treat the knowledge life cycle as a separate entity. Bearing in mind that this research area has a possible innovative novel solution, very little has previously been covered in the extant literature about this area (Al Saifi, 2015; De Marchi, 2012; Ebersberger and Herstad, 2011; Laursen and Salter, 2006), the researcher aims to review the extant literature and investigate further with knowledge experts to determine a view of the current landscape (Creswell and Clark, 2008). The literature review ensures that any duplication of previous research is avoided as well as understanding what the best methodology to use for the data collection process. Upon completion of the literature review, a methodology is established in Chapter 3 and for this study, a qualitative approach is used. Upon establishing the methodology, the study moves into Chapter 4 and considers the data collection and analysis needs. For this, NVivo V11 is utilised as the preferred tool for data collection and processing. Data is gathered and categorised using template analysis and the starting themes are based upon the outcome of the initial pilot collection process.

The data collection process begins by identifying relevant candidates to invite to take part in the study, commencing with a small pilot study of 5 participants to prove the concept. The next stage, Chapter 5 discusses the outcomes of the data collection and analysis Chapter. It is in Chapter 5, any solutions based on the outcomes of Chapter 4 are covered in more detail and the findings are aligned with both the observations from the literature review in Chapter 2 and the key factors from the findings and justifications for those findings. The final Chapter will close out this study by discussing any conclusions and offering further research opportunities as an outcome of this research. In addition, the reflexivity section allows the researcher to discuss this journey in the 1st person and offer insight into the process from a personal perspective.

1.6 Potential Contribution

The primary aim of this research project is to develop a new theoretical framework that can be used within the context of this thesis but also have the potential to be used within different types of existing organisations as a proposal to work with and introduce the concept of a knowledge life cycle framework and effective knowledge management. This is aimed at not only existing organisations who are about to embark upon the Journey of KM but also well-established organisations including the research target.

Previous research (Dalkir, 2017; Jennex *et al.*, 2012; Razmi *et al.*, 2009; Yu *et al.*, 2009; Nonaka *et al.*, 2006; Daellenbach and Davenport, 2004; Barna, 2003; Alavi and Leidner, 2001; Drucker, Holsapple *et al.*, 2000; 1998; Ichijo *et al.*, 1998; Grant, 1996; Grey, 1996; Durkin, 1994; Cohen and Levinthal, 1990; Popper, 1959) has looked at KM from a variety of different approaches including, technology related tools that focus upon the storage and retrieval of information stored as digital assets such as documents or images. Other areas of research have looked at KM Strategy (Hofstede, 2010; Hislop, 2009; Teece *et al.*, 2009; Perera *et al.*, 2007; Ardichvil *et al.*, 2006; Schein *et al.*, 2004; Bots, 2002; Guthrie, 2001; Davenport, 2000; De Long *et al.*, 2000; Grant, 1996; Creed *et al.*, 1996; Armour *et al.*,1978) as a key critical success factor. These and other research areas will be reviewed as part of this research and will be included as part of the literature review section of the thesis.

This research will attempt to develop a framework that allows for a multi-domain, boundary independent knowledge framework for the consumption and distribution of knowledge assets. This being a key factor to allow an organisation to grow both from the perspective of market share and commercial viability as well as remaining competitive within the future market place. Furthermore, to allow the organisation to become

knowledge leaders enhancing knowledge seekers both internally and externally, building a robust workforce and knowledgeable customer base and learning centre participants.

1.7 The methodological approach taken to research

This research uses a qualitative methodology strategy and adopts a social constructionist approach, therefore taking advantage of the wealth of knowledge resources available to the researcher. Template analysis was used, and data was collected from knowledge workers within the researchers own workplace. NVivo V11 was then used to code and analyse the data. Due to the researcher's workplace, there are sufficient organisational resources, or knowledge workers available and willing to participate in the study to allow for an effective qualitative approach, as discussed previously in extant literature (Ghauri and Grønhaug, 2002).

In Chapter 3, the researcher goes into more detail of the approaches undertaken to establish the required evidence to build on the theoretical framework put forward in this research.

1.8 Chapter 1 Summary

This first Chapter sets the base for the rest of this thesis and is built upon in the coming Chapters. Initially introducing this study and a brief overview of the researcher's background to ascertain their position within the knowledge realm and how this study began to emerge from within it.

From there, an overview of the remaining Chapters in this thesis was given and a brief explanation of what to expect from each of them respectively.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review will focus upon the key elements required to be able to propose a new theoretical framework for the knowledge management (KM) process. Looking at the product life cycle approach and understanding what the need is to move knowledge into the organisation, then back beyond the organisational boundaries again in an enriched state. Identifying gaps within the current literature and considering a combined element approach should help to address this goal and build upon existing theory. Identifying elements of those theories which have previously researched the key concepts, this study uses as components of a potential framework. Furthermore, understanding which components or sub-components could be re-used as part of an independent framework for the KM across organisational boundaries. The key goal being that the KM life cycle is detached from other existing business processes and stands alone as an independent entity of the organisation. Unlike other previous, research which appears to embed knowledge processes within existing functions of the business. Knowledge management is often tied to other organisational factors such as organisational performance or supply chain dependency. This study however, aims to treat knowledge as an independent object, focusing on the quality and value of the knowledge itself as opposed to the value it offers to other organisational processes.

Nowadays, organisations have recognised the value of knowledge and its abundant availability (Razmi *et al.*, 2009). There was the significant investment in technological solutions to try capture the value of such knowledge (Rouhani *et al.*, 2012; Ghazanfari *et al.*, 2011). Technology alone however, may not be sufficient to maximise the opportunities available from the knowledge economy.

Within this review, the focus will be upon identifying issues relating to detaching knowledge from typical organisational processes. Identifying key enablers and barriers, which affect a successful and effective theoretical framework. Firstly, reviewing the KM environment (KME) from a historical standpoint before investigating the three core elements external knowledge acquisition (EKA), the physical organisation (TPO) and knowledge management technologies (KMT). This approach has dependencies upon EKA, TPO and KMT, all of which shall be considered as part of this research. EKA includes the creation and consumption of knowledge, particularly knowledge generated outside of the typical organisational boundary. Then considering the need to be consumed internally with existing knowledge assets. The physical organisation (TPO) and its cultural impact is analysed further to identify the effect upon the knowledge acquisition process. Determining barriers or enablers that exist and any affect upon the

knowledge economy and organisational performance within this context. Finally considering the KMT technical capabilities of the knowledge life cycle and the impact of processes and organisational culture, based on physical needs. Reviewed will be those factors affecting knowledge application and managing knowledge within an organisation and the different shared concepts and potential technological barriers.

Combining these areas and understanding their impacts within the research context will allow for the development of a theoretical framework for answering the research question.

2.2 Literature Review Focus Areas

Based on the research question, a pre-defined approach to looking at the literature was determined to allow for a logical approach to searching and reviewing the current literature. Figure 2.1 below shows the direction of the literature review undertaken and the ordering of the reviewed topics.

The initial focus of this research is on general KM topics KM Foundation:

1. KM Environment (KME)

Secondly, the focus moves to the research question domain specifically identifying previous research within the problem areas of:

2. External knowledge acquisition (EKA)
3. The Physical Organisation (TPO)
4. KM Technology (KMT)

These 4 areas make up most of the review material, the identified gaps and sub questions predominantly come from this area of the literature review. The reason that these 4 key areas are defined is that they make up the visible areas directly attributing to the research aim.

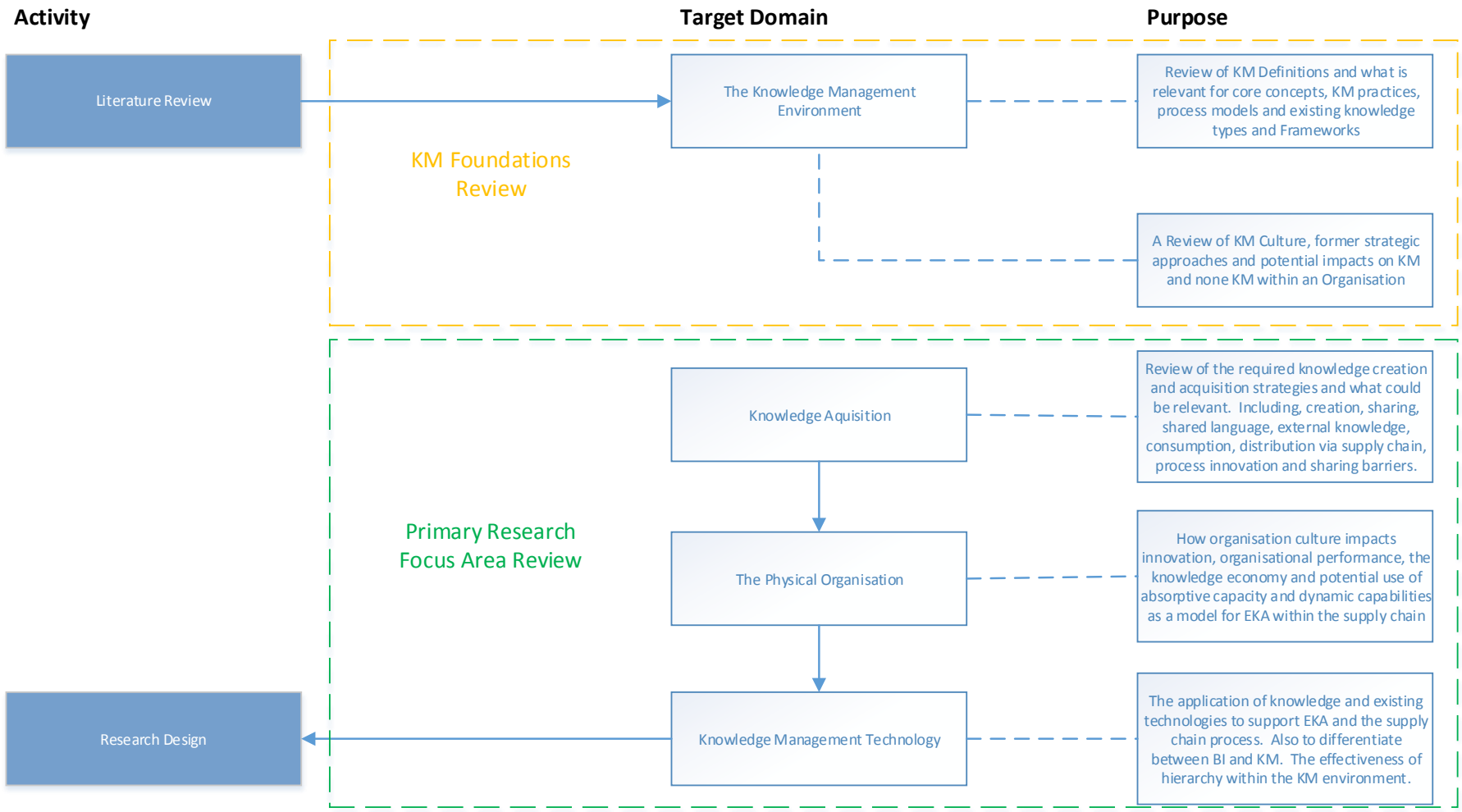

Figure 2.1 Literature Review Focus Areas

2.2.1 Key focus areas of the literature review

Very little has been discussed previously for the proposed concept of detaching knowledge into a separate, standalone framework as an independent entity for knowledge management. There is however, previous literature based on the three concepts, which make up the foundations of KM process under consideration:

Knowledge Acquisition Key Authors being reviewed: (Al Saifi, 2015; Liao *et al.*, 2010; Hagedoorn *et al.*, 2012; Wang *et al.*, 2010; Leiponen and Helfat; 2010), whereby the need to acquire sources of knowledge external to the organisational boundary is deemed a key area of research for the initial steps of the KM life cycle.

The Physical Organisation Key Authors being reviewed: (Hofstede, 2010; Hislop, 2009; Teece *et al.*, 2009; Perera *et al.*, 2011; Ardichvil *et al.*, 2006; Schein *et al.*, 2004; Guthrie, 2001; Davenport, 2000; De Long *et al.*, 2000) who have previously considered directly impact an organisation's ability to consume and enrich knowledge once acquired.

Technical Factors Key Authors being reviewed: (Dalkir, 2017; Jennex *et al.*, 2012; Razmi *et al.*, 2009; Yu *et al.*, 2009; Nonaka *et al.*, 2006; Daellenbach and Davenport; Barna, 2003; Alavi and Leidner, 2001) who have previously considered the need to have the physical tools and support mechanism to effectively manage the knowledge process.

Some authors have also considered KM from the perspective of the physical supply chain, is understood to be important for an organisation to remain relevant (Keupp 2012, Palmié and Gassmann, 2012; Reichstein and Salter, 2006; Hatch and Mowery, 1998). These authors all agree that KM affects the physical supply chain but do not consider the KM life cycle process as an independent entity. This research treats the KM process as an entirely separate entity to the physical supply chain and other organisational dependencies. Although it is relevant to highlight this importance, it goes beyond the scope of this research. It is an assumption that knowledge around the movement of goods and services do not physically affect the knowledge life cycle requirements.

Therefore, KM shall be considered as a separate entity and researched accordingly. According to Thomas and Griffin (1996) historically, there are three fundamental stages of the supply chain, procurement, production, and distribution. Although consideration is not given to the needs of the physical supply chain in any detail, a similar approach is given to an initial approach for considering a knowledge life cycle structure to focus research efforts on the key enablers of an effective life cycle process. Applying three levels for investigation of a theoretical framework; Knowledge Acquisition, The Physical Organisation and Technical Factors.

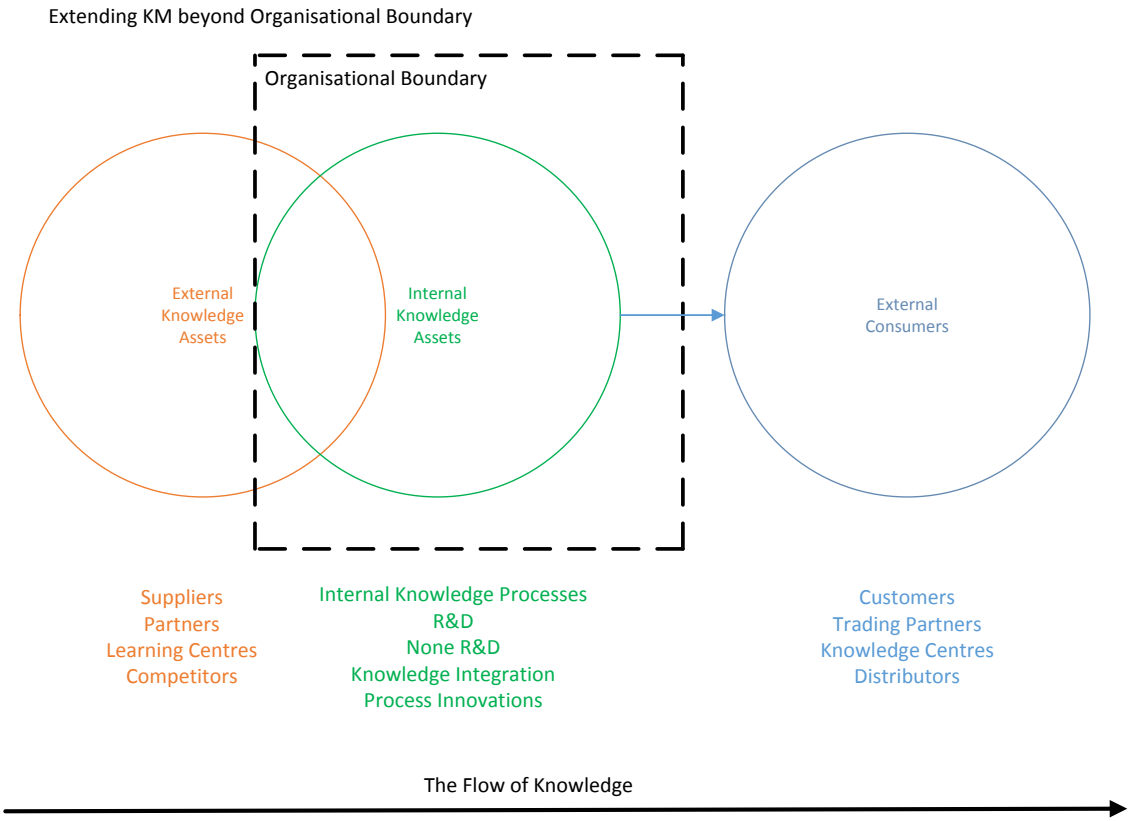

Figure 2.2 Core Research Topics

2.3 The Knowledge Management Environment

Knowledge Management has been around for some time and for completeness, an overview of the KM environment will be reviewed.

2.3.1 What is Knowledge Management

Knowledge is defined as “a justified true belief” (Nonaka, 1995:58), it can be considered as information about a given object, product, service, a process and even a state of mind (Nonaka, 1994). This was one of the earliest fundamental foundations of the definition of knowledge management, particularly from the perspective of an applied approach. Knowledge can be defined within the context of the organisation as an asset which can be leveraged to in an organisational setting to offer a competitive advantage (McDermott and O’Dell, 2001:26-28) and furthermore, be less valuable if not shared (Grant, 1996). Here the concept of KM moves beyond these original concepts of knowledge applied against a specific process or processes and begin sharing available knowledge assets. This early research falls short of covering knowledge from the perspective of moving knowledge across boundaries and further enrichment, as is the primary area of research for this study. It is however important to understand these were the starting point for many of the KM research topics. From this, it is derived that KM allows an organisation to benefit from

its intellectual capital through the effective use of knowledge as a digital asset, within existing organisation boundaries. This research focuses on knowledge as an asset within the organisational setting but also, as assets that have the capability to be absorbed from external sources.

Tuomi (1999) argues that the hierarchical journey from data to knowledge is typically approached from Data to Knowledge, whereas it can also be viewed from the opposite approach. In other words, knowledge needs to exist before deconstruction to generate information and then atomised down to an attributed data level. This approach suggests that no data can exist without corresponding knowledge as a determining factor. Tuomi (1999) argues further that the definition of knowledge essentially begets information and when reversed from its articulated structure or fixed state simply becomes information in an interpreted format becomes data. This argument very much depends on a) Data, information or knowledge remaining within the boundaries of the creator and not beyond this. It is argued that knowledge is shaped by the need of the individual and therefore subjective in nature, furthermore, its interpretation or enrichment is dependent upon the extant knowledge of the interpreter (Fahey and Prusak, 1998; Tuomi, 1999). Knowledge creation therefore is a) a cognitive process enabled by a pre-determined action and b) knowledge may not always be stored and distributed from technical sources, some of which may be transparent to the consumer.

Information is converted to knowledge once it is processed via individuals and defined further based on its purpose, it is argued by the researcher that consumed knowledge also holds a certain level of additional knowledge. This allows for it to be de-constructed in a meaningful manner so that is can be enriched and re-distributed as an enhanced knowledge asset, i.e. the concatenation of two knowledge assets via a common understanding. Therefore, it is surmised that data moving through inter-organisational processes as a digital asset, must contain at least a basic level of knowledge for it to be effectively processed further by individuals with no physical interaction with the creating source.

2.3.2 Definition of Knowledge Management

Drucker (1993), a professor from Harvard University is perceived by many in the literature as the first to identify the concept of KM. It is argued that only knowledge can be defined as the only distinct resource available to an organisation (Drucker, 1993). He argued that KM is about the provision of new knowledge and the use of existing knowledge within the same context to identify an effective approach to maximise the benefit of knowledge to produce the best outcome for an organisation. Furthermore, he inferred that KM is

focused on the learning organisation. The research aims of this study align broadly with "an organisation that knows how to do new things well and quickly" (Davenport and Prusak 1998:13), and the potential practices to achieve this.

Within previous literature and research definitions of knowledge have been discussed generally, and therefore have differing interpretations of what knowledge is. Davenport and Prusak (2000:67-69) defined KM as a framework that consists of a number of elements such as knowledge experts experience, context specific information and core values. "Knowledge Management is the process by which we manage human centred assets" (Brooking, 1999:154). "Knowledge management is defined as an information technology system that dispenses organisational know-how" (Dalkir, 2017:8). Each of these definitions consider knowledge management from a different perspective and are applied using different practices.

Knowledge management is a multi-disciplinary practice and can include many approaches depending upon the context of its application i.e. decision support systems, collaborative technologies, cognitive science, help desk systems (Dalkir, 2017:8-9). Extant literature considers different approaches as important for the application of these practices. For example, (" (Michailova and Mustaffa (2012:391); McDermott and O'Dell, 2001; Delong and Fahey, 2000; Martin, 2000) have similar beliefs that organisational culture has a substantial effect on the management of knowledge, particularly within in the organisation. Prior to this, (Ichijo *et al.*, 1998) argued that knowledge processes require more flexibility and less focus on work rules, offering some conflict on approaches to this subject. In addition to cultural considerations, knowledge sharing plays a crucial part in knowledge sharing, "The ability to share knowledge within the MNC is critical for a host of organisational process and performance outcomes." (Dalkir, 2017:8-9). Furthermore, other researchers establish "it is deficient in studies at the individual level: the field is in need of more studies which investigate how knowledge flows among individuals can affect subsidiary-level and MNC-level knowledge flows. For instance, a fine-grained assessment of organisational members is likely to trigger new and more nuanced insights about knowledge flows in subsidiaries and in MNCs." (Michailova and Mustaffa (2012:391). These practices are not mutually exclusive however, "there is a relationship between the creation, sharing and application of knowledge" (Al Saifi, 2015:168) Furthermore, the application of knowledge can be dependent upon technologies "A major challenge for enterprises involves investing in the appropriate ICTs that help facilitate prosumers' knowledge engagement and knowledge transfer" (Ewa *et al.*, 2016:1273).

The flexibility of processes, particularly within the context of the typical organisation need to be investigated to identify potential approaches. The focus being on the organisational

capabilities for the integration of the external knowledge asset and the flexibility of existing knowledge. Since the introduction of the concept of Knowledge Management, there has considered many different approaches for the interpretation of KM as a process and the practices affecting them. Although, these are relevant within the context of their previous studies, they only touch on certain areas of this study. This study is particularly interested in the impacts of knowledge sharing, organisational culture and technological impacts to address the research aim.

Although these differing definitions and approaches do represent a portion of the KM process, this research requires both the acquisition of knowledge from external sources and re-distribution beyond the organisational boundaries. Therefore, the researcher proposes that a more suitable definition for this research would be:

"Managing Knowledge for the purposes of the organisational processes, need to leverage knowledge as an asset from beyond the organisational boundaries. Integrating with KM principles within the organisational boundaries and enriching effectively. This approach being to retain the value of the organisational knowledge asset whilst being able to disseminate combined experiences, products and services to external consumers."

Figure 2.3 shows this approach:

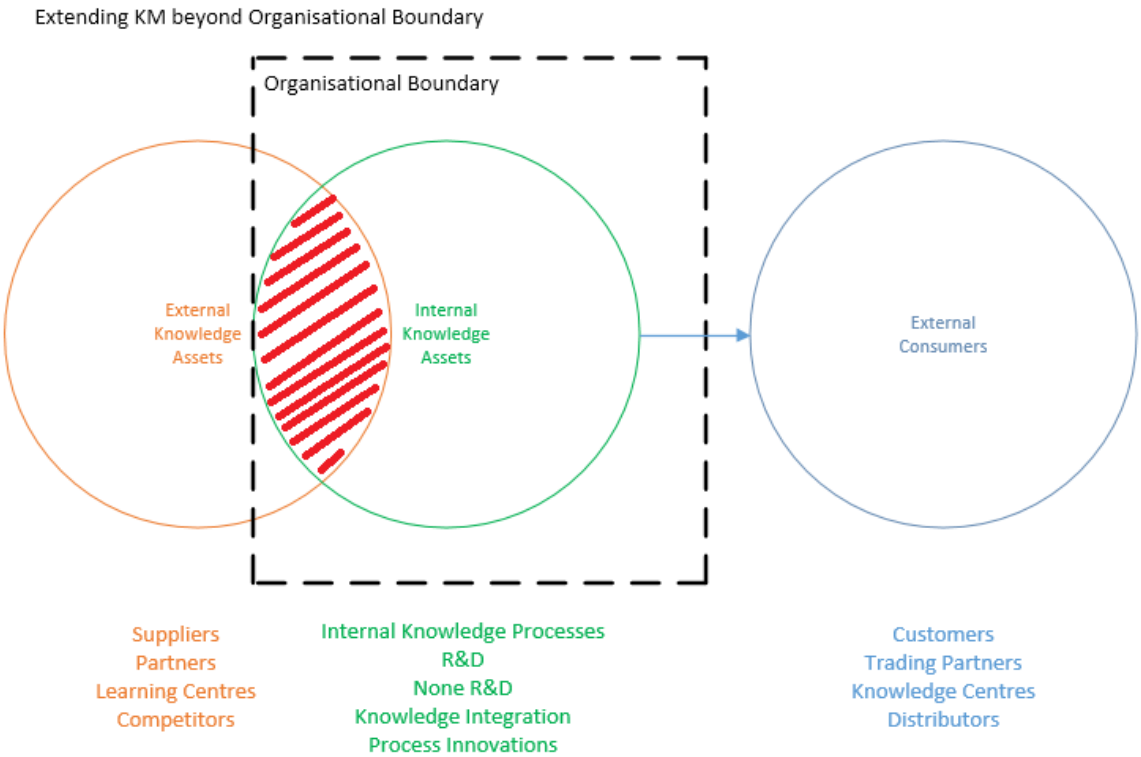

Figure 2.3 Extending KM beyond Organisational Boundaries

Figure 2.3 shows that any asset re-distributed back out beyond the organisational boundary may be done so without the need of further enrichment. Not all existing assets or knowledge absorbed from outside of the organisation initially as part of EKA may require further enrichment. It would however still need a mechanism for progressing through the organisation, and treated as any other asset, whether enriched or not as part of an effective framework. The key considerations being a) the consumption of external knowledge, b) its ability to be treated as an asset, c) its ability to be converted or enriched as an asset, or d) its ability to be consumed by external sources as an effective asset. The organisation being investigated currently considers its ability to be able to remain competitive but also be able to retain knowledge in the long term as crucial for it to remain effective in the marketplace.

Alavi and Leidner (2001:26-28) discuss that KM concepts vary because of listing and classification of processes as opposed to the basic concepts themselves. Concepts being a consolidation of practices and processes to apply KM. Al Saifi (2015) argues that this diversity might have occurred because not only is KM diverse in nature but also the amount of effort required to implement effective KM processes and the lack of understanding in implementing them. Furthermore, Barreto (2003) highlight in their research that others have argued that KM is wholly about IT capabilities. Barreto (2003) further identify that others perceive KM is about effectively capturing knowledge within the organisation and having the capability to distribute this knowledge further. Finally, Barreto (2003) then goes on to discuss that knowledge is not only created but also disseminated and capitalised upon further.

This research identifies the need for the consolidation of such KM processes, the impact upon these processes by cultural influences and the technological barriers and enablers that aid the application of the business processes.

2.3.3 KM Practices and Processes

O'Leary (2002:101) discussed that KM could be defined using four processes: "1) capture knowledge; 2) convert personal knowledge to group-available knowledge; 3) connect people to people, people to knowledge, knowledge to people, and knowledge to knowledge; and 4) measure that knowledge to facilitate management of resources and help understand its evolution''. These processes are comprehensive from the perspective of KM physical processes but very broad and do not consider consumption of knowledge from disparate sources.

Skyrme (2011) identifies a range of practices and processes used in knowledge management; examples have been listed in Table 2.1. below. These are important

because they give a broad overview of what an organisation may use as part of its KM process development. Although all of them may not be relevant, most of them appear in different approaches within this literature review. Some of the more common ones are:

Table 2.1 Practices and Processes involved in the KM Process (Adapted from Skryme, 2011)

Processes	Practices
Knowledge Creation and Discovery	Problem Solving and Creativity Data Discovery Text Discovery Environmental Analysis Knowledge Creation Business Intelligence
Organisational Learning	Communication Channels Knowledge Sharing Maintenance and Review Structured feedback and analysis Knowledge sharing Intra-organisational teams
Strategy and Maintenance	Knowledge Bases Knowledge Profiling Knowledge Mapping Knowledge Monitoring Data Management Performance Management

As defined in the literature, organisations use various combinations of these practices to implement theoretical frameworks based on the context of the research area. Often, these practices are additionally complimented with domain specific knowledge activities. Skryme's approach covers many of the key processes involved within the internal KM processing but lacks coverage for the external asset. To extend this further, Botha *et al.* (2008:136) refined these practices additionally considering the importance of cross boundary knowledge consumption and knowledge learning. Al Saifi (2015) discussed that this was crucial in an organisation's ability to continue to adapt in the modern market place. Table 2.2. Shows these enhancements:

Table 2.2 Additional Key components for the EKA introduction to KM (Source: Botha *et al.*, 2008:136)

Processes	**Domain**	**Practices/Activities**
Creating and Discovering:	Business Intelligence	The application of Business Processes against BI and KM activities to ensure effective consolidation.
Sharing and Learning:	Cross Boundary Teams	External partner initiatives to promote knowledge sharing across knowledge boundaries.
Organising and Managing:	Hierarchical Maintenance	Taxonomic and Ontological modelling as an explicit factor of the management process

Botha *et al.* (2008:136) theorised the process model in Figure 2.4 which reflects current thinking around the issues facing KM projects in recent literature. Their model has a predominant focus upon technology being the answer to addressing KM issues. Originally, this had previously raised some discussions from other researchers (Mehta, 2001) who had suggested that a KM solution cannot simply be technical but also an organisational and socio-cultural issue as well. Botha *et al.* (2008:136) model addresses these earlier concerns as shown in Figure 2.4:

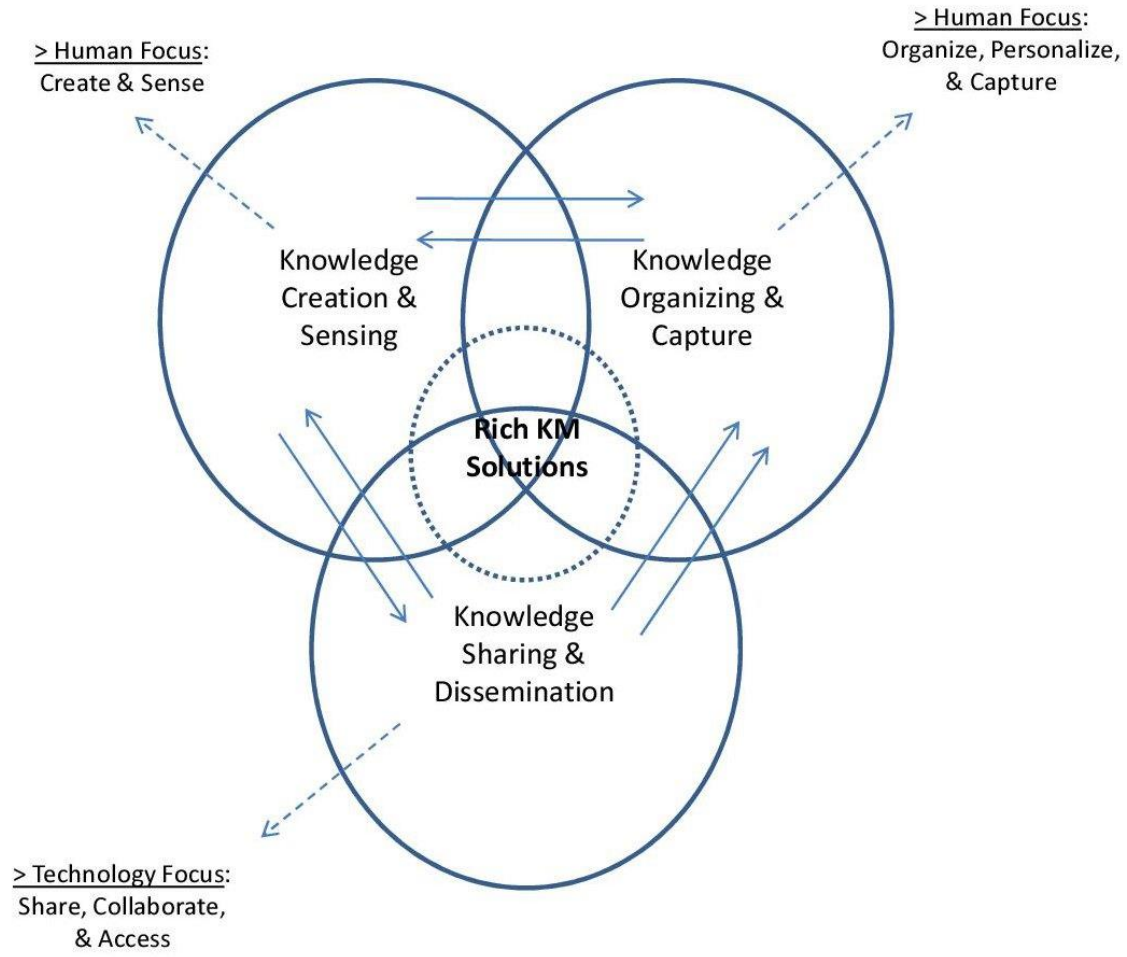

Figure 2.4 Knowledge Management Process Model (Botha et al., 2008:136)

This model reflects well the approach required for internal KM processing and goes some way towards identifying the cultural barriers that need facing. However, it again reflects the approach primarily from the internal organisational focus. Although this study needs to consider the capability to share and capture knowledge, only these elements are relevant from the model in Figure 2.4. Furthermore, it would be required to extend both the knowledge creation and sensing and knowledge sharing and dissemination beyond the organisational boundaries. Knowledge organising, and capture could remain an internally focused task but only if the sensing opportunities become a cross boundary activity which acts as the intra-organisational bridge.

2.3.4 Knowledge Types

The literature typically refers to three types of Knowledge within the context of KM research. These are: Tacit Knowledge, Explicit Knowledge and Embedded knowledge. In

Nonaka and Takeuchi's (1995) seminal work *The Knowledge Creating Company*, they define that "Knowledge can be broadly classified into two types; explicit and tacit" (Nonaka and Takeuchi, 1995:71). It is important to understand this definition as the two knowledge types are consumed in different ways as discussed further in 2.2.5 and 2.2.6 respectively below.

It is argued that only knowledge can be defined as the only distinct resource available to an organisation (Drucker, 1993) and is recognised as the key differentiator, and crucial for any organisation to maintain its competitive advantage (De la Vega and Stanosky, 2006; Halawi *et al.*, 2005). One of the core concepts of KM is that explicit and tacit knowledge are not independent values contained in siloed environments but are related and must work with each other to be effective (Nonaka and Takeuchi, 1995). Botha *et al.* (2008) went further by identifying that tacit and explicit knowledge should be a spectrum rather than as definitive points to be adhered to. Below, Nonaka and Takeuchi's (1995) spiral of knowledge creation representation of the relationships between the tacit and explicit dimensions that identify the relationship between the two knowledge types, Tacit and Explicit:

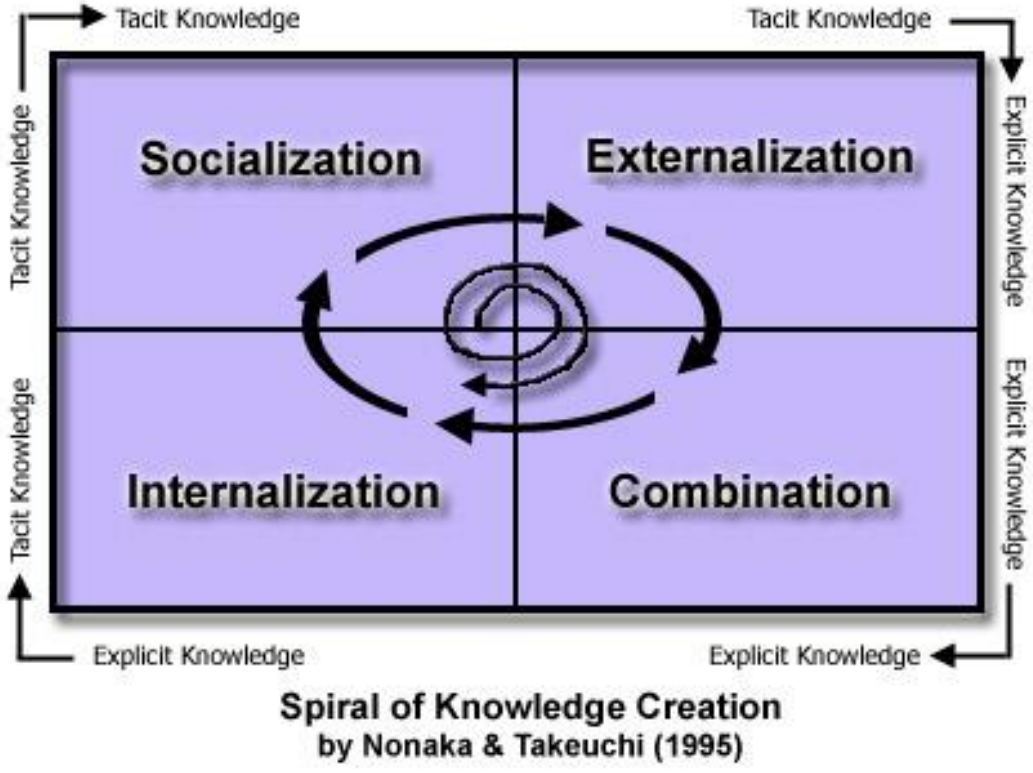

Figure 2.5 Spiral of Knowledge Creation (Nonaka and Takeuchi ,1995:71)

This model reflects very well the process of capturing and re-use of both the tacit and explicit knowledge required within the organisational boundaries. For this research however, externally acquired knowledge is also be embedded within existing products and

processes and this model would not be effective from the perspective of the knowledge provision process. Clear definitions of what constitutes a flow of knowledge are required to differentiate between what is embedded knowledge applied against a physical object such as a product or service vs what knowledge can be generated through relationships with external knowledge providers. Therefore, generating opportunities for generating knowledge assets.

2.3.5 Tacit Knowledge

Previous researchers, including: (Moingeon *et al.,* 1998; Sparrow *et al.,* 2009; Edwards *et al.,* 2005; Ferner *et al.,* 2005; Nonaka and Takeuchi 1995) reference Polanyi's (1966:4) initial definition of tacit knowledge that theorises "tacit thought as an indispensable element of all knowing and as the ultimate mental power by which all explicit knowledge is endowed with meaning". This is one of the earliest definitions from the perspective of modern thinking around KM but often overlooked. Considering the value of tacit knowledge at the point of knowledge acquisition could potentially allow an organisation to add value to their existing knowledge bases.

The initial term Tacit Knowledge was first introduced in (1958) by the philosopher Michael Polanyi in his magnum opus *Personal Knowledge*. Furthermore, Polanyi (1966) goes on to discuss how knowledge is complex because not all of it can be articulated verbally, stored or captured. (Polanyi, 1966:4) discussed that "a person will always know more than what they can explain" in his work *The Tacit Dimension*. Polanyi (1966) goes on to discuss that a lot of knowledge cannot be converted from tacit and that all translated knowledge is inferred from tacit knowledge.

From the literature reviewed (Nonaka and Takeuchi, 1995; Polanyi,1966) tacit knowledge is seen to be difficult or impossible to articulate and makes up part of a human's cognitive processes and perception of reality. Such knowledge is complicated to share (Nonaka and Takeuchi, 1995; Wang *et al.*,2006) efforts in this area can be very expensive and without a guaranteed outcome (Kogut and Zander, 1992). However, the capacity (Buckman, 2004; Mooradian, 2005) and significance (Davenport and Prusak, 1998; Reychav and Weisberg, 2010) of tacit knowledge makes such efforts financially viable. Financial viability, often being a ley driver of an organisational justification for the application of new processes. Furthermore, tacit knowledge in embedded processes themselves must be maintained. (Walker, 2017:266) discussed "tacit knowledge embedded in a procedure can lead people to rely on the procedure inappropriately, as if the output from procedure were the judgment of a human expert". This argument re-

enforces the requirement for a knowledge worker to be an active participant in knowledge processes.

The concept of knowledge sharing, because of the potential value it adds to KM processes is being highlighted as a potential area of interest for this study, particularly because of its potential benefit to an organisation (Yi, 2009; Jonsson and Kalling, 2007) and is itself critical to a firm's success (Davenport and Prusak, 1998). When considering tacit knowledge, it is often not clear to an individual that they possess such knowledge or what value it offers, therefore making it difficult to capture. The process of capturing or transferring knowledge is often very difficult and requires personal contact and the ability to be able to translate such knowledge (Goffin and Koners, 2011). This study will go a step further however by considering these relationships across the typical organisational boundary.

Within the literature, the prototypical example of true tacit knowledge is Nonaka and Takeuchi's (1995) discussion of the kinaesthetic knowledge that is required to design and engineer a home bread maker. To allow for the knowledge transfer, engineers worked alongside bakers and learn the method and pressure to apply to knead bread dough (Nonaka and Takeuchi, 1995). This is typically a requirement of the manufacturing process, the ability to understand how a product needs to be produced to offer the same results as a manual process. Put simply, simply how the product is manufactured in general and understanding the human element of the process. As most products and services within this research are already manufactured, this makes the need to understand knowledge of this type less important and the focus upon explicit knowledge more relevant, however, tacit knowledge must still be considered as part of the knowledge acquisition process. Existing products and services typically come with this form of knowledge in the shape of data sheets, technical documents, and user guides etc.

2.3.6 Explicit Knowledge

Explicit knowledge can be formalised and codified and is often referred to as know-what (Brown and Duguid, 1998). Therefore, it is easier to identify, store, and retrieve (Wellman, 2009). Many previous researchers express explicit knowledge as of less value (Cook and Brown, 1999; Brown and Duguid, 1991; Bukowitz and Williams, 1999) than tacit knowledge. However, the organisation within this study consumes significant volumes of explicit knowledge and therefore it is deemed valuable within the context of this research. Knowledge that can be captured and explained, then furthermore stored as a physical asset (Nonaka and Takeuchi, 1995), and then communicated (Grant, 1996) forms the explicit component of the knowledge dichotomy.

Alavi and Leidner, (1999) discussed that the predominant factor for the investing in and developing KM technologies is a premise on the expectation that efficient KMS should disseminate knowledge through an organisation and offer opportunities to knowledge workers to help enhance decision-making capabilities. The potential impact of KMS on knowledge consumption is critical given that knowledge provides the basis for tacit knowledge transfer and is also the initiator (Roberts and Ashton, 2003; Alavi and Leidner, 2001; Anderson *et al.*, 1996; Michelene and Chi, 1989).

These observations are also used for this research (Alavi and Leidner, 2001), harnessing the existing explicit and embedded knowledge already in existence. Then focus upon how to consume and enrich it from external sources as opposed to the re-creation of knowledge assets. This knowledge then becomes a key factor in the development of innovative knowledge processes to help the competitive advantage.

2.3.7 Embedded Knowledge

Embedded knowledge as a type defines knowledge that is encapsulated in existing processes, products, culture, routines, artefacts, or structures (Gamble and Blackwell, 2001). This can lend itself towards both tacit and explicit knowledge and is often difficult to quantify on its own.

Wensley (2017:78) discussed that "When processes fail is it because of the inappropriate design of processes, or because of the knowledge embedded in the process or the knowledge necessary for interacting with the process? These are fertile areas to study."

Routines can be embedded in the employee as well as organisational processes and can be separated out from the tacit and explicit definitions (Gamble and Blackwell, 2001). Often however, for knowledge management, this level of detail gets too granular unless you are approaching this from a cognitive science perspective.

Acquired knowledge, particularly pertaining to an existing product or service will come with a certain level of known or embedded knowledge. Embedded knowledge from the perspective of the employee will be analysed to assess if this affects the ability to enrich further externally acquired knowledge or assets. I.e. does an employee's experience and existing knowledge offer any additional value to an already enriched product? Furthermore, this relates directly to the cultural impacts upon an employee within the physical organisation and their ability to enrich based on these impacts i.e. a centralised vs de-centralised working environment.

2.3.8 Broad KM Frameworks

The previous literature discusses many previous theoretical frameworks for the implementation of KM Frameworks. The following are identified as being some of the more prominent within the KM research domain. These previous frameworks are reviewed to understand what has been considered in extant literature for knowledge management. Furthermore, to understand any potential issues that have arisen during the development of these frameworks and any potential pitfalls. The chosen frameworks below do offer some similarities but fall short of being able to offer a complete process life cycle moving beyond the typical organisation boundary.

The Bukowitz and Williams Framework (1999) is predominantly driven from two directions, the first direction is based on market requirements and available opportunities within the market place. This is a very specific approach and focuses upon maximising revenue Benefits for the Organisation. The second direction focuses upon the strategic requirement to drive market demand and support the tactical approach.

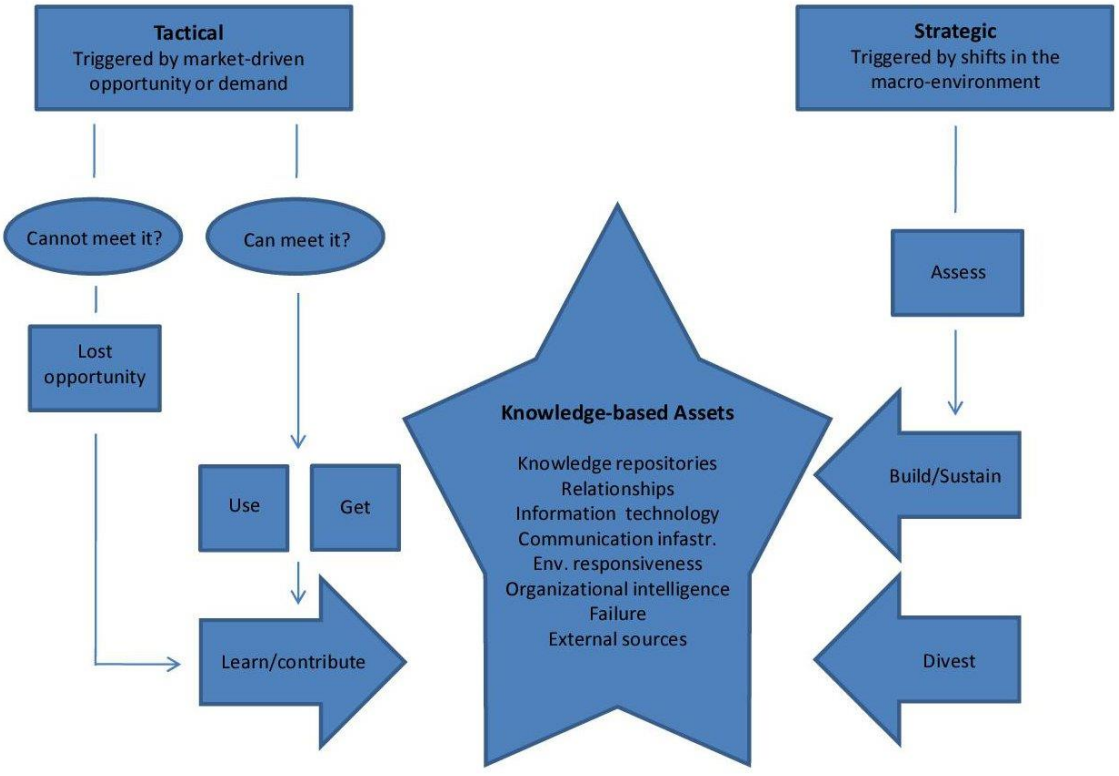

Figure 2.6 The KM Process Framework (Bukowitz and Williams, 1999:75)

This framework is reflective of the market requirement to remain flexible within the KM domain and covers both the need for a tactical approach to the development of processes, but also the requirement for a strategic approach to controlling the knowledge assets within the organisation. If the concept of EKA is introduced against this framework,

then consideration can then be given to an approach for the process innovation requirements. This approach would allow for the use of information but would need to allow for external knowledge assets and the learning requirements, both from the perspective of existing product knowledge processes.

The Cynefin framework was developed by Dave Snowdon (1999) in response to the need to find a solution for the ever more complex systems that were being developed. The original focus was on KM solutions with a deeper understanding of the psychological aspects within the KM environment.

The Cynefin framework (Snowdon, 1999) consists of four domains:

Complicated – the complicated domain focusing primarily upon the relationship and impacts of cause and effect and how to work with those relationships.

Chaotic – focuses on when no relationship exists within the complicated domain at a systems level.

Complex – identifies when a relationship already exists but not in a future state, therefore working within the boundaries of the existing relationship.

Simple – The approach is clear and straightforward and needs little explanation. This allows for the focus to remain purely on quality rather than complexity.

The work of Snowden (1999) and his team was initially in the areas of knowledge management. Kurtz and Snowden (2003) went on to discuss cultural change, and community dynamics. As time progressed they developed more and more into the areas of marketing and product development to enhance the global market place. Figure 2.7 below shows how the Snowden Framework is derived:

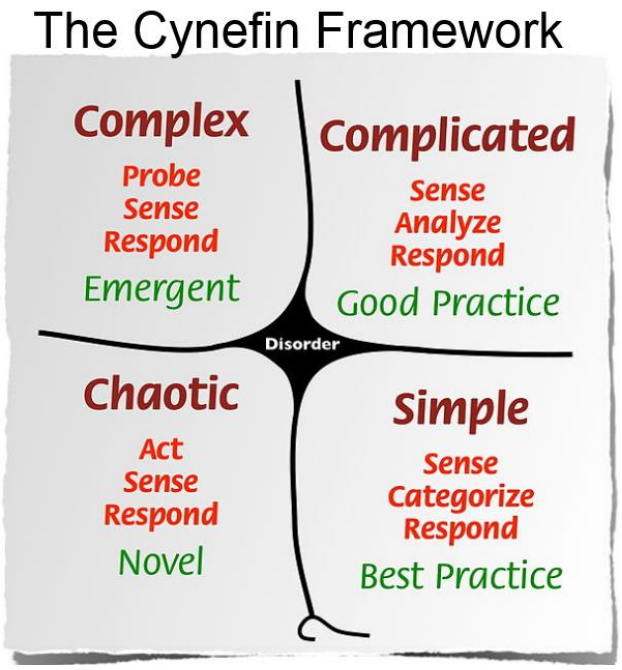

Figure 2.7 The Cynefin Framework (Snowdon, 1999, Pt. 7)

This framework focusses too much upon the theoretical framework perspective and lacks the perspective of the implementable process perspective of this research. Although this framework is a good overview of the similarities in the frameworks discussed in previous literature such as Botha *et al.* (2008) and the similarities between sensing as shown in Figure 2.7 with the Cynefin Framework for knowledge creation. Furthermore, elements from this framework could be used as partial elements of the knowledge lifecycle, within the enrichment process, post-external acquisition.

The Cynefin Framework (1999), the Bukowtiz and Williams Framework (1999) are discussed more broadly here as they have an over-arching broad view of the KM process. Other KM frameworks have been discussed within the literature review but are available in their respective areas of application for ease of interpretation: Botha *et al.* (2008) is discussed in section 2.2.3 and shown in Figure 2.4, Nonaka and Takeuchi's (1995) Framework is discussed in section 2.2.4 and shown in Figure 2.5, Liao and Marsillac's (2015) framework is discussed in section 2.3.1 and shown in Figure 2.8, Al Saifi (2015) framework is discussed in section 2.4.1 and shown in Figure 2.10.

It is the complication of the differences in the definitions and interpretations of KM frameworks and their theoretical applications which makes it difficult to capture all frameworks in a broadly defined section.

2.3.9 Knowledge Management Culture

Business and Academia both argue that, by the implementation of a KM environment, it can impact the long-term competitive advantage of an organisation (Liu and Lai, 2011; Gonzalez-Padron *et al.*, 2010). Maintain performance levels (Pina *et al.*, 2013; Theriou and Chatzoglou, 2009) and offer more innovation opportunities (He and Abdous, 2013; Gonzalez-Padron *et al.*, 2010). In particular, with the organisational environment, that is regarded as a knowledge-driven economy (Zhou and Fink, 2003). Therefore, KM becomes a pre-requisite for an organisation's ability to remain competitive (Matusik and Hill, 1998).

2.3.10 The impact of Culture on Knowledge Management Activities

The inter-relationship between the culture of the organisation and KM has been an important factor in effectiveness of KM (Al Saifi, 2015). Zheng's (2009), proposal was a theoretical framework that was a combination of extant theory on cultural antecedents which may impact KM processes. The proposed framework by Zheng (2009) is divided into three cultural categories: 1) cultural antecedents, 2) people and 3) work. Al Saifi (2015) supported this but further argued each category within this framework impacts KM in divergent ways and has a direct impact upon the effectiveness, efficiency and sustainability of knowledge management. When these conditions exist, the creation of a culture which promotes the sharing of ideas, are critical for the success of KM initiatives (De Long and Fahey, 2000; Gupta and Govindarajan, 2000). This approach only considers sharing within the existing organisational boundary. Sharing beyond the typically boundaries need to be analysed to extend these thoughts on sharing. Sharing within the organisation has limitations; therefore, this research looks to address the need of sharing beyond these boundaries and limitations.

De Long and Fahey (2000) think about a variety of different approaches where culture has a direct impact upon the behaviours affecting knowledge sharing. Their initial approach, Organisational Culture, generates an environment for interacting socially, defining the use of knowledge in each form. Furthermore, how culture within an organisation directly influences processes used to generate new knowledge and then further distribution of that knowledge. Furthermore, Alavi *et al.* (2006) further develops that KM is embedded in communities that greatly impact its processes. Again, the organisational boundaries act as a limitation but the concept of social interaction and sharing relevance remains relevant.

De Long and Fahey (2000) consider a more definitive relationship for this culture and its knowledge, discussing that cultural expectations are formed about what is the purpose of knowledge, and what is important to produce an environment that promotes social activity.

McManus and Loughridge (2002) argued that embedding a culture of standardisation and knowledge maintenance is crucial to achieve organisational goals. Edvinsson and Sullivan (1996) propose a framework which identifies the importance of culture in KM by proposing culture is a considered part of any intangible structural capital that knowledge sharing utilises. More recently, (Liao and Marsillac, 2015; Al Saifi, 2015) re-enforces the importance if the cultural impact upon KM, specifically within the area of external knowledge application and goes on to discuss the important elements of this cultural impact in section 2.4.1.

From this, it is recognised that within this research, the following influencing cultural antecedents should be considered as part of the data collection process: social relationships, knowledge sharing, external knowledge, consumption relationships and organisational boundaries.

Social relationships, offer two potential impacts upon a successful theoretical framework, firstly the direct relationship within an organisation and their ability to exist effectively depending upon the environment. Grandinetti (2016:160) concludes that "the items of social capital that have an impact on knowledge acquisition include: maintaining close social relationships with a key customer; personally, knowing this customer's people; acquiring new customer contacts and business relationships through this key customer"

Secondly, social relationships within external environments and opportunities which may arise from them are pertaining to knowledge acquisition (Nahapiet and Ghoshal, 1998) Knowledge sharing is directly impacted upon from these relationships as research needs to determine if KE is either viable or affected by such relationships. Conversely for this study, knowledge may not always be acquired from known sources or sources with relationships (i.e. external partners); therefore, this also needs to be considered. External knowledge consumption will be analysed to determine the need for effective processes for both channels. Typically, previous research has only focused upon knowledge within the organisational boundaries.

2.4 **Knowledge Acquisition**

Knowledge Acquisition refers to the capability of consuming knowledge in a form which is suitable for the given context. Durkin, (1994) argues that this is most important phase of knowledge-based systems design and development, but it is also the most problematic

process. The process of KA is used to collect, transform, and consume expertise from the primary source of knowledge to a digital asset. Knowledge acquisition can be categorised into two groups: difficulties from the expert's side and difficulties from the knowledge engineer's side (Milton, 2007). The manager of a KM project needs to determine the best method and the most appropriate tools for solving these problems (Milton, 2007). As this research is considering an approach from beyond the typical organisational boundary, both the knowledge creation process (internally within the organisational boundary) and the knowledge acquisition (internal and external to the organisational boundary) process have been identified as potential required capabilities for investigation. Therefore, some of these issues need to be considered but the inter-organisational approach requires more attention than this alone.

Previous literature has revealed that an organisation may obtain knowledge from third parties through setting targets, mechanisms for measurement and collaborative ventures (Gold, Malhotra, and Segars, 2001; He, Ghobadian, and Gallear 2013); the application of joint strategic ventures or the application of technological solutions (Almeida, Dokko, and Rosenkopf, 2003; Zhang *et al.*, 2010); external party involvement in the product development process (Handfield *et al.* 1999); and casual social interaction (Almeida *et al.*, 2003; Lee *et al.*, 2011). These authors all consider these knowledge acquisition capabilities however from an atomic standpoint focusing explicitly upon a key enabler. This only offers limited focus when considering how to build up a collaborative relationship between a knowledge supplier (He *et al.*, 2013), Furthermore, how the knowledge is then consumed and enriched further using technologies (Zhang *et al.*, 2010), which are not necessarily dependent upon existing organisational processes (Handfield *et al.*, 1999). In addition to the coordinated efforts of external third-party relationships, consideration also needs to be given to the value of knowledge consumed from external sources with little or no relationship availability i.e. open consumption of knowledge from electronic sources such as websites without the knowledge of the third-party. Moving beyond the external knowledge acquisition requirements, an organisation's existing knowledge creation processes and what needs to be aligned with externally acquired knowledge need to be analysed in more detail to understand enrichment and integration capability requirements.

2.4.1 External Knowledge Acquisition

Recent studies about how an organisation consumes external knowledge have explored opportunities to use existing internal knowledge as a mechanism to further extend the internal knowledge base. Xiaoqian and Xinmei (2017:773) discuss that "Amassing knowledge from external sources enriches the team's pool of raw material for producing creative insights" This builds on previous work by (Atuahene-Gima *et al.*, 2005:467) who

discuss “the search for new and diverse [. . .] knowledge that takes the firm beyond the scope of its experience”. Also, the impact upon supply chain process, product and process innovation and intra-firm activities have been suggested as opportunities for further research (Liao *et al.*, 2010; Zhang *et al.*, 2010). As the notion of absorptive capacity (AC) has incorporated, consumed and transformed externally acquired knowledge into an organisation, further investigation should be considered to determine a broader application. Considering knowledge acquisition and re-distribution, so that the potential benefits in External Knowledge Acquisition can be fully absorbed by the organisation (Liao and Marsillac, 2015). This research has a significant focus upon addressing the issues pertaining specifically to the consumption of externally acquired knowledge. The relation to consuming knowledge from external sources both within the intra-organisational perspective but also consumption of knowledge from sources where no knowledge source relationship exists. Lichtenhaler (2016:603) discusses “Besides responsive market orientation, proactive market orientation may affect a firm’s knowledge exploration in absorptive capacity.” Furthermore, knowledge forming intangible assets could be consumed from social networks (Subramony et. al., Segars, 2018). The need to have an effective and flexible approach to process innovation and the capabilities to adapt to the changing needs of knowledge management. The researcher is trying to consider the issues of EKA, Knowledge integration and the knowledge life cycle management process into an integrated approach. External methods of KA provide benefit to internal strategies in terms of more efficient learning in unpredictable environments. However, they cause disadvantages in terms of a lack of utilisation of internally created knowledge and a lack of protection for knowledge from competitors (Leiponen, 2005).

EKA is made up of processes that seek out knowledge persistently from third parties and build relationships with external partners (Cassiman and Veugelers, 2006). It is acknowledged that there is a clear requirement for external knowledge to enrich the knowledge base to continuously grow an organisation’s knowledge base.

Natalicchio et al., (2018) highlighted in their work on open innovation that although benefits exist for consuming external knowledge, there could also exist a negative effective to consume such knowledge due to it not being created within the consuming organisation. This was called the NIH or “not invented here” effect by Manzini et al., (2017), such as the so-called not-invented here (NIH). This is often affected by an organisation existing internal infrastructure and stifles a knowledge workers ability to maximise the value (Liao and Marsillac, 2015). Furthermore, since performance in current marketplaces has shifted from single organisations to more complex networks such as

supply chains (Cabral *et al.*, 2012) improving such networks becomes more prevalent to the success of an organisation (Liao *et al.*, 2010) also identify that a broader research approach is required to understand the benefits of EKA. The researcher considers this approach from the perspective of a potential knowledge framework, that could work with other organisational processes and align with them but retaining the perspective that knowledge itself can be defined independently of other organisational processes.

Although this study focusses upon existing products and services, consideration is still given to internal processes and process development from an innovation perspective. Piening and Salge (2014) discuss that activities supporting EKA as well as internal knowledge creation are especially important in the initial steps of innovation processes. "There is an implicit assumption that considers knowledge acquisition as automatically starting once a firm is able to identify valuable knowledge, but in fact, it rarely happens this way in practice (Ortiz, Donate and Guadamillas, 2018:7;Todorova and Durisin, 2007). Extant literature discussing absorptive capacity does so by considering knowledge discovery and acquisition variables as being combined into a singular construct, namely, potential absorptive capacity (Zahra and George, 2002).

By considering a broader view of the organisational knowledge base, this allows for a greater understanding of potential knowledge availability, and furthermore, potential knowledge assets (Zahra and George, 2002; Cohen and Levinthal, 1990). This research will focus upon these proposals as the initial stages of the knowledge life cycle process as a key factor within the intra-organisational approach to knowledge sharing. This must also be able to integrate within processes restricted within internal boundaries; this begins to move from considerations relating to knowledge acquisition and crosses over into organisational factors.

In current competitive environments supply chain agility and autonomy, a crucial factor in an organisation's success (Li *et al.*, 2008) that allows an organisation to form a strong position within the market place by allowing the organisation to responding to market volatility and unforeseen issues (Gligor and Holocomb, 2014; Swafford *et al.*, 2006; Power *et al.*, 2001). This research will show that this is also true for the knowledge life cycle and the importance of its position within the organisation, the ability to flow knowledge through a consumption and distribution could be used to enhance existing supply chain processes.

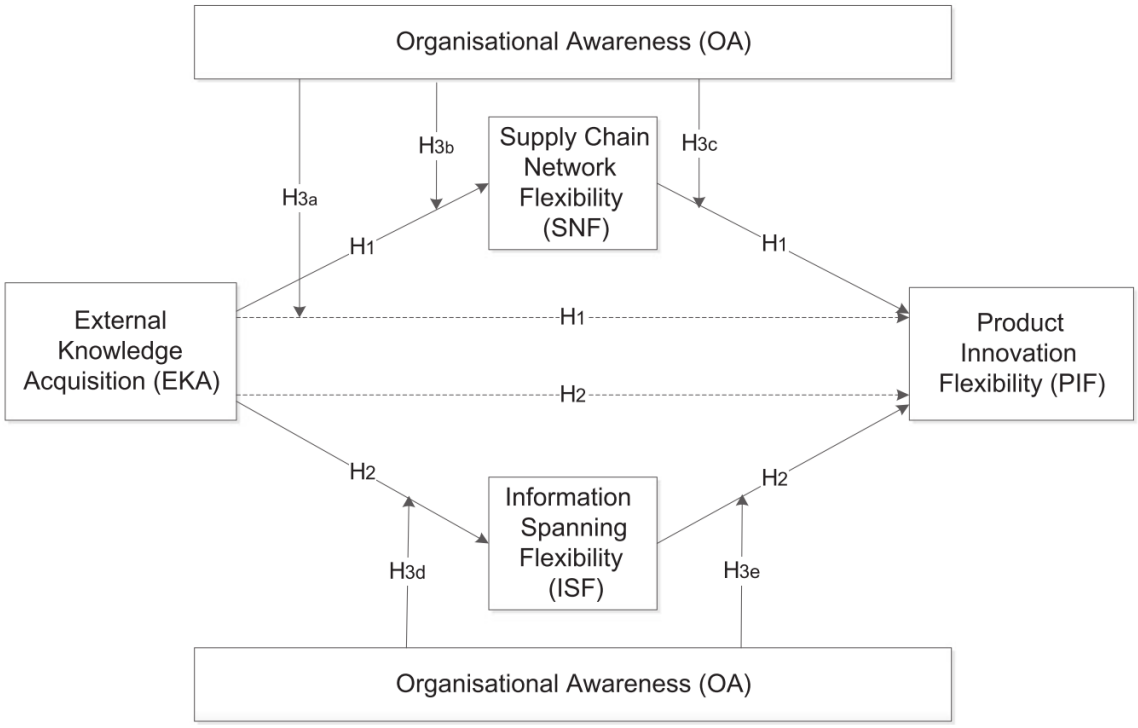

Figure 2.8 Liao and Marsillac's Conceptual Framework (Liao and Marsillac, 2015:5440)

Figure 2.8 shows Liao and Marsillac's (2015:5440) conceptual framework considers KM from the perspective of supply chain-oriented flexibility, and information spanning flexibility. This approach is intended to facilitate the interaction between EKA and Product Innovation Flexibility using organisational awareness and a mediating variable (Liao and Marsillac, 2015). It is worth considering this framework because it shows the need for flexibility within an organisational context for traditional processes and the need to grow.

The notion of the consumption of externally acquired knowledge to enhance an organisation's processes is not a new one. Such intra-organisational initiatives are effective if an organisation recognises the value of externally acquired knowledge and potential relationships with third parties (Liao and Marsillac, 2015). It is relevant to understand the knowledge process associated with as this research is proposing a detached framework for knowledge that considers flexibility and innovation in much the same way. The emphasis being on a theoretical framework that is not only be detached but which could also be overlaid against other business frameworks requiring the need to consume and re-distribute knowledge.

The above discussion from Liao and Marsillac's (2015) emphasises the need for organisational awareness but do not discuss explicitly intra-organisational awareness and the potential impact of large-scale external knowledge sources and the impact on maintaining such an environment. Many thousands of sources as opposed to known

third-party relations and this potentially limits the ability to consume knowledge from disparate or limited third-party relationships. Although the general framework proposed by Liao and Marsillac (2015) does address the relationship between EKA and the requirement for a flexible approach to supply chain innovation. This framework also considers that product innovation has an impact upon the flow of knowledge. However, no consideration is given as a factor for this research as it is assumed that products or services may already exist and have existing knowledge assets. Such as within a wholesale environment instead of a siloed manufacturing environment or multi-site siloed environment, where the impact upon existing knowledge assets already exist. The ability to generate new knowledge assets based on product innovation has been covered previously (Pavlou and El Sawy, 2011; Benner, 2009; Marsh and Stock, 2006).

This research considers enhancing Laio and Marsillac's (2015) framework as shown in Figure 2.9.

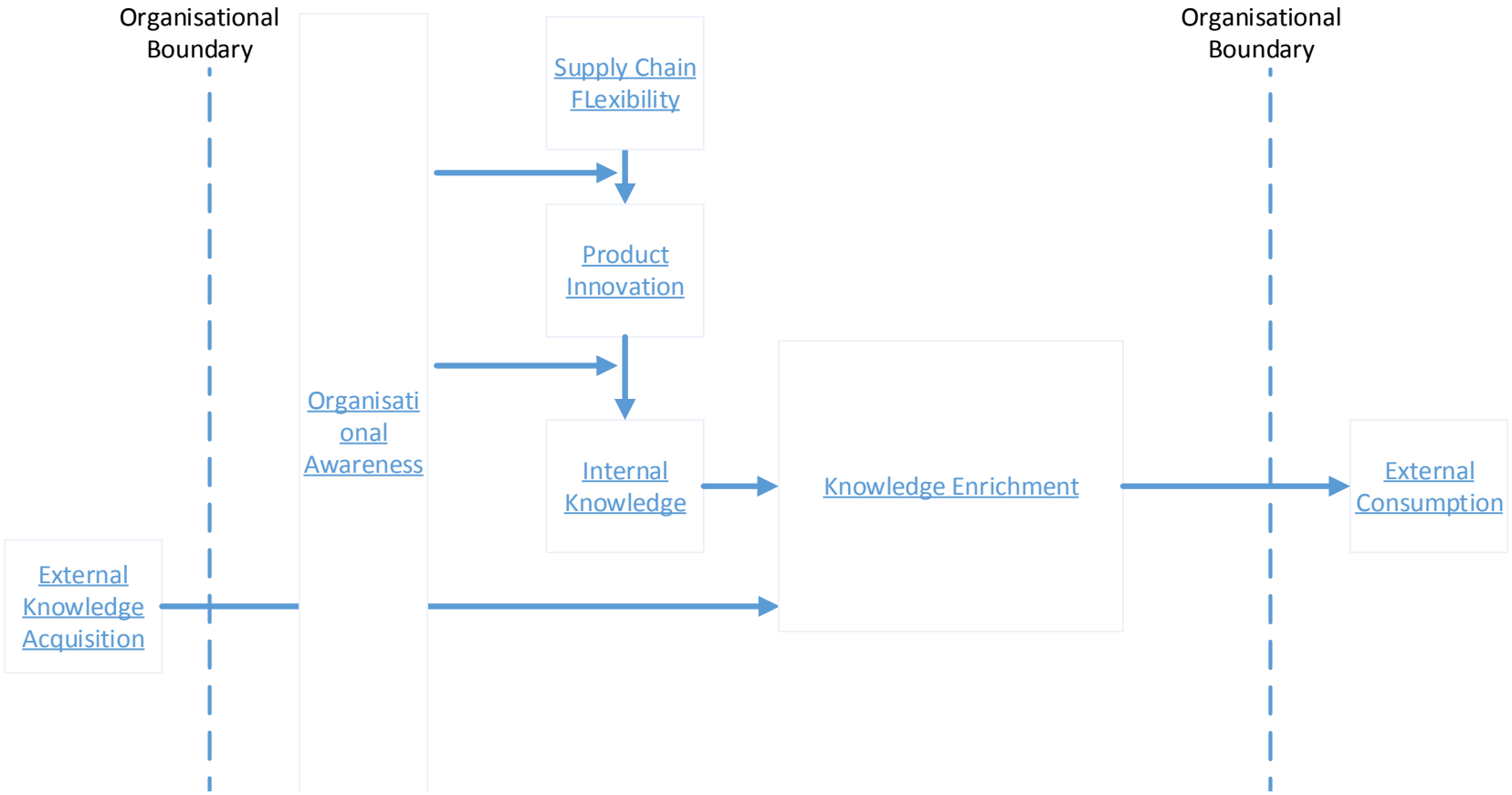

Figure 2.9 Enhanced Laio and Marsillac Framework

Extant research in organisational awareness deliberates organisational knowledge, absorptive capacity (AC) (Cohen and Levinthal 1989, 1990) and the potential magnitude of knowledge spillovers as important factors when considering mechanisms acquire knowledge externally (Cassiman and Veugelers, 2002; De Bondt 1996). Arvanitis *et al.* (2015) discuss that there is a direct correlation between the following three concepts: 1) AC is required to consume external knowledge; 2) to make sure knowledge flows through the organisation; 3) an organisation protects its knowledge base from exploitation by competitors without consent to do so. Thus, avoiding potentially negative effects of knowledge spillovers for an organisation.

Liao and Marsillac (2015) discuss that as an organisation evolves, its success becomes more dependent upon external sources of knowledge, relationships with third parties and the ability to consume such knowledge in valid and meaningful ways. This inevitably makes the acquisition a more complex activity and one that is not consistent in structure. Although prevalent, previous literature has approached this with an emphasis on organisational relational structures. In this research, the aim is to determine that not only is knowledge acquisition important to the innovation process but also to the supply chain process and how knowledge from external sources defines an organisations strategy for both the innovation Research and Development (R&D) process and existing supply chain processes that need to be considered both internally within an organisation and externally from partner organisations.

Although knowledge acquisition is covered in some detail in the sections above, the extant literature still falls significantly short of considering knowledge from the consumer or customer perspective. The understanding of how a firm absorbs new customer knowledge during service development is limited (Volberda, Foss, and Lyles 2010) discussed that there was little research in this area. However, Storey and Larbig (2018) discuss “Directly involving customers in the service design process has been adopted by firms as an alternative, and perhaps more valuable, means of acquiring new knowledge than feedback”. These inconsistencies in approach is a significant gap in the extant literature and potentially not optimising the available knowledge sources available. This particular issue will be investigated further during the data analysis.

From this, it can be concluded that knowledge, knowledge spillovers and AC can be defined as determinants for consideration in the development of a suitable framework. This research will also consider adding organisational relationships and social interactions as possible determinants. These are important to consider because of the fundamental impact the knowledge and the ability to consume knowledge has upon an organisation.

Furthermore, the value of knowledge and the costs associated with these processes and not wanting to inadvertently give away this value to competitors.

2.4.2 Knowledge Creation

Nonaka and Takeuchi (1995:71) coined one of the earliest modern definitions of knowledge creation as "an organisational, social and collaborative dynamic process of interactions between explicit and tacit knowledge". Knowledge creation being more effective working together as opposed to considering tacit or explicit knowledge as separate processes. Wang (2016:20) discussed that "knowledge creation within a team also depends on activities out-side the team." Although this has been discussed by many researchers (Zarraga and Garcia-Falcon, 2003; Liponnen, Hakkarainen, and Paavola, 2004; Alavi and Leidner, 2001; Teese, 1999) over the years within many different environments, Nonaka and Takeuchi's (1995:71) definition remains relevant. Nonaka and Takeuchi (1995) discuss that knowledge creation and knowledge management is more than data warehousing, installing intranets, developing expert systems, or refining organisational routines. Hon *et al.* (2017:20) discuss that "the knowledge creation metaphor combines the acquisition and participation metaphors: it posits that individuals participate in collaborative activities in a community, acquire individual knowledge and create new knowledge that is usable for the community at large." In Von Krogh's (1998) paper "Care in knowledge creation" he discusses that knowledge creation is also a social process; more than one individual is involved. This definition assumes that knowledge is being transferred from tacit to explicit and is not being derived from multiple explicit sources to generate a different context or meaning from existing knowledge. Von Krogh (1998) went further by discussing that to create knowledge; you must first have mechanisms in place to share tacit knowledge and an individual's ability to be creative. Furthermore, an individual being able to share their personal true beliefs about a given situation with other team members. However, this again is only considered from within organisational boundaries.

Schulz (2001:661-681) defined three kinds of knowledge-creation processes:

1) Encoding existing knowledge into structures suitable for re-distribution – the objective is to remove causality from the knowledge generation process
2) The combination of existing knowledge – the objective being to capture existing and relevant information for use in a historical context
3) The generation of knowledge, with the aim of consuming information that generates new insights.

Nonaka *et al.* (2006) discussed that there can be many characteristics of an organisational that can be considered determinants for the definition and application of a given dynamic process for knowledge creation at different levels of a given organisation. The recurrent process of organisational knowledge generation may have an impact ensuring that organisational performance is amended (Nonaka *et al.*, 2006). Ang (2006) elaborated further and believes that knowledge creation is the activity of developing a new understanding.

2.4.3 KM Strategy within the Context of KM Culture

Jennex (2012) backs the theory that KM strategy is key to an effective implementation and recognises many previous researchers have identified strategy as an enabler or key success factor (Jennex and Olfman, 2005; Yu, *et al.*, 2004; Barna, 2003; Koskinen, 2001; Ginsberg and Kambil, 1999; Holsapple and Joshi, 2000; Sage and Rouse, 1999; Mandviwalla, *et al.*, 1998)

Jennex (2012) discusses that several researchers have acknowledged KM strategy as an effective part of their success frameworks. "These Include the Jennex and Olfman (2006), KM Success Framework Bots and de Bruijin's (2002) KM Value Chain framework, Massey *et al.* (2002) KM Success Framework, Lindsey's (2002) KM Effectiveness framework and Maier's (2002) KMS Success Framework.

Jennex *et al.* (2012) proposes the following critical components for the successful implementation of a KM strategy:

- A strategic approach to KM that acknowledges and applies the appropriate mechanisms that considers users, sources, processes, storage strategy, knowledge and links to knowledge;
- Staff engagement and positive re-enforcement of KM including appropriate training;
- Technical environment to support KM processes and knowledge workers;
- Organisational culture and commitment from all levels of an organisation which support the use of knowledge as an asset;
- A common interpretation of the definition of knowledge and its place in the organisation;
- Top down commitment to KM as an embedded mechanism with relevant human and fiscal resources to support;
- Learning Organisation;
- Mission statement and explicitly defined direction;

- Key performance indicators and relevant measurement tools to manage on-going refinements;
- Knowledge interrogation and retrieval tools;
- KM processes for the explicit purpose of KM;
- Knowledge protection and safeguarding mechanisms.

The individual components discuss the pertinent requirements that need to be applied against a KM strategy, although the individual components depend upon the organisation. Strategy is seen as a fundamental requirement for the consideration of a KM framework.

Jennex *et al.* (2012) does not consider the impact of externally acquired knowledge on the cultural impact on the KM approach. Further work would be needed here to understand the impact of EKA and sharing knowledge with external partners as part of the supply chain process innovation requirement, for the purposes of this research. External Knowledge from multiple sources could require explicit or sub strategy to align within the internal organisational KM strategy.

The inter-relationship between the culture of the organisation and KM has previously been the topic of many research studies. Zheng (2009), proposal was a theoretical framework which combined previous research on cultural antecedents. Zheng's (2009) proposed framework consists of three cultural categories including knowledge, people and work, each of which can be defined as a cultural antecedent. It is argued that there is a correlation between each of these categories and their requirement to work together for the benefit of KM. (Al Saifi, 2015). When these conditions exist, the creation of a culture which promotes the sharing of ideas, are crucial to the success of KM initiatives (De Long and Fahey, 2000; Gupta and Govindarajan, 2000). The approach to sharing beyond the organisational boundaries would be a logical next step in this approach.

2.4.4 Knowledge Creation – Organisational Impact

The existing literature (Holsapple and Joshi, 2000; Oyefolahan and Dominic, 2010) have confirmed that there is a need for the acceptance of the organisational structure and its ability to function effectively. Within the literature, this is typically broken down into two definitions 1) Formalisation and 2) Centralisation.

Holsapple and Joshi (2000) discussed that formalisation is defined as the level that decisions and working relationships are governed by formalised rules, standard policies and procedures. This infers that organisations are rigid in nature when adopting rules and structures that must be followed explicitly (Oyefolahan and Dominic, 2010).

Others suggest that for KM to be effective, an organisation needs to remain flexible and reduce the need for stringent rules (Bennett and Gabriel, 1999; Ichijo *et al.*, 1998). This research is interested in knowledge sharing beyond the organisational boundaries for consumption of external knowledge, therefore: when rules based, rigid and formalised processes are adopted, there are less new novel concepts being proposed. Graham and Pizzo (1996) argue that applying flexibility into processes and process development offers a more effective approach than those rigid in nature. Furthermore, Wang and Ahmed (2003) discuss informal structures offer a more realistic view of organisational efforts and also offer more time effective opportunities. Therefore, organisations which adopt less formal approaches are anticipated to offer knowledge workers a higher probability of opportunity to be innovative and be able to work in collaboration more effectively (Al Saifi 2015).

This suggests that unknown complexities could have a direct impact on productivity where effective organisational governance does not maintain a balance between organisational flexibility and organisational creativity.

2.4.5 Knowledge Sharing and Team working

Knowledge sharing, and team working is important to gain an understanding of how organisations integrate internal knowledge with externally acquired knowledge, furthermore applying processes to understand their effectiveness (Arvanitis *et al.*, 2015). One of the major challenges within an organisation is how to effectively manage its knowledge assets in the context of managing the transfer of technological knowledge across the firms' organisational boundaries. (Chase, 2004). Knowledge transfer is a crucial factor in inter-organisational knowledge sharing and without the mechanisms in place to support effective transfer then the process of the knowledge life cycle would effectively become redundant, but this needs to be considered with other key factors within this research such as the ability to adapt and consume incoming knowledge in an effective manner.

Knowledge sharing is the process of making knowledge available to knowledge workers within an organisation" (Ipe, 2003). Knowledge sharing empowers workers to be creative an come up with novel solutions to help the organisation offer new products or services to the market place (Wang and Noe, 2010; Morag *et al.*, 2010; Nonaka and Takeuchi, 1995) The ability to enrich consumed knowledge should offer new versions of the original knowledge thus offering the capability to offer new processes and services both within the organisation and once the knowledge is further enriched, offered back outside of the

organisational boundary for further consumption taking into consideration knowledge spill-over related factors.

Davenport and Prusak (2000) argued early on that effective knowledge sharing should not only be defined by the distribution of existing knowledge to others. It should also reflect the ability to consume knowledge from other providers. Al Saifi (2015) discussed that this indicates that all knowledge-sharing behaviours constitute both contributing or bringing knowledge together, collection and consumption. There is also potentially no reason to update the source as any additional enrichment may only be relevant within the current context or upstream environments and therefor feeding back knowledge may offer no value.

Knowledge sharing (KS) is further defined within extant literature as a culture of social interaction, symbolising knowledge exchange using workers knowledge, experiences and expertise within the organisation (Lin, 2007). This is further re-enforced by Ardichvili *et al.* (2003) who believed that KS involves consumption of existing knowledge but also the need for new sources of knowledge. Van den Hooff and de Leeuw van Weenen (2004:8) found "the extent to which people collect knowledge from others positively influences the extent to which they also donate knowledge to others". For this study, this is true for certain knowledge sources, however some knowledge is consumed from sources without an owner i.e. existing knowledge asset available online. Furthermore, research will consider the need for an intra-organisational social group, inevitably this scenario will factor in some channels, but it is also deemed feasible that organisational data may be pushed for consumption without the need for further interaction i.e. a supplier sending product data through to a distribution centre.

Tsai (2002) argues that, a centralised organisation does not enable effective KS because of the potential impact of lateral networks. Such networks are likely to have a negative effect from a timing perspective, in turn affecting an organisation's desire to apply such processes. However, it has been acknowledged that there are intrinsic benefits for knowledge sharing, but also identifies that people are still reluctant to share. Numerous reasons have been quoted and among them scholars have consistently identified organisational culture (Al-Alawi *et al.*, 2007; McDermott and O'Dell, 2001; Davenport and Prusak, 1998) as one of the main reasons. Schein (2004:3) argues "Culture is an abstraction, yet the forces that are created in social and organizational situations that derive from culture are powerful". It is also argued here that the knowledge life cycle process itself in some respects is an abstraction from both the supply chain and KM capabilities with a definitive relationship.

Consideration needs to be given to external knowledge consumption and a forced requirement to consume such knowledge assets based on a driven demand for continuous improvement on existing knowledge understanding and the knowledge life cycle processes. External knowledge sharing is a key antecedent to the consumption and re-distribution process.

Plessis (2007) and Gong *et al.* (2012), argue that the sharing of knowledge has a strong influence on organisational creativity. In this respect, a pro-active approach to knowledge sharing encourages an individual's creative skills (Gong *et al.*, 2012). Other research has also shown that knowledge sharing has been associated with a variety of positive results involving problem solving (Ipe, 2003; Nonaka and Takeuchi, 1995).

Jetz *et al.* (2012) discussed that centralisation had a negative impact upon KS because it could impact creativity and teamwork. Moshari (2013:21) extends the idea, "Organizations with team-oriented employees who trust one another are more successful at sharing knowledge than those who are merely technologically superior". More specifically, considering that those who rely on technology are less likely to gain value or benefit from new knowledge acquisition. When considering the acquisition of knowledge from sources beyond the organisation barrier, then teamwork is deemed to be less of an issue as previously discussed due to the consumption of knowledge not necessarily requiring knowledge to be provided back to the source environment.

Other researchers also support that third-party networks sustaining inter-organisational relationships could be used for many purposes potentially improving decision-making processes, effective communications and the creation of relationships with third parties (Mehra *et al.*, 2006; Mischen and Jackson, 2008).

Piening and Salge (2014) discuss that such arguments do relate to an organisation's ability to be innovative based on existing knowledge or different configurations of existing knowledge, furthermore, allowing an organisation to extend its existing knowledge base by utilising existing knowledge effectively (Kogut and Zander, 1992). Within this context, EKA could further enrich an organisation's knowledge base by applying externally acquired knowledge against existing knowledge assets (Piening and Salge 2014) using mutually viable external relationships. This approach could help to remove barriers and constraints applied by rigid systematic processes (Cassiman and Veugelers, 2006; Hagedoorn and Duysters, 2002). This research considers this further by considering the impact of KE based on externally acquired knowledge beyond the traditional boundary. Additional barriers need to be considered from the perspective of how this knowledge can

be consumed from both the capability to enrich existing knowledge and generate new knowledge assets, but also to be able to stand as a separate knowledge asset.

So far, this review has highlighted a transition from the traditional understanding of knowledge is power to an understanding where the ability to share knowledge could be significantly effective. Furthermore, considering a flexible culture that enables knowledge workers on their capabilities for working with the knowledge assets (Dalkir, 2017). This could further be defined to suggest that sharing enriched knowledge to others beyond the original source-recipient relationship also continues to offer more value than knowledge sharing and begins to define what is discussed here as a knowledge framework solution.

Various researchers also discuss that there has been a significant lack of research in the areas of knowledge sharing and its impacts on both the process and innovation (Piening and Salge, 2014; Keupp *et al.*, 2012: Salge *et al.*, 2012).

A gap in the literature appears to reflect that although consideration is given to "knowledge sharing" and also "team work", they are independent activities. Also, it is concluded from the literature that "intra-organisational teams" are not well covered within this context. Further research would be needed to consider the required relationships between teams, intra-organisational teams and knowledge sharing capabilities to address this gap. This study will investigate these scenarios as part of the analysis in chapter 4.

2.4.6 Knowledge Flexibility

PIF (Product Innovation Flexibility) can be defined as an organisation's ability to adapt to and modify processes to align with ongoing organisational changes (Singh and Sushil, 2004; Zhang *et al.*, 2002). Inevitably, this impacts knowledge currently stored as an asset against an existing product. Change is fundamental to product innovation (Liao and Marsillac, 2015). This research considers whether in addition to the fundamental impact on innovation via external knowledge, are the impacts for non-innovation processes. Not all organisational processes are the consequence of an innovative need. I.e. wholesale re-distribution vs manufacturing processes.

Innovation is also defined as an intentional process having a direct impact upon the decision-making process. An organisation's requirement to technically evolve to manage slowly moving dimensions in organisational activities processes which allow flexibility and can be applied when pro-actively as required (Singh and Sushil, 2004; Smith, 2007). Therefore, it is concluded that innovation capability should be considered as a potential impact on an effective knowledge framework. PIF and EKA be an approach to not only enhance the innovation processes but to also enrich existing processes of knowledge

partners that do not directly impact the innovation processes. Alternatively, those products or services which are being re-distributed with no relationship or association to an organisation's internal PIF process.

The availability of product innovation appears to not be as relevant within organisational environments which focus more directly on distribution and external partners as opposed to full manufacturing environments. However, because of the direct influence it has of the knowledge asset, it is worth considering as a potential dependent variable.

EKA is a mechanism for pro-actively seeking external sources of knowledge and applying processes to support this requirement. Where possible, this requires working with external partners or providers but not at the exclusion of disparate sources. This approach offers an organisation a view of external impacts or knowledge availability and can add value to an organisation's existing knowledge environment (Liao and Marsillac, 2015). KE and knowledge availability aids an organisation in securing its position in the marketplace. This being possible by utilising knowledge to implement mechanisms such as, forecasting and predictive analytics to help with ongoing change requirements (Carlo, Lyytinen and Rose, 2012; Yli-Renko, Autio and Sapienza, 2001). By utilising EKA, an organisation could identify issues more effectively and furthermore, highlight potential solutions more creatively. This is of benefit for autonomous organisations that change rapidly and require a rapid solution for process innovation (Liao and Marsillac, 2015).

Existing literature has become more prevalent for supply chain flexibility, particularly from the perspective of the "customer" but also the impact being felt across organisational networks (Stevenson and Spring, 2007; Vickery *et al.*, 1999). Innovation management research highlights flexibility within supply chain processes and the success of an organisation, this being due to an organisation's ability to innovate (Lee at al., 2011). Although this study is focussed upon KM processes, the literature review has often returned previous studies for supply chain due to the reliance of transfer mechanisms i.e. the transfer of knowledge through an organisation as opposed to a physical product. The network perspective considers the impact across organisational boundaries, as does the needs of EKA, the primary focus being on having sufficient flexibility for an organisation to remain competitive (Duclos *et al.*, 2003; Lummus *et al.*, 2003). Supply chain dynamics are a key factor in the effective processing of cross boundary knowledge. Evidence is provided by Oh *et al.* (2013) and Ivanov *et al.* (2010) that a supply chain network structure can enable physical asset flows across a supply chain. (Jung *et al.*, 2013) also however identify that further research is required to allow for more diverse strategies within different environments to further this research. This study considers the impact of a knowledge asset requiring similar treatment to a physical asset but with the need for enrichment.

For this thesis, the researcher proposes that the need to understand the impact of the physical material flow and changes to existing knowledge assets. This proposes a potential impact upon external knowledge acquisition and an organisation's ability to introduce an effective framework. This is an area of consideration to investigate in much deeper detail, to consider potential barriers and impacts. The effect on the KE requirements, based on the selection criteria for the consumption of knowledge. The size of the selection pool and how these impacts physical material flows for an organisation and how this directly impacts a) technical factors, b) social factors, c) political factors as part of organisations existing capabilities to absorb this effectively.

2.4.7 Organisational Structure Impact on Knowledge Sharing

Creed and Miles (1996) argue that having a rigid hierarchical structure within an organisation limits the employee's ability to share knowledge dynamically. Furthermore, it is argued that building flexibility into organisational structures would aid in collaborative efforts within an organisation (O'Dell and Grayson, 1998). However, the literature falls short of considering this flexibility across the typical organisational boundary.

Nonaka and Takeuchi (1995) re-enforced the importance of flexibility but also ensuring that the formal hierarchical structure is maintained. Chen and Huang (2007) confirm that a centralised hierarchy with coordinated formalised processes combined, are not as effective for KS than those which operate in a decentralised environment and are more flexible in nature. The predominant reason for considering the first approach is its cost-effective application, however, this is significantly limiting and reduces the opportunity for flexibility (Lam, 2000), this is significant when considering the disparate potential of externally acquired knowledge.

Al Saifi (2015) argues that in organisations which adopt centralisation, knowledge workers are less effective, and collaboration is diminished. Furthermore, they is suggested that knowledge workers creativity and empowerment are reduced, potentially reducing enrichment opportunities using their own experience. Furthermore, Pertusa-Ortega *et al.* (2010) argue that employees with empowerment will encourage the use of new knowledge. From this, it is suggested that participation within a centralised structure would have a negative impact on knowledge creativity.

2.4.8 Process Innovation

Process innovation is now seen as becoming more and more crucial to the organisation, particularly from the perspective of KM and supporting the organisations supply chain

capabilities and other organisation critical processes (Keupp et. al., 2012; Reichstein and Salter, 2006; Hatch and Mowery, 1998).

As such, independent contributions that when combined, contribute towards more significant performance outcomes, instead of being independent end goals (Crossan and Apaydin, 2010; He and Wong, 2004). An organisation's capability to modify or enhance existing processes through technological and administrative innovations is of value in rapidly changing environments where both commercial advantage and market position deteriorate quickly due to the rapid transition of available technology needs, evolving market places, developing customer environments and legal/regulatory processes (Damanpour, *et al.*, 2009; Teece *et al.*, 1997). Any theoretical framework for KM needs to consider the ability to adapt to new and innovative processes. Knowledge and the source of knowledge will inevitably need to adapt to support new products or services over time. The scope to which this needs to be, will be considered during the data collection and analysis process.

Previous research has shown that process innovation has not received as much theoretical, and empirical coverage, though there is widespread agreement of the economic value associated (Crossan and Apaydin, 2010; Macher and Mowery, 2009; Reichstein and Salter, 2006; Adams *et al.*, 2006). Therefore, the current understanding of effects upon process innovation from elements such as antecedents and contingencies remains limited (Piening and Salge 2014). One gap within the extant literature relates to the lack of visibility into the organisational and managerial activities through which an organisation introduces processes innovations (Keupp *et al.*, 2012; Woiceshyn and Daellenbach, 2005). These gaps will be used for further analysis in the development of a suitable framework.

Previous research has highlighted that there is still very little literature that considers the intra-firm differences for internal process innovations and the potential impacts on an organisation's performance (Keupp *et al.*, 2012; Woiceshyn and Daellenbach, 2005). This is also a topic discussed previously for knowledge acquisition Al Saifi (2015). A requirement that would benefit from further investigation. In addition, the "scope" of what needs to be considered for the ability to consume knowledge from "open sources", or knowledge where no partner relationship exists is a crucial factor in the data collection process. Therefore, this ability could outweigh the need to build intra-firm relationships. However, this could be dependent upon the original source of knowledge i.e. external to the existing knowledge boundary or from an open or known provider.

Crossan and Apaydin (2010) discuss that many opportunities have been missed by not considering further investigation into understanding this underlying relationship and the key factors associated with it. Although cost and value are predominant within most organisations, this study does not consider profitability as a defining dependent variable, this will be given consideration as part of this research. Potentially, profit could influence an organisation's motivation to invest in knowledge as an asset but to what level? In addition, does this impact the ability to develop an effective framework?

Understanding the mechanisms and contingencies (e.g., environmental turbulence) of these relationships is fundamentally important, both practically and theoretically. The ability to adapt an organisation's processes to comply with the needs of the market place but also to consume external knowledge is seen to be beneficial to an organisation's performance (Keupp *et al.*, 2012; Crossan and Apaydin, 2010).

Previous literature has provided some evidence that process innovations do in fact affect fiscal performance positively (Baer and Frese, 2003; Klomp and Van Leeuwen, 2001; Ettlie and Reza, 1992). As discussed previously, although this is not seen as a defining enabler, organisational performance could potentially be used to convince an organisation to adopt process innovation mechanisms. He and Wong (2004) suggested in their work that an organisation's process innovation capability but utilising new or enhanced processes via flexible process innovation methods was shown to have a positive fiscal effect for the organisation. Dehning, Richardson and Zmud (2007) offered a possible explanation for this behaviour highlighting that enhanced cost reducing applications could potentially be used to a) increase commercial viability or b) transfer of savings to the customer. Conversely, other researchers argue that when process innovation offers mutual viability, this can re-enforce relationships and enhance organisational processes such as fiscal performance and process innovation activities (Crossan and Apaydin, 2010) and potentially having a positive effect.

There is still a lack of clarity within the literature of which antecedents, determinants, independent and dependent variables contribute to an effective process innovation framework, particularly from the perspective of EKA.

Product innovation explicitly refers to an organisation's ability to develop new products or processes, however, process innovation refers the way in which an organisation delivers upon these products and services and the mechanisms required to support the organisation (Piening and Salge, 2014). The primary focus of process innovation is to enhance the value and proficiency of the processes of an organisation. Process innovations generally are characterised by an organisational emphasis (Damanpour *et al.*,

2009; Ettlie and Reza, 1992). Previous literature has highlighted that their many potential benefits available. These benefits include cost and time savings, quality enhancements, increases in productivity and possible turnover growth (He and Wong, 2004; Baer and Frese, 2003; Edmondson *et al.*, 2001; Klomp and Van Leeuwen, 2001). Furthermore, there is a clear gap in the literature where process innovation within a firm significantly outweighs product innovation within smaller scale manufacturing environments where product innovation is not seen as the predominant key organisational driver, but process innovation based on external products and services provision within a distribution process is the primary driver. The primary consideration here is that process innovation would appear to have an indirect impact upon knowledge movement. By the very nature of knowledge acquisition and enrichment, it is a fluid concept and a certain level of flexibility would be required for it to be effective. This thesis considers what level of innovation flexibility is required to propose an effective framework.

Crossan and Apaydin (2010) suggest that innovations in process creation are incremental however, previous literature argues that organisations have issues realising any benefits of processes newly integrated (McNulty and Ferlie, 2004; Edmonson *et al.*, 2001). Klein and Sorra (1996) discussed that such problems can be attributed either to the ineffectiveness of an innovation itself or to the inability of an organisation to use the innovation in a consistent and effective manner. Consideration needs to be given to the "purpose" of the innovation requirement. From the context of this study, it would be to advance the development of transfer of knowledge to digital assets.

Piening and Salge (2014) discusses the various attempts to explain variance in an organisation's ability to implement process innovations effectively. Furthermore, previous literature has identified a number of factors at different levels, hierarchically, they can be defined as the individual, teams, and organisational) which promote of stifle innovation. The literature goes on to identify many factors including access to fiscal resources (Klein, Conn and Sorra, 2001); knowledge workers ability, motivation, and commitment (Cooper and Zmud, 1990); organisational hierarchy (Douglas and Judge, 2001) and organisational climate (Choi and Chang, 2009); as well as firms' R&D activities (Pisano, 1994) were all found to influence the success of process innovation strategies.

This leads to the conclusion that investigation into multi-level factors impacting innovation need to be understood. Then a clear definition of how these factors add value to the scope process innovation be addressed i.e. which determinants and mediators should be considered.

Notwithstanding certain exceptions, the existing literature leans towards examining separate process innovation activities (i.e. EKA, KM etc.) in silos, this disparate approach does not consider the broader requirement that knowledge as an asset requires and therefore, does not offer a solution for the application of flexible processes to address this need (Hagedoorn and Wang, 2012; Schmiedeberg, 2008). Fiss (2011) suggested a fuzzy approach to try and identify which innovation activities offer the best chance of innovation success. Changing focus to an explicit set of activities may offer a stronger approach to defining new processes. Comparable observations have also been discussed in extant research considering a broader scope to capture such requirements, furthermore, considering an autonomous approach to external KP and how not to be rigid in the selection process (restricting numbers of providers) (Salge *et al.*, 2012; Laursen and Salter, 2006).

Therefore, this research needs to consider the requirement for which of the antecedents, contingencies and performance affect KM processes, specifically relating to EKA. This ability to offer a level of flexibility to a knowledge consumption framework could allow for a solution that would offer a level of dynamicity.

2.5 The Physical Organisation

Previous studies have emphasised KM in a cross-cultural business context (Nazari *et al.*, 2011; Liu and Fellows, 2008). However, previous literature has not considered the relationship between organisational culture and KM processes and furthermore, their impact upon organisational performance (Al Saifi, 2015). This further strengthens the approach taken for this study where the proposed knowledge framework is separated and treat as an independent entity, specifically with the intention of minimising the impact of other organisational functions against knowledge. This research topic considers which of the cultural factors impacting knowledge acquisition beyond the typical organisational boundary and which capabilities are affected by organisational culture? These include, organisational innovation, process innovation, organisational performance, organisational structure and knowledge relationships. Any combination of these factors can be used to deliver a knowledge framework but the review of the literature in this section should identify which are most pertinent to this study.

The introduction of more advance technology has seen a growth in the ownership of intellectual property. Intellectual property is now recognised as a valid asset within an organisation and furthermore, has a practical cost association in the creation and maintenance of such assets (Lange, 2006). Al Saifi (2015) discusses the value of knowledge assets and the potential for competitive advantage for organisations who can adopt mechanism for harnessing such knowledge, in addition to the rapid growth in acceptance of the value of knowledge assets. As the world economy becomes more global in nature, knowledge plays a more crucial part in an organisation's success. Particularly for multi-national organisations and those passing goods or services into different territories. Therefore, an organisation's requirement to be able to absorb and manage knowledge across the typical organisational boundary becomes more crucial (Burstein *et al.*, 2002).

Al Saifi (2015) discusses that organisation culture is crucial to an organisation's ability to have effective KM. Furthermore, they discuss the need to have a strategic direction which not only incorporates an organisation's culture but does so in a way that puts KM at its heart.

2.5.1 Organisational Culture Definition

Alavi *et al.* (2006) argued that knowledge-based processes are affected significantly by social environments, and as such Morgan (2006) suggest that this can apply a significant influence upon knowledge workers within the organisation. This lack of consistency may arise historically because organisational culture is a complex combination of factors based

upon the needs of individual organisations. (Cameron and Quinn, 1999). Furthermore, it is suggested that the open-ended nature of organisational culture means that there have been many definitions of organisational culture and its impact (Alavi *et al.*, 2006). Robbin (2004) re-enforces this understanding by discussing these difficulties and how they are affected by values, behaviour, practices and general meaning which are common between an organisation's human resources (Robbin, 2004). Because of this "broad definition" pertaining to organisation culture, Alavi *et al.* (2006) argued that it was by its very nature self-contained inclusive.

Morgan (2006) discussed that organisational culture itself could be defined in on one of two different ways 1) anthropological and 2) sociological. Anthropological refers to an organisation having a culture and sociological defines that on organisation is a culture. This study will be considering external relationships with KP; therefore, it will need to consider how this culture affects the organisation and what may overlap across the organisational boundary. However, Morgan (2006) does consider that organisational culture is often shaped by external resources entering the organisation who bring their own cultural understandings with them. This would therefore determine that culture to some respect appears dynamic in nature and therefore requires the appropriate mechanisms to support these slowly moving dimensions. Cameron and Quinn (1999) re-enforce this understanding by supporting that organisation culture will improve and adapt over time. Doing so by adjusting key elements of the organisational structure to accommodate the needs of the organisation. There could be an argument that not all changes have a positive effect however, but based on this definition, changes could be reversed to correct a negative effect.

Organisational culture can be defined as the organisational configuration used to embed a practical KM solution. Cavaliere and Lombardi (2015) discussed that organisational culture is critical for an organisation's ability to foster a KM environment. Their findings suggest that a top down approach to KM could aid in a successful application and predominantly focused upon configurations of cultural dependencies directly influences KM. Al Saifi (2015) discussed that although there is extant literature on organisational culture, the term organisational culture itself is not well defined. Furthermore, in Al Saifi's (2015) paper, he reviewed comprehensively this lack of consistency and considered options for creating a solution. Therefore, this lack of consistency needs to be addressed as part of this study. Particularly from the perspective of cultural antecedents directly affecting the ability to apply knowledge management within as inter-organisational framework.

Given that the previous literature has shown that knowledge itself has the potential to be fluid in nature, further analysis needs to determine: does the potential impact on the fluidity of organisational culture impact the fluidity of KM processes?

Schein (2004) suggested that organisation culture needs to include three fundamental areas for further investigation. These were artefacts, espoused beliefs and values. Al Saifi (2015) investigated this further and extended the understanding of what these key areas consisted of. Al Saifi (2015) defined these beliefs in Figure 2.10 below:

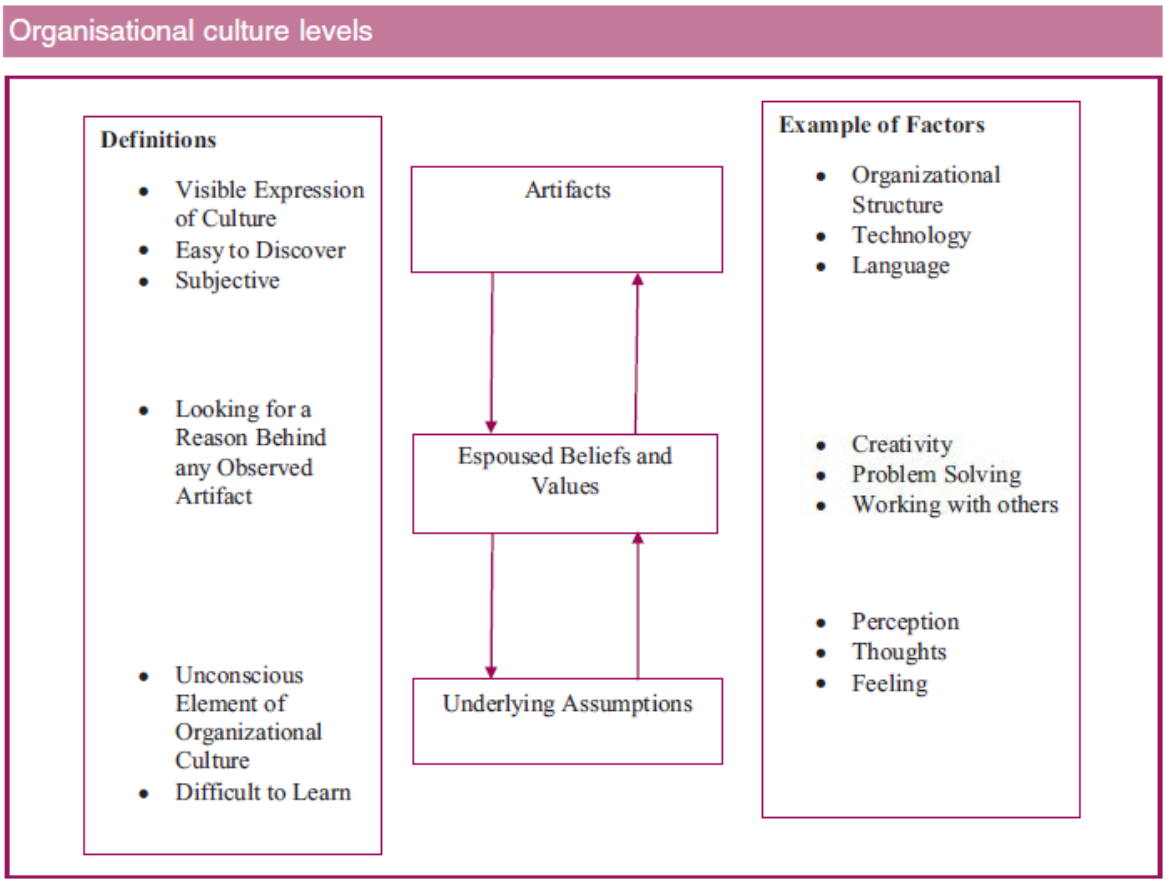

Figure 2.10 Organisational Cultural Levels (Al Saifi, 2015:168)

2.5.1.1 Artefacts

Al Saifi (2015) defined Artefacts as visible expressions of culture. Furthermore, Al Saifi (2015) discusses that artefacts comprise of internal structures including organisational aspects such as structures, dress code, standard operating procedures, organisational practices and communication in conjunction with each other. Al Saifi (2015) defines these artefacts as what collectively define when a new knowledge worker enters the organisational environment (Barrios, 2013). Two key factors for this research are "Organisational Structure" and "Technology". Both of which need to be considered from

not only what is being discussed by Al Saifi (2015) within the traditional organisation boundary, but also consider knowledge acquisition from beyond those boundaries.

2.5.1.2 Espoused Beliefs

Earlier literature (Hibbard, 1998; White, 1998) considered that initial it was values that were most impactful within an organisation's culture. These values being defined as problem solving, creativity, knowledge sharing and working with others. It was later with the work of Hofstede (2001) who suggested that organisational culture was more complex than this. Though values are important to an organisation's culture, it is only one level defining that culture. From this it is concluded that there may be a correlation between the ability to consume knowledge and the capability to enrich this knowledge further. The quality of additional enrichment being defined by the level of flexibility and creativity available to the knowledge worker.

Although Hofstede (2001) discussed the value of "values" within organisational culture, he went on to discuss that in fact this was only of value to the organisation and was not transparent to the knowledge worker. Behaviours from knowledge workers more closely defined the values of the knowledge worker within the organisation rather than the culture itself. For example, Al Saifi (2014) discusses that for an organisation that adopts strong values where knowledge workers can showcase their beliefs, there would be a definite advantage to both the knowledge worker and the organisation. The literature shows here that the type of enrichment given to add value to knowledge appears to be subjective in nature. This subjectivity could potentially apply contextualisation against a knowledge asset as opposed to knowledge being explicit to the knowledge asset. Analysis will need to show that any proposed framework for this research will address this need.

2.5.1.3 Underlying Assumptions

Al Saifi (2015) discussed that underlying assumptions also have an impact upon organisational culture and have an indirect affect. "Underlying assumptions are an unconscious element of organisational culture that comprise elements such as perceptions, thoughts and feelings, and these assumptions are extremely difficult to change" (Schein, 1990:13). Al Saifi (2015:168) has considered this as part of their framework and discuss that these be represented by using "general and abstract statements that express specific ideas and truths about human beings". Although relevant from the perspective of knowledge learning, this is beyond the scope of this research but does reflect the subjective nature of the issue.

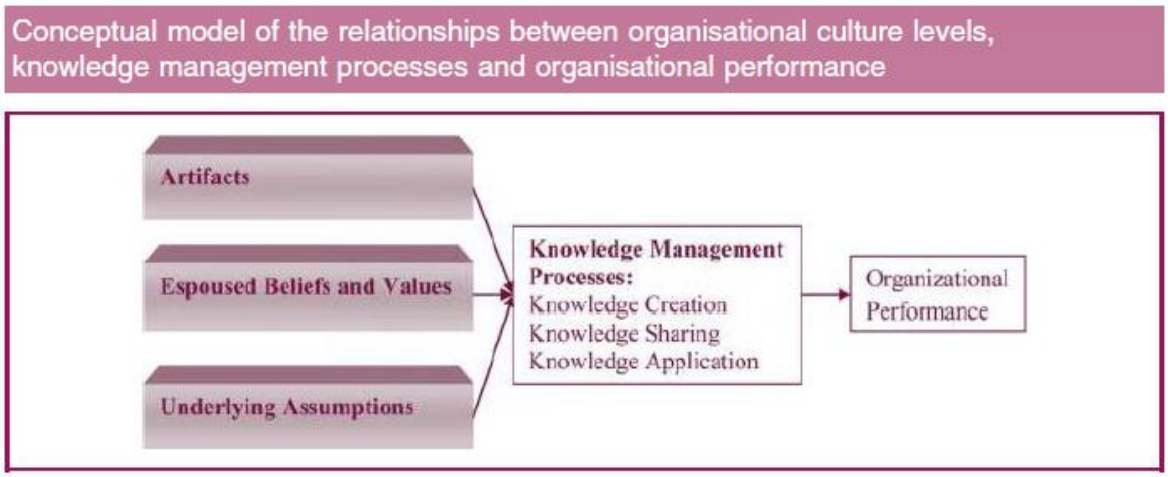

Figure 2.11 Conceptual model of the relationships between organisational culture levels, KM processes and organisational performance (Source: Al Saifi, 2015:169)

Al Saifi's (2015) model offers an approach to address the needs of the cultural components of the process innovation concept. This is limited however to within the typical organisational boundary. However, some of these concepts are still relevant as there is still a need to consider the creation, sharing and re-distribution of knowledge. This needs to be embedded as part of a more relevant model, to consider external knowledge and the effects beyond the typical organisational barrier i.e. third-party relationships. Furthermore, the lack of relationships but the need to acquire knowledge and consume it enrich further and re-distribute it. The concept of artefacts, espoused beliefs and underlying assumptions are still relevant but how relevant needs to be determined.

2.5.2 Knowledge Economy

The knowledge economy is how knowledge is transferred from humans into tangible or intangible assets. Furthermore, incorporating such assets into an organisation's technical solutions or knowledge base(s) for the advancement of the organisation. The term Knowledge Economy was originally penned by Drucker in (1969) and since has been used to define various methods of KM capabilities typically related to human capital. There has been little previous research on the application of the knowledge economy functioning as an independent framework, but previous literature has tried to align it against the supply chain as a mechanism for strengthening it. Extant literature has discussed that flexibility is required to cope with turmoil and unexpected changes in a competitive environment, thus providing a strategic advantage by converting change into opportunities through accumulating knowledge assets, and relationships with rapidity (Yang, 2014; Ralston *et al.*, 2013; Ngai *et al.*, 2011).

Guthrie (2001) discussed that since the popularity of the knowledge economy has grown significantly. This has had the effect of reducing the significance of tangible resources ad seen an increase in the investment in knowledge as intellectual capital, not without significant value (Guthrie, 2001). This shows the relevance of knowledge from the perspective of the supply chain. However, it does not show an explicit correlation between knowledge, supply chain and assets. This further re-enforces that analysis of the problem area considers that the "knowledge asset" be detached from legacy processes.

Asad and Muhammad Imran (2013) discussed the importance of having an organisational environment that can support an effective knowledge economy. The application of knowledge within an organisation being fundamentally important and, in many cases, reliant upon technological capabilities and the ability to apply knowledge assets as required. Furthermore, Asad and Muhammad Imran (2013) identify three key factors which create issues: 1) Growth in the knowledge economy, 2) Business globalisation and 3) the requirement of increased diversity in human resource.

Extant literature considers that an organisation should conduct R&D internally to some degree. Especially if they are going to choose third-party partners to work in partnership. This correlates with findings consistent with Cohen and Levinthal's (1990) idea of AC. Whereby they discuss an organisation's capability to gain value from externally acquired knowledge. They further discuss that this is a predominant requirement of knowledge gained through internal R&D. While consistent from an R and D approach, this notion does not consider externally acquired knowledge and the need to enrich further. Therefore, this research will consider the need for AC as a component of the initial EKA capability as part of the early stages of knowledge consumption and the relationship to existing organisational knowledge.

Conversely, other previous research has highlighted the different obstacle to overcome. Including dealing with associated costs generated through dynamic environments parallel activities to simultaneously uncover potential substitution effects for i.e. internal development processes and EKA (De Marchi, 2012; Ebersberger and Herstad, 2011; Laursen and Salter, 2006). Furthermore, Hess and Rothaermel (2011) identified that potential substitutes in process innovation exist due to focussed efforts on the same areas of organisational processes, this in turn leading to inevitable redundancies in knowledge acquisition. This approach is very domain specific and considers only part of the value chain. It is expected that a certain level of redundancy or substitution would be acceptable to accommodate a broader knowledge base. This aligns with previous literature on espoused beliefs and values and the level of creativity or flexibility required to deliver an effective framework. For example, the approach to consuming and enriching

knowledge should not be affected by the existence of redundant knowledge. A process should exist whereby redundant knowledge is separated from rich knowledge, managed as a separate entity. Perhaps archived and used for future enrichment activities.

2.5.3 Organisational Performance

Organisational performance is defined by Hamon (2003) as a measurement of an organisation's ability to achieve their targets. Although organisational performance will inevitably be a defining factor for advancement for strategic decision making, it does not necessarily define the quality of knowledge stored as an asset. Robbins and Coulter (2002) discuss that "objective accomplishment" can be used as a way of defining the effectiveness of an organisation. Previous literature has identified many different definitions for organisational performance. Deshpande *et al.* (1993) and Perera *et al.* (2011) define organisational performance as: an organisation's ability to use global targets aligned with those of partners of competitors that can be measured to show impact. These targets may include commercial viability, profitability, growth rate, organisation size and share price indicators etc. Although organisational performance is a key indicator for any successful organisation this specific indicator is beyond the scope of these research objectives. It is useful to show this has been considered because many organisations apply processes or technology based on return on investment. However, there could be an argument that return on investment from an organisational perspective does not necessarily mean that a knowledge framework is not effective but rather, not profitable. Profit does not drive all organisations therefore; this information is retained here to highlight this distinction.

2.5.4 Organisational Innovation

Organisational innovation is an organisation's ability to implement new methods to aid business practices and ensure the functional capacity of the organisation. Al Saifi (2015) discussed that within the context of the organisation, organisational performance has an in-direct impact because innovation is typically driven by organisational performance. Therefore, an organisation adapts or creates processes as required to support their operational needs (Zahra *et al.*, 2006; He and Wong and Aspinwall, 2004). Although this clearly reflects the term value from the perspective of the organisation. The term itself is subjective in nature and from the context of this study, value is defined by the quality of knowledge available for knowledge assets as opposed to organisational performance from a fiscal perspective. Al Saifi (2015) further discussed the impact of dynamic capabilities (DC) from the perspective of EKA and suggested that the usefulness of such mechanisms is extremely useful within turbulent environments. Furthermore, Al Saifi (2015) re-

enforces this by highlighting previous literature which characterised organisations that have been affected such turbulent environments, more specifically autonomous organisations with rapidly changing environments, such as rapid technology enhancements or continuously changing product lines (Pavlou and El Sawy, 2011; Teece, 2007). Furthermore, (Helfat and Winter, 2011; Zahra *et al.*, 2006) discuss that any gains, potential or otherwise is more likely to be prevalent in high velocity markets. The electrical wholesale environment is one such market and is extremely volatile and fast moving, although due to the varied sub-domains it is easier to consider the technological and competitiveness as opposed to financial performance for shared knowledge assets to the disparate environment.

Previous literature highlights technological environments and market turbulence significantly highlight the value in reconfiguring organisational processes to meet ever changing demands. i.e. rapid changes in technologies or customer requirements that make existing products or services obsolete, therefore promoting the need for an organisation to make changes to its existing processes. Similarly, enhancements in the production and sharing processes of existing products or services are crucial to allow an organisation to be able to respond to market changes such as new market entries, growth and decline of demand, and price adjustments by competitors (Jansen, Van den Bosch and Volberda, 2006; Jaworski and Kohli, 1993).

From this it is concluded that organisational innovation could have an impact upon process innovation and KM directly. Building processes that consider these relationships and the effects of changes within the flow of knowledge could offer a more robust but flexible framework.

2.5.5 Absorptive Capacity

Absorptive Capacity (AC) of future oriented knowledge as a dynamic capability (DC) is a crucial competitiveness factor of the individual actors and innovation networks (Uotila, Harmaakorpi and Melkas, 2006). Soo *et al.* (2017:431) suggested "the importance of human capital as a key contributing factor to organizational learning and performance has been widely examined". In addition to human capital, "technology foresight has received growing attention among those involved in the shaping and implementation of Science and Technology (S&T) policies" (Salmenkaita and Salo, 2004:897). The concept of AC was originally defined as an organisation's ability to recognise "the value of new information, assimilate it, and apply it to commercial ends" (Cohen and Levinthal, 1990:128). The focus of the Cohen and Levinthal model was predominantly based around the concept of R&D functions being central to the role that Absorptive Capacities plays

within the organisation. This definition includes many important key elements. The multi-dimensional nature of the concept, which involves three key factors in relation to new knowledge: a) the ability to understand its value; b) the ability to integrate it and c) the ability to apply it. Furthermore, the relationship between an organisation's absorptive capacity and its existing knowledge base, including knowledge worker skills and a common understanding (Vega-Urado *et al.*, 2008). In an analytical model used within their research, previous authors use AC as a theoretical tool to define incentives for R&D investment, but do not establish a method of measurement. Furthermore, no empirical study of the impact of the factors that they defined as determinants of AC was conducted (Vega-Urado *et al.*, 2008). Further investigation within the data analysis section will determine what would be the most effective capabilities. For example, the importance of knowledge consumed externally, capabilities include: consumption of disparate data or knowledge, third-party relationships, ontological and taxonomical structures and technical capabilities.

Since Cohen and Leventhal's (1990) seminal work, there have been many studies, both empirical and theoretical exploring the concept of AC using different contexts to try and identify analytical tools or strategies for measurement (Newey and Shulman, 2004). The predominant strategies are those presented by Van den Bosh *et al.* (1999) and Zahra and George (2002). The primary focus of these framework strategies is to make the organisation central to the framework and using this as the principal success factor. As has been discussed previously however, previous literature suggests that centralisation has a negative impact on process innovation and creativity.

Other frameworks have been developed which extend or consider AC using a different approach to Teece (2009). Zahra and George (2002:196) suggest one such framework which looks at AC from a segmented approach and states "a set of organisational routines and processes by which firms acquire, assimilate, transforms and exploit knowledge to produce a dynamic organisational capability." Furthermore, Zahra and George (2002) discuss their approach allowing for multiple elements within two specific capacities:

1) Potential Absorptive Capacity, this first capacity focusing upon two primary elements. The first being knowledge acquisition and how knowledge is captured and what should be captured. Then secondly, how an organisation disseminates and works with its knowledge using its internal routines and processes.

2) Realised Absorptive Capacity, an organisation's ability to adapt existing or create new processes that either a) utilise existing knowledge or b) consume new knowledge

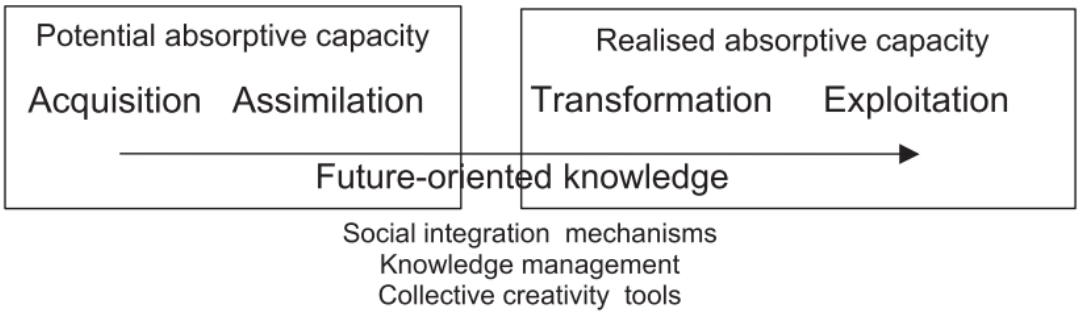

Figure 2.12 Absorptive Capacity of future-oriented knowledge in innovation processes (Zahra and George, 2002)

This framework more closely reflects the requirements of this research whereby the process of acquisition through to exploitation could be a) the independent variables as a basis for the creation of a b) DC as a dependent variable of c) the process innovation activity.

Van den Bosch *et al.*'s (1999) Thesis on the "Coevolution of Firm Absorptive Capacity and Knowledge Environment" looked to extend Cohen and Leventhal's work further by developing a more integrated framework with a focus on a given firms path-dependent AC and the knowledge environment. Their work focused on addressing three existing research questions that were not mutually exclusive from each other. These research questions were:

"What does an organisation define as the important determinants of absorptive capacity?"

"How does absorptive capacity impact knowledge management?"

"How can an organisation's requirement for absorptive capacity be strategically applied and aligned with the needs of KM?"

An organisation's ability to be able to adapt flexibly towards processes and knowledge acquisition is crucial if a framework is to be established that can be effective against large volumes of changing knowledge and knowledge sources. The three questions above are important to establish an individual organisation's ability to understand the independent components comprised with a knowledge framework to make it effective.

Furthermore, it is discussed that the requirement to reconfigure existing knowledge components periodically based on the distinctions by Henderson and Clark (1990) between four types of innovations: 1. Incremental, 2. Modular, 3. Architectural and 4.

Radical Innovation. Henderson and Clark further identified that “The essence of an architectural innovation is the reconfiguration of an established system to link together components in a new way.” (Henderson and Clark, 1990). To explain their approach, they created the following diagram as a general context:

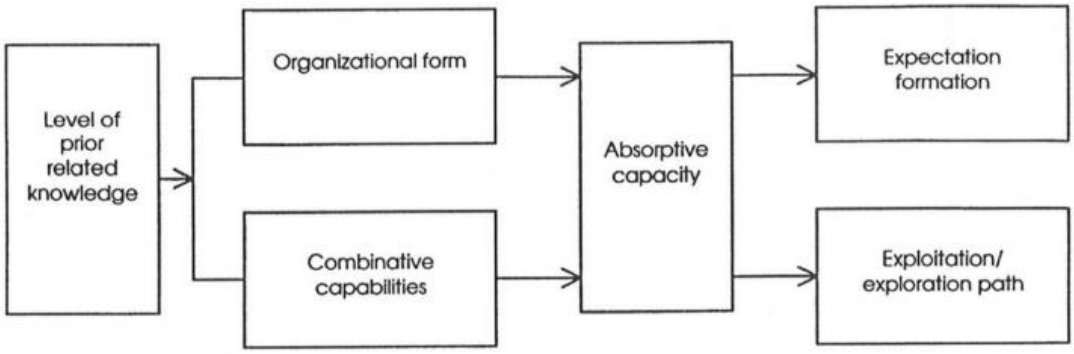

Figure 2.13 Building Blocks of the Framework: Determinants of Absorptive Capacity and Expectation Formulation (Van den Bosch et al., 1990)

Kim (1998) argues that AC requires learning capability and develops problem solving skills; learning capability, again, is the capacity to absorb knowledge for innovation. (Uotila, Harmaakorpi and Melkas, 2006).

Based on the factors taken from the literature above and what is covered for DC, questions need to be derived that consider AC as an independent variable. Furthermore, would DC become dependent variables within the construction of an effective framework. Proposing such a flexible framework requires components and processes that allow for the effective consideration of artefacts and espoused beliefs.

2.5.6 Dynamic Capability

Dynamic capabilities (DC) are defined as an organisation’s ability to build mechanisms to re-configure, create, and integrate competences to meet the needs of autonomous environments (Teece *et al.*, 1997). Braganza *et al.* (2017:329) discuss “The growth of internal databases to capture customer information and access to external data from web based sources provides organisations with unprecedented opportunities to develop innovative and tailored offerings to customers and other stakeholders.” They are an organisation’s ability to best utilise its resources to not only remain with a competitive advantage but also to ensure that the organisation is capable of sustainable stability, particularly within difficult periods. It was most notably defined by Teece *et al.* (1997) as an organisation’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. DC allow the firm to reconfigure its set of practices to adapt them to environmental changes (Teece *et al.*, 1997; Zott,

2003; Teece, 2007). Organisational capabilities are created or renewed through the influence of different DC (Winter, 2003; Zollo and Winter, 2002).

DC are built upon the concept of Organisational Capabilities, an organisation's ability to manage people and resources to gain competitive advantage. DC go further by extending with resources external to the organisation as well as harnessing internal resource capabilities. DC form the core of an organisation's DNA and research has established the strong link between these capabilities and the organisation's performance (Winter, 2003; Makadok, 2002; Peteraf, 1993; Barney, 1987; Wernerfelt, 1984). It is this factor, which makes DC of interest, the focus upon cross boundary relationships. Which in turn poses the question, could DC offer value within the context of external knowledge acquisition?

Teese (2009:48) noted that technical change itself is systematic in that multiple inventions must be combined to create products and/or services that address the customer needs. Teece (2007) discussed three principles of effectively developing DC: Sensing, Seizing and Transforming. Figure 2.14 below shows the selected micro foundations of each of these three principles.

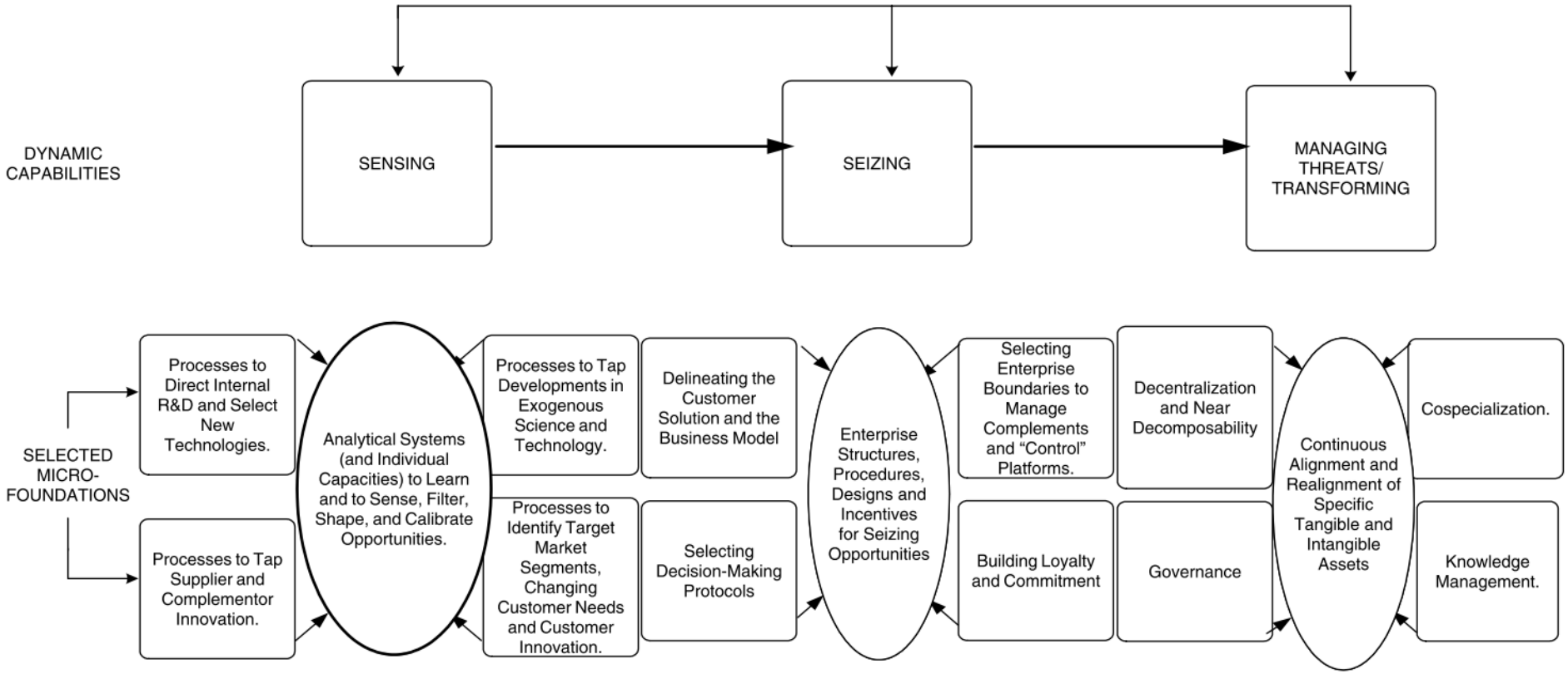

Figure 2.14. Foundations of dynamic capabilities and business performance (Teese, 2009:49)

2.5.6.1 Sensing

Figure 2.14 identifies many key elements which make up the sensing micro-foundation. The specific areas of interest from the perspective of knowledge acquisition are the processes affecting supplier innovation. This approach could offer value in the external knowledge acquisition process. Braganza *et al.* (2017:330) conclude “high velocity markets are characterized by non-linear and unpredictable change. In such markets, existing knowledge is less relevant, and the challenge is to create innovative, situation specific knowledge”.

2.5.6.2 Seizing

Opportunities for taking advantage of new capabilities development and strategic planning Teese (2009:17). Which opportunities from the perspective of this study are established within Chapter 4 as part of the data analysis. This is coupled with the decision of “when” and “how” to invest in such capabilities and strategic approach. For the “When”, there may be a financial advantage to wait until other organisations have begun to form strategies and shape the environment. Teese (2009) goes on to discuss that significant investment early on, is an inevitable part of becoming a market leader within a given domain. One of the stronger elements of this study being addressed is the mis-use of knowledge workers to the detriment of effective KM. This study will look at the positioning of knowledge worker resources and their impacts.

2.5.6.3 Transforming

Teece (2007:1319), explained that transforming is “to maintain competitiveness through enhancing, combining, protecting and, when necessary, reconfiguring the business enterprises intangible and tangible assets”. Teese (2009) went further by discussing the potential for applying absorptive capacity as a mechanism by considering skills, organisational structure and processes to derive value from intangible assets for the benefit of the consumer. This transforming however is predominantly focussed upon internal opportunities and is not tightly coupled with the requirement for EKA. This is quite broad from the perspective of what is trying to be achieved with this study. In fact, where Figure 2.14 shows that managing threats and the impact of KM itself is addressed at the latter stages. This study will consider the KM life cycle to be a far more embedded process of the organisation. This coupled with the argument above relating to the relevance of the knowledge worker within the overall process will be analysed in Chapter 4.

Transforming also considers the physical hierarchy of resources and favours a de-centralised approach (Teese 2009:48). Previous research has shown that decentralisation along product or market lines with independent profit centre led to performance in many industries, at least during those in which these organisational innovations were diffusing (Amour and Teece, 1978; Teece, 1981). Other extant research suggested that even further decentralisation and decomposition in large organisations might be beneficial (Bartlett and Ghoshal, 1993). This study analyses this factor during Chapter 4, as early discussions with knowledge workers during the research question-setting phase suggested that this would be converse to what the study organisation expects to see as an effective outcome.

Using Teese's (2009) approach of DC, for knowledge acquisition purposes, this study investigates how this approach can be extended beyond the organisational boundary. Although this approach is relevant for the initial acquisition phase of the knowledge life cycle, additional capability would be required to consider the cyclic process of knowledge collection. Technological advances in databases has resulted in greater capability to capture data and information, providing organisations with unparalleled development opportunities; leading to additional knowledge opportunities. Furthermore, this research aims to further extend this proposal, would further de-centralisation offer more flexibility for an effective framework? It could be argued that dynamic capabilities can influence knowledge management because of a) its ability to consider impacts upon the organisation boundary and b) the flexibility required to consume knowledge from ever changing sources.

2.5.7 Dynamic Capabilities and Process Innovation

Given the explicit focus on how an organisation performs innovation activities and reconfigure their operational processes in pursuit of improved effectiveness (Helfat *et al.*, 2007), Piening and Salge (2014) argues that their theoretical framework holds promise for advancing our knowledge of process innovation based on the DC approach.

Piening and Salge (2014) further goes on to identify that more recently, extant literature has begun to investigate innovation-based research by considering the application of DC. DC potentially offering a more flexible approach to knowledge acquisition mechanisms. This is further re-enforced by (Pavlou and El Sawy, 2011; Benner, 2009; Marsh and Stock, 2006) who argue that DC help to contribute to innovation capabilities by adding greater understanding to development of new processes and process innovation.

Helfat and Peteraf (2003) defined that a resource is an "input to production (tangible or intangible) that an organisation owns, controls, or has access to on a semi-permanent

basis". This understanding partially addresses the needs of this study but in addition, a resource could be a disparate source with no obvious ownership. Furthermore, Helfat and Peteraf (2003) define a capability as an organisation's ability to carry out a task or tasks in an organised and structured process whilst utilising organisational resources as inputs to such tasks. Capabilities come in more than one type, Piening and Salge (2014) identified that capabilities could exist as a) operational capabilities and support "keep the shop open" or day to day key processes or b) higher order capabilities. The purpose of such capabilities is to modify the operational processes of an organisation to ensure ongoing improvements. These capabilities offer genuine value to the organisation and help assure market place positioning (Helfat and Winter, 2011; Zahra *et al.*, 2006; Teece *et al.*, 1997). An organisation's ability to modify existing processes or apply new processes as what allows process innovations to be defined as a DC (Macher and Mowery, 2009; Zollo and Winter, 2002). Such capabilities allow for sufficient flexibility to consider this approach as potentially suitable for the EKA section of this study. Existing DC theory recognises the importance of being able to acquire, consume, enrich and distribute knowledge effectively for organisational gain. (Pavlou and El Sawy, 2011; Eisenhardt and Martin, 2000). Therefore, it is assumed from the previous literature that if the organisation considers innovation from the perspective of dynamic flexibility i.e. a broad range of sources, be them disparate or otherwise (Teece, 2007), acquiring external knowledge EKA (Grimpe and Kaiser, 2010), organisational learning (Edmondson *et al.*, 2001) it is likely that the organisation would develop an effective KM environment based on the quality of knowledge vs organisational performance, selecting the relevant espoused beliefs and values.

An organisation's ability to develop and implement process innovations is embedded in various, interrelated activities focused on acquiring, creating, integrating, enriching and disseminating knowledge (Teece, 2007; Zollo and Winter, 2002). From this, the researcher shall consider if it is it feasible to consider a DC approach for the initial external knowledge acquisition process. Furthermore, would this approach offer effective flexibility for a disparate selection of knowledge sources.

2.5.8 Knowledge Relationships

In the awakening of the knowledge society the most strategic resource of the firm, knowledge (Grant, 1996; Nonaka, 1994), is increasingly residing outside the formal boundaries of the single organisation. Collaboration across formal organisational boundaries to secure access to, acquire and leverage vital knowledge is central to the operations of contemporary Organisations (Barringer and Harrison, 2000; Lang, 2004; Powell, 1998).

The level of relationship required for knowledge leverage is also considered from the perspective of organisational culture. Therefore, it is considered as part of the data gathering and analytics to identify the impact of any potential cross-over considerations.

Other researchers have identified that the importance of the relationships is also an important factor, involving key stakeholders an important enabler of inter-organisational knowledge transfers (Kale and Singh, 2000; Powell, 1998; 1999; Uzzi, 1997). According to this approach, organisational members are involved in networks of relations through which knowledge and learning is channelled (Powell, 1998). They also argue that the quality of an organisation members' networks as an important element of an organisation's ability to access and acquire knowledge across firm boundaries. (Werr et. al., 2009). This research falls short of identifying the retention of such relationships during natural evolution of the work force. The relationship management is seen as a barrier to knowledge acquisition and needs to be understood. Furthermore, knowledge retention of the provide relationship capability requires further analysis to define whether it would become a crucial factor in an affective KM framework.

2.6 Knowledge Management Technology

Previous literature has acknowledged that there are only a small number of accepted technological tools to measure the effectiveness of KM (Chong, 2006a, 2006b),

Other researchers have discussed that the "knowledge asset" is the only true way of absorbing measurable knowledge (Gonzalez-Padron *et al.*, 2010; Liu and Lai, 2011; Sullivan, 1998) and the only way to understand if a competitive advantage is being achieved. Therefore, applying a mechanism that organisational KM practices can be applied in the most effective way. The focus of this study is on the processes of KM as opposed to technology as the primary enabler of KM. However, Gaimon, Hora, and Ramachandran (2017) discuss innovations in technology may lead to unique process capabilities that enable a firm to offer new products, services, or business models (technology push) which may remain proprietary and thereby offer long-term competitive advantage." This approach of considering the process as apposed to physical technology aligns in that technology itself does not need to be considered but the driving processes do.

2.6.1 Knowledge Application

Lin and Lee (2005) defined knowledge application as an organisation's ability to process knowledge using technology to store and retrieve knowledge in an efficient and easy manner, simplifying access using technology. An organisation's processes, through which

effective storage and retrieval mechanisms facilitate a firm's easy access to knowledge. This study goes one step further by defining knowledge application as the ability to utilise the knowledge asset beyond the technical environment. i.e. Physical support based on the knowledge asset for the consumer. The process of knowledge application comprises of methods to retrieve and utilise existing knowledge to allow the organisation to a) make effective decisions, b) problem solving, c) develop strategic direction d) align resources and e) enhance productivity (Sagsan, 2006). Although this does not guarantee that value will be gained from such knowledge, it does allow the knowledge worker to access it in a more effective way (Sun and Hao, 2006).

Researchers (Abdul and Shamyla, 2012) argue that the most important element of KM processes is technology. Gold, *et al.* (2001) discussed that for the creation of new knowledge, structural dimensions (such as knowledge hierarchies) are required to enthuse the knowledge worker and technology is an important part of the structural dimensions. The idea of social capital status that "any social matter is supported by associations of relationship by associating all entity for capital owned collectively" (Vandaie, 2007:921).

Big Data Analytics (2017) discuss "The volume and diversity of information acquired by many companies ensure that processing is no easy task. However, it must be categorized appropriately before any meaningful interpretations can be made. Organizations aiming to enhance their decision-making therefore regard effective knowledge management (KM) as critical." "KM technologies represent solutions for execution of KM processes. However, decision making on the choice of technology and the logic behind these decisions have not been precisely documented and widely shared. Therefore, a considerable amount of knowledge is wasted" (Hashemi, Khadivar, and Shamizanjani, 2018). These arguments still depend upon the knowledge based processes to be able to be able to define the logic and is not intelligent technology. Therefore, falls beyond the scope of this study.

Soo *et al.* (2002) argued that technology would enable knowledge workers to work with KM processes more effectively by creating, maintaining and re-distributing knowledge more effectively. Within the researcher's professional environment, historically knowledge is owned by long term employees and consideration to transfer this to digital assets is a critical next step. Although previous research has identified the procurement of knowledge-based solutions to promote such knowledge transfer activities (Vega-Jurado, Gutierrez-Gracia, and Fernandez-de-Luci, 2009), this study only deems this to be a partial solution as processes could be defined by the technology as opposed to technology being crafted to fit the required organisational processes.

Previous research has closely aligned learning activities with technological availability and experimentation i.e. (Macher and Mowery, 2009; Edmondson *et al.*, 2001) who suggest a learning by doing collectively approach. However, this does not always align with extant research earlier discussed and the de-centralised hierarchical approach whereby a collective approach could be significantly more difficult to adopt. Although innovation activities are pro-actively encouraged in previous literature (Piening, 2011; Jones, Jimmieson, and Griffiths, 2005) technological learning should be balanced with process learning requirements with a primary focus on the knowledge asset.

With these arguments in mind, it is concluded that: A KM system is a technological solution used for organising, storing and configuring knowledge assets in a useable way. It can be used to convert knowledge from tacit to explicit and often comprises tools to allow knowledge to be managed more effectively. Different KM solutions offer different capabilities, but the majority can create new knowledge assets, collect knowledge, modify and enhance existing assets, act as a transport mechanism to distribute knowledge assets and some offer language translation capabilities. Nonaka (1994) discussed that certain knowledge management opportunities offered the ability to socialise knowledge using technology as well as internalisation and externalisation of knowledge. Furthermore, they discussed that the ability to combine existing knowledge potentially offered insights into new knowledge discoveries.

2.6.2 Factors directly impacting KM Technology Implementations

Nonaka (1994) argued that certain group-based user platforms such as email and community support systems had been found to impact organisations in a negative way and in turn, directly impact knowledge creation processes. Since then, technology has evolved, and knowledge is easier to capture. Although email channels themselves are beyond scope, technical capabilities for storing and retrieval of information is a potential enabler.

Similarities between KM and Business Intelligence are also seen as a potential conflict due to their similar nature, Cheng and Cheng (2011) defined the following similarities between Business Intelligence and Knowledge Management:

- Both BI and KM are typically associated with technological solutions. This study suggests that BI is not as valuable without KM in modern technological solutions as the “knowledge asset” itself contains explicit knowledge pertaining to an objective or service. BI would utilise multiple Knowledge assets to output business performance.

- Both have a dependency upon the need of existing knowledge or information to be effective. As already discussed, collective assets would output resource for BI and therefore BI would be dependent upon KM but not the other way around.
- Both are subjective in nature. The application of solutions providing an output is very much dependent upon the defined variable exposing those outputs.

Cheng and Cheng (2011) go on to further define the differences between Business Intelligence and Knowledge Management. These are:

(1) Connotation. BI is an evolution of the need for business information based on the use of information gathered during information systems-based processes operating within an organisation. KM is a more modern concept focusing on the need for an understanding of products services and applications that can be used by an organisation. Therefore, it would be assumed that BI would report on KM, but KM would not offer anything back to BI.

(2) Focus. BI explicitly focuses on existing information sources and structured information. BI does not offer significant value for disparate or unstructured sources of information. KM focuses upon the creation of knowledge assets and knowledge structures, both for the application of knowledge assets within those structures and the creation of knowledge structures. This ability to create knowledge structures is fundamental in an organisation's ability to build knowledge bases.

(3) Technology BI has a specific focus on utilising existing data sources or knowledge bases to apply its tools against. Allowing BI to offer findings based on the existing of these stores and applying business rules against these resources. KM uses its capabilities to build these stores and structures and apply knowledge assets against them. This allows tools such as BI to get a clearer understanding of the value of an organisation's knowledge. It is important to understand the clear differences between BI and KM because currently there is a misconception with knowledge workers that a) they are not mutually exclusive and b) they have the same purpose.

Kadayam (2002) argues that KM and BI should be integrated. Furthermore, it is suggested that technological enhancements are beginning to blur the line between both activities and as such technological bridges are being formed. Other researchers suggest that value could be increased through the application of BI against knowledge assets and potential increased return on investment (Yu *et al.*, 2011). Conversely, Nemati and Steiger (2002) argues that only if KM and BI are integrated can an organisation begin to understand KM and improve its decision-making capabilities.

Liu and Wang (2007) proposes that KM is an essential process for growth in business intelligence. Zhu Xiaowu (2007:15) "holds the point that business intelligence is using a specific method to solve the problem of knowledge sharing in knowledge management". This definition appears to share the output of knowledge assets and the value attributed to them as opposed to the value or the generation of the physical knowledge asset. Therefore, this definition will not be considered as part of this study.

At present, within the "enterprise the KM system is usually independent from the information system or is as a separate module connected through the interface to the information systems. Consequently, the links especially data links is missing between KM system and information system, which results in a lack of knowledge storage and processing capabilities of the enterprise" (Cheng and Cheng, 2011:309).

2.7 Chapter 2 Summary

In addition to a review of the KM environment and common definitions, this Chapter has presented the theoretical base for the research framework proposed. Identifying the three core elements, bringing together the elements required to build an effective framework; Knowledge Acquisition, The Physical Organisation and KM Technology. Identifying that they are not only separate, disparate domains but together can produce a framework for a theoretical framework. Initially, reviewing the concept of Knowledge Acquisition.

It is established that a growing consensus recognises an organisation's need to externally acquire knowledge effectively via third-party or partner organisations to remain competitive. The source of knowledge, specifically coming from outside of the typical organisational boundary is a key feature in developing an effective framework. Then introducing the ability to consume this knowledge and then integrate directly with existing knowledge within the organisation. This first step in the process has a direct requirement on 1) the physical organisation and its culture of managing knowledge and its ability to adapt to changing demands. Possibly utilising AC and DC as part of its culture. 2) The need to consider the capability of consuming knowledge and integrate with existing knowledge. 3) The technical capability to manage the process and the physical organisational factors influencing this. Thus, potentially affecting an organisation's ability to both create knowledge and knowledge structures that can be adapted and enriched.

Therefore, knowledge creation should be analysed as a potential influencing factor by an organisation and its ability to adapt to these internal needs. Knowledge flexibility in this sense is being analysed due to unforeseen changing requirements and the need for flexibility within a given framework to allow for changes in both the source of external knowledge and existing knowledge. This could allow for the adaptability required to

consume, integrate and enrich knowledge as a flexible asset of an organisation. This approach offering a different approach than that of a static object with rigid boundaries that would not offer rich knowledge growth. The flexibility of the knowledge asset alone however is not sufficient when considering an effective framework.

The physical organisation itself plays a crucial part in this ability to allow KE. As discussed previously, the concepts of centralised and de-centralised resource structures that work in different ways. Centralisation viewed as less flexible and more formalised than a de-centralised approach. Further analysis will consider a flexible knowledge framework at the "knowledge asset" level. This analysis will determine if flexible centralisation is viable as an approach to implement an effective framework. The benefits being analysed are the validity to streamline the capabilities of an organisation within a dedicated function or role can offer benefits not previously considered within other frameworks. I.e. a knowledge life cycle approach using a hybrid centralised, low formulation approach. Furthermore, knowledge innovation being just as important as process innovation is analysed as a factor in the effectiveness of a dynamic knowledge framework. Process innovation, as a crucial element of an organisation's ability to adapt to knowledge growth and variation is analysed as a potential effective paring. The ability to adapt to changes in both knowledge structure and knowledge value without process innovation has the potential of a negative effect. The objective being to understand the capability of process innovation upon the needs of knowledge as an asset and the effect on a knowledge life cycle process.

The physical organisation is a key element in understanding the effects of the organisation and its ability to collect, enrich and disseminate knowledge further. This is fundamental, particularly when considering the three-core, cultural levels typically associated 1) Artefacts, 2) Espoused beliefs and 3) Underlying assumptions.

When coupling these factors with those attained from considering the knowledge economy, a relationship between the volatility of a turbulent market place and the need to apply effective processes to govern the requirements for knowledge processes is an essential consideration. Where previous research has shown the volatility of the market place and using the knowledge economy approach utilising existing knowledge assets, it does not consider external knowledge assets. Furthermore, it does not consider the volatility of knowledge itself and the impact of consuming from multiple disparate sources. Such factors could offer opportunities to measure organisational performance but this would-be part of a different study. When considering the needs of such processes within the organisation, it does need to consider organisational innovation and its ability to adapt to changing needs with internal processes. This offers potential enhancements,

considering AC as a factor in process innovation capabilities, and to understand the value of new knowledge. This capability offers a relationship between the needs of an organisation's innovation requirements and its process innovation activities to be able to recognises this value. A potential contributor to utilising AC in this way is to consider DC. DC have already defined an effective method of building competences within changing environments. Furthermore, have shown a positive effect upon the organisational capabilities creation, especially across organisational boundaries. Further investigation will look at applying the three concepts of sensing, seizing and shaping opportunities to acquire knowledge across organisational boundaries. Particularly, from the perspective of initial knowledge acquisition in the early stages of the life cycle process.

Without the relevant technology, then knowledge as an asset could be very costly, particularly within modern working environments where the term Big Data and KM systems are commonplace. Although not a significant portion of this research, technology capabilities do still play a factor. Technology platforms previously considered have shown that prohibitive costs and the knowledge to implement technology suitable for such demands can prove negative. However, other research has argued that technology is a key enabler to effective knowledge management. This research aims to establish that modern technology, when applied correctly can offer the level of flexibility required to adapt to the flexible needs of knowledge acquisition, knowledge integration, process innovation and organisational needs. Offering a technology platform, which could support a flexible knowledge life cycle framework?

This literature review has covered a significant area of available prior knowledge within this area of research. There are however clear areas that need further investigation to be able to offer an effective cyclic knowledge framework. Knowledge acquisition has emerged as a concept of not only significant value but significant challenge.

These challenges have been approached in different ways but none from the perspective of a cyclic knowledge application and the ability to continue to evolve through a process of knowledge acquisition. Al Saifi (2015) discussed in detail, knowledge diversity and the impact of KM processes but did not offer an approach to address this diversity cyclically. Al Saifi (2015) was not the first to discuss this approach as Alavi and Leidner (2001) discussed the disconnected approach taken towards KM frameworks. This lack of connection has led to various frameworks being developed as discussed within this chapter but they are all focussed on a one way pathway through an organisations information pathway. This lack of cyclic process limits an organisations capability to continually adapt it's processes to evolve naturally. Skyrme (2011) discussed the processes impacting KM within the organisation and that they needed to be used in

different configurations to be able to process knowledge. However, this approach is limited in its use as the need to build relationships with external knowledge providers need to be able to establish a consistent model and mechanisms to be able to repeat knowledge type acquisition in a cyclic manner. The literature reviewed has failed to offer an effective approach for utilising KM processes in a) a cyclic approach and b) aligned with effective KM processes for organisational knowledge management.

This cyclic approach is emerging as only feasible if EKA is also introduced as a key concept for a cyclic knowledge framework. Durkin (2004) discussed the challenges involved with acquiring knowledge from external sources and that further research should be done in this area. Previous authors such as He, Ghobadian and Gallear (2013) considered the perspective of the value of joint ventures with external knowledge stakeholders but the solution their discussion was limited in scope as it did not allow for knowledge being consumed from large volumes of knowledge providers or knowledge providers without any clear accountable stakeholder. More recently, Xiaoqian and Xinmei (2017) have discussed opportunities for knowledge growth based on EKA processes but this focus is limited to knowledge growth through bulk capture and process as opposed to an approach where cyclic learning becomes an integral part of the overall framework.

Further to the needs of KM processing itself, the impacts of the physical organisation need to be established and aligned with the capability to apply cyclic knowledge mechanisms. Previous authors such as Nazari et al. (2011) have discussed the importance of cross business contexts but not how KM processes can be utilised within these relationships to benefit both parties. Al Saifi (2015) discussed this as part of their approach for EKA and the impact of inter-organisational KM processes but fell short of building a clear distinction between the relationship impact and how this could be developed to introduce a mutually viable solutions between the organisation and the third-party knowledge stakeholder. In addition, the data collection process needs to consider the knowledge economy beyond the typical organisational boundary. This is of particular importance as Hess and Rothaermel (2011) discussed the impact of knowledge redundancy because of no structured mechanism for the collection and processing of knowledge. This is perceived to be due to a disconnected approach to KM. Teese (2009) discusses that the most effective approach to KM is through separate knowledge functions within an organisation. Early indications is suggesting that this is not correct and a more effective approach is to centralise knowledge processing capabilities and this will be investigated during the data collection stage.

Emerging from the literature is that technology itself only plays a limited role in the implementing an effective KM model. Lin and Lee (2005) discussed that technology is

very effective in allowing an organisation to process its knowledge assets. This however is only a very small element to the over-arching need to grow an organisations knowledge capability. Recent research by (Hashemi, Khadivar, and Shamizanjani, 2018) suggests that ineffective use of technologies can lead to knowledge waste, caution needs to be given when considering the application of a theoretical framework within a technological environment. Although the technological implications of this research are limited, a small amount of focus needs to be given to establish that technology itself is a limited requirement for the application of a cyclic knowledge framework.

Table 2.3 below highlights the list of key messages which have been collated during the literature review. These key messages are used later in Chapter 4, as a basis for the semi-structures interview questions.

Table 2.3 Summary of Key Messages

Knowledge Management Environment (KME) Review of KM Definitions and what is relevant for core concepts, KM practices, process models and existing knowledge types and Frameworks. A Review of KM Culture, former strategic approaches and potential impacts on KM and none KM within an Organisation	(Dalkir, 2017) (Dasi, 2017) (Michailova and Mustaffa, 2012) (Skyrme, 2011) (Botha *et al.,* 2008) (Alavi and Leidner, 2001) (McDermott and O'Dell, 2001) (Bukowitz and Williams, 1999) (Davenport and Prusak, 1998) (Fahey and Prusak, 1998) (Grant, 1996) (Nonaka, 1995) (Drucker, 1993)	**A flexible knowledge Management framework via the application of an effective 'Knowledge Model' would have a positive effect on the competitive advantage of an organisation** **'Knowledge Sharing' requires an 'organisational culture' of commitment to knowledge management for it to be effective. Organisational culture has a direct impact upon an organisations ability to consume external knowledge** **'Formalised core values' with a capability for flexible changeable attributes could have a positive effect on the cultural impact of KM upon the organisation** **knowledge management cannot be effectively dealt with without addressing organisational culture**	**How do we advance current theory of knowledge management beyond the organisational boundary?** **Which are the most effective antecedents to use as part of an effective model?** **How do we apply a formalised knowledge management model within an organisation whilst retaining flexibility?**

External Knowledge Acquisition (EKA) Review of the required knowledge creation and acquisition strategies and what could be relevant. Including, creation, sharing, shared language, external knowledge and consumption, distribution via supply chain, process innovation and sharing barriers.	(Storey and Larbig 2018) (Ewa *et al.*, 2016) (Liao and Marsillac, 2015) (Al Saifi, 2015) (Piening and Salge, 2014) (Cassiman and Veugelers, 2006) (Leiponen, 2005) (Zahra and George, 2002) (Davenport and Prusak, 2000) (Li *et al.*, 2008) (Cohen and Levinthal, 1990)	**External knowledge sharing can help overcome internal innovation barriers and have a positive effective on an organisations performance by increasing the knowledge base beyond the organisational boundaries** **External knowledge acquisition can strengthen an organisations process creation capability by enriching existing knowledge capabilities** **Intra-organisational relationships are crucial to effective external knowledge acquisition and knowledge sharing** **The involvement of communities of practice would have a positive impact on knowledge consumption and knowledge sharing** **Knowledge Acquisition for the purposes of improving the quality of the supply chain process is not explicitly dependent upon internal Innovation** **Dynamic capability as a dependent variable of absorptive capacity would allow for flexibility within the process innovation strategy while minimising the need to completely re-invent a given process** **The introduction of absorptive capacity as an independent variable could offer**	**Does the size of the knowledge source pool affect the knowledge acquisition strategy?** **Do externally acquired knowledge have a positive impact on internal R&D Functions** **Does a dynamic supplier network offer more process innovation opportunities for the internal supply chain process?** **Is broad organisational involvement in process creation requirements is more effective than independent innovation activities?** **Would Artefacts and espoused beliefs as "independent variables" have a positive effect on a process innovation strategy?** **How do we introduce a framework for inter-firm relationships that allow for the flexible adoption of antecedents and contingencies to support the development of innovative processes?** **Are Intra-organisational relationships crucial to effective external knowledge acquisition and knowledge sharing** **Does knowledge sharing require an organisational culture of commitment**

		potential opportunities for bridging the gap between the acquisition and consumption stages of the research analysis	**to knowledge management for it to be effective?** **what are the barriers and enablers for effective integration of knowledge into existing organisational knowledge assets?** **Which antecedents, contingencies and performance affect process innovation?**
The Physical Organisation (TPO) How organisation culture impacts innovation, organisational performance, the knowledge economy and potential use of absorptive capacity and dynamic capabilities as a model for EKA within the supply chain	(Soo et al.,2017) (Grandinetti, 2016) (Piening and Salge (2014)) (Keupp et. al., 2012) (Jetz et al., 2012) Zahra and George, 2002) (Teese, 2009) (Alavi et al., 2006) (Hofstede, 2001) (Davenport and Prusak, 2000)	**Organisational determinants act as a barrier to process innovation, within the context of intra-organisational knowledge sharing** **Internal structures impact knowledge processing from the perspective of EKA** **Members of intra-organisational social groups should be engaged and knowledgeable to be able to have a positive effect on suitable knowledge transfer capabilities** **A de-centralised, low formalised organisational structure has a positive impact on the ability to create effective knowledge sharing supply chain processes.** **Organisations which have the capability of adapting to cultural changes allow for a**	**Does an organisation that has the capability of adapting to cultural changes allow for a positive effect on knowledge as an asset?** **Would an organisations performance defined as an dependant variable have a positive impact upon process innovation?** **Would organisational enhancements defined as dependant variables have a positive effect on process innovation?** **Does Absorptive Capacity as a dependent variable of process innovation have a positive effect?** **Does Absorptive Capacity as an Independent variable become a pre-requisite for having a Dynamic Capability as a dependent variable?**

	(Snowdon, 1999) (Cohen and Leventhal,1990 (Schein, 1990) (Drucker, 1969)	**positive effect on knowledge as an Asset** **The application of a 'knowledge life cycle' against the process innovation perspective could have a positive effective for the organisation and third party relationships** **Process innovations focussing on the use of External Knowledge Acquisition may contribute to the success of an organisation** **Organisational factors to define innovative processes has a positive effect on the supply chain** **The requirement for multi-dimensional factors as variables within the process innovation strategy has a positive effect** **Organisational determinants act as a barrier to process innovation, within the context of intra-organisational knowledge sharing** **Research has yet to examine how intra-firm differences in managing process innovation activities are related to firm performance**	**Could the deterministic attributes of absorptive capacity be used in a holistic process innovation strategy?** **Would a centralised organisation with low formalisation offer the best opportunity for the successful integration of externally acquired knowledge?** **Would broad organisational involvement in process creation be more effective than independent innovation activities?**
Knowledge Management Technology (KMT)	(Lichtenhaler, 2016) (Abdul and Shamyla, 2012)	**Social networks have a positive effect on knowledge creation capabilities** **Members of intra-organisational social groups should be engaged and**	**Is there a need for technological capability to be able to consume knowledge directly from disparate knowledge sources outside of social**

The application of knowledge and existing technologies to support EKA and the supply chain process. Also to differentiate between BI and KM. The effectiveness of hierarchy within the KM environment.	(Cheng and Cheng, 2011) (Gonzalez-Padron *et al.*, 2010) (Liu and Lai, 2011) (Vandaie, 2007) (Chong, 2006a, 2006b) (Sagsan, 2006)	**knowledgeable** **An organisations investment in EKA (External Knowledge Acquisition) show a positive impact upon the supply chain process** **The capability to consume effective knowledge is dependent upon the source on which it is drawn from and the quality of the relationships between provider and consumer** **Knowledge Acquisition for the purposes of improving the quality of the knowledge supply chain process is not explicitly dependent upon internal Innovation** **Mechanisms implemented internally can have a positive effective upon the control of knowledge spillovers** **Technology dependency is a single factor within the process innovation strategy** **Technology solutions act as an enabler to innovation effectiveness for employee creativity and cross-boundary learning**	**networks?** **Does an organisations level of investment within EKA affect the capability of knowledge collection processes?** **Does enhanced knowledge enrichment capabilities derive from a technological solution or effective process innovation?** **Can a technical solution offering the capability to avoid knowledge spillovers be effective?** **How much dependency is there on technological capability to offer effective knowledge management vs effective processes?** **Which technical enablers and barriers should be considered to apply an effective model?**

CHAPTER 3: METHODOLOGY

3.1 Introduction

The previous Chapter had the specific focus of reviewing the literature to date and highlighting any gaps, inconsistencies and conflicting arguments within the subject area being researched. From this, gaps were identified that were explicitly related to this subject area and then broken out further for the primary research question. "Very little research in the field is pure in nature" (Kumar, 2011:4), the literature review focused upon the key areas within the KM Domain pertinent to the primary research question. The next step is to address these gaps and define the approach for further analysis and solution proposition. Gathering evidence of the current subject area and analysing this evidence to allow for creation of a theoretical framework, which addresses the research question. Linden et. al., (2007) discussed that there are many perspectives that can be adopted when considering inquiring systems and their effect upon knowledge and knowledge-based systems. Therefore, it is important that clear justification is given to the direction undertaken for the methodological approach.

There are probably as many different perspectives on how inquiring systems could support KMS as there are IS researchers willing to study them

People inevitably have a different world view, this emphasises the different approaches taken in research. The researcher needs to first understand the various theoretical perspectives of research methods before defining the research design. The aim of this Chapter is to discuss the philosophical position and research methods adopted before discussing the approaches to data analysis in the next section.

In this Chapter, the Ontological and Epistemological choices made for this research are discussed further. Fleetwood (2005) discussed that the way we think the world is, impacts our perception and what we think can be known about it and how we think it can be investigated. Based on this, this section will discuss the approach taken and the choices around the selection process by discussing in more detail.

The research methodology can be referred to as a systematic process for the collection of data in a structured way to achieve the objectives of the study (Ghauri and Grønhaug, 2002). For this research, it was determined that inductive reasoning could offer the most effective outcome for the research question, this being due to the data collection method and the researcher building on the findings as they emerge from the data. Furthermore, allowing for a naturalist and emerging research design approach. The key objective being

to capture the experiences and beliefs of the knowledge workers, this is crucial to understand the issues affecting the research domain. Furthermore, the approach should avoid the blurring of biographical methods, as this is not the desired outcome (Denzin, 1997).

Whilst performing the extensive literature review in the previous Chapter, there were some basic but clear observations about the subject area. Although extensive previous research has identified gaps in the separate core areas of the subject domain (Knowledge Management, External Knowledge Acquisition, The Physical Organisation and Knowledge Management Technology), there is very little investigation in how to effectively manage knowledge passing through an organisation. Furthermore, additional gaps are found in enrichment and redistribution to external partners or customers (Hagedoorn and Wang, 2012; Keupp *et al.*, 2012; Schmiedeberg, 2008; Woiceshyn and Daellenbach, 2005). Data collection will aid the creation of a theoretical framework that focusses upon the core areas relating to the consumption, processing and re-distribution of knowledge and help to build upon previous theory to understand the challenges faced within this subject area.

3.2 Ontology and Epistemology

Crotty (1998:10) wrote “ontological considerations are concerned with the notion of ‘being’, by looking at the nature of existence and the structure of reality as such”, furthermore it “is concerned with the nature of reality” (Saunders et al., 2012:110). Ontological concerns look at the question “what it means to know” (Crotty, 1998:8). Ontology, referred to as the indispensable assumptions a researcher considers in relation to the nature of reality (Easterby-Smith, Thorpe and Jackson, 2012, Gioia and Pitre, 1990). Ontology, to social scientists, is related to the essence of the phenomena under examination, irrespective of whether the reality has a subjective or an objective nature. Furthermore, whether the reality pertaining to an individual is internal or external to that subject (Burrell and Morgan, 1979).

The reality of the research domain for this project is clear in that subjectivity often means that knowledge workers are struggling to generate knowledge assets in an effective way. There have been previous research focusing upon explicit factors such as KM or external knowledge acquisition, but the literature review shows that there is very little prior research focusing upon the real need of the requirement for a combined framework, combining these singular entities into a complete framework. Furthermore, the potential issues relating to the relationships between these separate entities and how these affect the KM environment, particularly considering the impact of a subjective environment. Therefore, a social constructionist approach is taken to allow the perception of the

outcome from the data analysis to continually grow as “the definitive outcome will evolve” (Bryman, 2001) as the findings emerge in Chapter 4.

Epistemological considerations deal with “the nature of knowledge” (Crotty, 1998:3). These two concepts co-exist alongside each and complement each other’s perspective on the understanding and definition of knowledge and learning. Considering Ontological and Epistemological concepts in parallel, expresses the theoretical position of a single view of the world and allows the research to consider the question “how we know what we know” (Crotty, 1998:8). Since ontology and epistemology often surface together due to their interconnectedness (Crotty,1998:9-10), thoughts on epistemology also encompass ontological issues in the context of this research project. By understanding these aspects, it clarifies how organisational elements such as people, processes and practices need to be interpreted.

Epistemology on knowledge is a tangible asset and as such, can it be captured, shared, stored, re-used and refers to basic assumptions about the nature if knowledge as well as reality and correlated phenomena (Johnson and Duberly, 2000:11). Knowledge acquisition forms a primary part of this research project and as such, epistemology plays a key role in the approaches to determine the outcome. Burrell and Morgan (1979:32) discuss “what sorts of knowledge can be acquired, and whether the nature of knowledge is hard, real, possible to transmit in tangible form and accordingly, obtainable, or whether it is softer, subjective, spiritual, and based on experience and perception of a unique and fundamentally personal nature”. Easterby-Smith *et al.* (2012) discussed how understanding the research philosophy could help in research activities. Firstly, helping researchers define the research method used within the research or more specifically the research strategy; also, including what evidence is collected, how to interpret it, and how this will answer the research question. Secondly, understanding the research philosophy can help us in choosing or adapting suitable methods for our research by evaluating the different methodologies and methods. Therefore, helping to identify the limitations and advantages of a specific approach for this research.

This study takes an interpretivist view from an epistemological standpoint and applies this to the social constructionist direction, discussed previously, to address the ontological and epistemological stances taken as part of this study.

3.3 **Methodological Approach**

Researchers need to decide upon a research methodology for the collection of data to be critically analysed as part of the research project. There are typically two distinct approaches for consideration, qualitative or quantitative. As the term suggests, a

qualitative approach offers a detailed analysis of the research domain. Historically, approaches to research have evolved since the 1960's (Hirschheim et. al, 2012) with the continual interest in the field of IS. The interest between qualitative and quantitative approaches falling in and out of favour depending on trends in areas of research. Quantitative however, is used to define explicit measurements based on detailed analysis of a given environment. Saunders *et al. (*2009:108) note, "The important issue is not so much whether our research should be philosophically informed, but it is how well the researcher is able to reflect upon our philosophical choices and defend them in relation to the alternatives that could be adopted". The following Table3.1 shows the variations in qualitative vs quantitative considerations:

Table 3.1 Qualitative vs Quantitative considerations (Holloway and Wheeler, 2002:11)

	Qualitative	**Quantitative**
Aim	• Exploration of stakeholder experiences and environment • Understanding and generation of	• Search for causal explanations • Testing hypothesis, prediction control
Approach	• Broad Focus • Process oriented • Context-bound, mostly neutral setting • Getting close to the data	• Narrow focus • Product oriented • Context free often in artificial or laboratory setting
Participants	• Participants, informants • Sampling units such as place, time and concepts • Purposive and theoretical sampling • Flexible sampling that develops during research	• Respondents, participants • Randomised sampling • Sampling Frame fixed before research start
Data Collection	• In-Depth non-standardised interviews • Participant observation/fieldwork • Documents, photographs, videos	• Questionnaire, standardised interview • Tightly structured observation • Documents • Randomised Controlled trials
Analysis	• Thematic constant comparative analysis • Grounded theory, ethnographic analysis etc.	• Statistical analysis
Outcome	• A story, an ethnography, a theory	• Measurable results
Relationships	• Direct involvement of	• Limited involvement of

	researcher • Research relationship close	researcher • Research relationship distant
Rigour	• Trustworthiness, authenticity • Typicality and transferability	• Internal/external validity, reliability • Generalisability

Table 3.1 above shows the different impacts of qualitative vs quantitative approaches and allows the researcher to consider the direction to take. This is based on the elements that directly affect the study being undertaken. When considering the needs of the research strategy, one must also consider the type of study as well as whether it be qualitative, quantitative or a mixed method approach. Creswell (2008:173) defined this as strategies of inquiry and these typically consist of experimental and non-experimental designs. Both of which offer different value based on the chosen methodology.

For this research, the approach will be to adopt a qualitative strategy of inquiry, thus utilising semi-structured interviews and template analysis for a defined set of key stakeholders within the target domain who have agreed to participate. This approach follows the qualitative path for two main reasons; 1) To optimise the data collection due to direct access to key knowledge workers and 2) To get a broader understanding of the problem area. This is of importance due to the variety of factors that need to be considered i.e. EKA, TPO and KMT, of which make up the key elements and are broadly visible from the research question.

3.4 **Research philosophy**

Here the researcher explores the philosophical foundation of the research methodology that is used in this research project. Myers (1997:241) states “research is based on basic underlying assumptions that determine which research methods are relevant or how to conduct effective research, while the most appropriate philosophical assumptions relate directly to the underlying epistemology”. Research philosophy defines the “method of developing knowledge and the nature of that knowledge” (Johnson and Clark, 2006:105) within a field. Furthermore, “important assumptions regarding the way in which researchers view the world” are established. “These assumptions support and guide the selection of the research strategy and the methods applied as part of that strategy” (Johnson and Clark, 2006:105). This thesis builds upon human perceptions and attitudes. Therefore, it is also influenced by the researchers own perception of the reality and attitude towards the nature of research. Consequently, it has been important to define the research philosophy of this study and its findings. Furthermore, the direction of the

research methodology and the processes undertaken as part of the data gathering process are discussed below.

Philosophical choice is considered as the initiating factor when commencing with any research project. It is therefore important that the philosophy of research is understood for two reasons (Hughes and Sharrock, 1997:54) 1) the exploration of philosophy encourages in-depth thinking, and spawn further questions in relation to the topic under consideration (Crossan, 2003) and 2) the understanding of philosophy is significant for researchers to refine, specify and evaluate research methods (Easterby-Smith, Thorpe and Lowe, 2002). The philosophy clarifies how research objectives are defined, and research is conducted to allow for the effective interpretation and presentation of the final results. The choice of philosophy is connected to the researcher's assumptions about reality as well as the kind of knowledge the researcher believes in (Crotty, 1998). This is an important factor as the choices made can impact the outcome of the research and must consider carefully the issues of ontological and epistemological decisions. Burrell and Morgan (1979) argue that approaches to social science are underwritten by philosophical theories and that research practices are driven by explicit assumptions of the behaviour of the social environment.

There are several philosophical approaches relating to social sciences research. Depending upon a researcher's philosophical stance, they would take either an objective or subjective stance. Empiricism is the way we define the verification of facts through observation and examination. Easterby-Smith et al (2012) described how the understanding of research philosophy could aid research activities. Table 3.2 below, adapted from (Hussey and Hussey, 1997) shows the varying philosophical approaches:

Table 3.2 Philosophical Approaches (Adapted from Hussey and Hussey, 1997)

Objectivist	**Subjectivist**
Quantitative	Qualitative
Positivist	Phenomenological
Scientific	Humanistic
Experimentalist	Interpretivist
Traditionalist	

Thus, by adopting a subjectivist approach, it would offer significant qualitative advantages for this study, due to the rich source of knowledge available to the researcher. It was envisaged that within the research domain and its multi-faceted environment, it would likely offer up subjective views from the interview participants. If this is then applied against the social constructionist approach discussed previously in section 3.2 a research

philosophy now begins to emerge that is relevant for this study. To re-enforce the direction already considered, Table 3.3 below is used to confirm the direction of study:

Table 3.3 Differences between Positivism and Social Constructionism (Ramathan, 2008:54)

	Positivism	Social Constructionism
The observer	Must be independent	Is part of what is being observed
Human interests	Should be irrelevant	Are the main drivers of science
Explanations	Must demonstrate causality	Aim to increase general understanding of the situation
Research progresses through	Hypotheses and deductions	Gather rich data from which ideas are induced
Concepts	Need to be operationalised so that they can be measured	Should incorporate stakeholder perspectives
Units of analysis	Should be reduced to simplest terms	May include the complexity of 'whole' situations
Generalisation through	Statistical probability	Theoretical abstraction
Sampling requires	Large numbers selected randomly	Small numbers of cases chosen for specific reasons

Unlike quantitative research offered by a positivist approach, which focuses upon volume data collection and interpretation, qualitative methods gain an understanding of the problem area via the means of direct interaction with people and social issues and the direct impact such issues have upon them. Denzin and Lincoln (2005:3) argued that "the researcher's practices transform the world". The process of research consists of questions, processes and procedures, data usually collected within the participants location, and data analysis generated from details extrapolated from the problem area and the researcher making interpretations of the meaning of data (Creswell, 2009). Unlike positivism, social constructionism researchers "do not act as an invisible neutral in the field, but that they take part when they observe (in participant observation), which may lead the interviewees to new insights about their situations and the world around them" (Flick, 2007:7). Typically, this approach is associated with inductive reasoning, as used for this study. "Thus, qualitative research uses text as empirical material (instead of numbers), starts the notion of the social construction of realities under study" (Flick,

2007:2). As discussed in section 3.3 the researcher has direct access to a pool of knowledge workers, thus offering a richer collection of data. Table 3.4 below further gives a broad overview of the main philosophical approaches and highlights the key elements under Constructivism that have been discussed as relevant to this study so far:

Table 3.4: Philosophical Research Comparison (Adapted from Saunders *et al,* 2012)

Paradigm	**Positivism**	**Post-positivism**	**Pragmatism**	**Constructivism**
Methods	Quantitative	Predominantly Quantitative	Quantitative + Qualitative	Qualitative
Logic	Deductive	Predominantly Deductive	Deductive + Inductive	Inductive
Epistem-ology	Objective point of view. Knower and known are dualism	Modified dualism. Findings probably objectively "True."	Objective and subjective viewpoints considered	Subjective point of view. Knower and known are inseparable.
Axiology	Inquiry is value free	Inquiry involves values, but they may be controlled	Values play a large role in interpreting results	Inquiry is value bound.
Ontology	Naïve realism	Critical or transcendental realism	Accept external reality. Choose explanations that best produce desired outcomes.	Relativism

The constructionist approach accepts that researchers understanding, and interpretation is derived from their own frame of reference, as a consequence of personal interactions (Orlikowski and Baroudi, 1991). Conversely, reality is socially constructed as opposed to being objectively defined. Commonality exists throughout the various approaches applied to Interpretivism and Constructionism, whereby they all have a focus on shared meanings with a subjective outlook. This research looks to explore issues relating to the key elements that make up the inter-dependent elements that affect flows of knowledge through a typical organisational setting. As such, this research aims to look at the perception of key stakeholders and understand the key values and their meanings.

3.5 Method

3.5.1 Data Collection

The research target domain will be set against the context of the electrical wholesale environment in which the researcher currently works. The target organisation is a multinational organisation with major operations predominantly focused in the UK and the US, although smaller operations exist in Europe and Australia.

The target organisation has a significant supply chain operation with over 30000 suppliers currently feeding product and product information into it. It also has significant investment in manufacturing operations for specific product lines which are distributed exclusively through its own supply chain. These products include but are not limited to electrical lighting, heating, security hardware and cabling solutions to name a few. These are referred to as In-House operations of which there are approximately fifty divisional operations grouped within their respective product manufacturing output (lighting, heating etc.) KM plays a crucial part as a valid contributor to the core supply chain and as such, the organisation should be able to manage the consumption, management and re-distribution of knowledge as an asset.

In addition to this, the organisation has approximately 1000 branches for direct sales to the trade and public. The geographic split is approximately 500 branches in the UK and 500 branches in the USA with a small number of branches within the other regions as discussed previously.

The organisation has approximately 4,500 employees worldwide comprising of a variety of skill sets from sales and support, knowledge workers, manufacturing and distribution.

For this research project, the focus will be on UK operations only as the respective regions currently work within silo market places i.e. EU, UK and North America and at the time of writing, there are no plans to group operations globally. The following Figure 3.1 shows the outline approach for the collection of data for this study:

The Data Collection Process

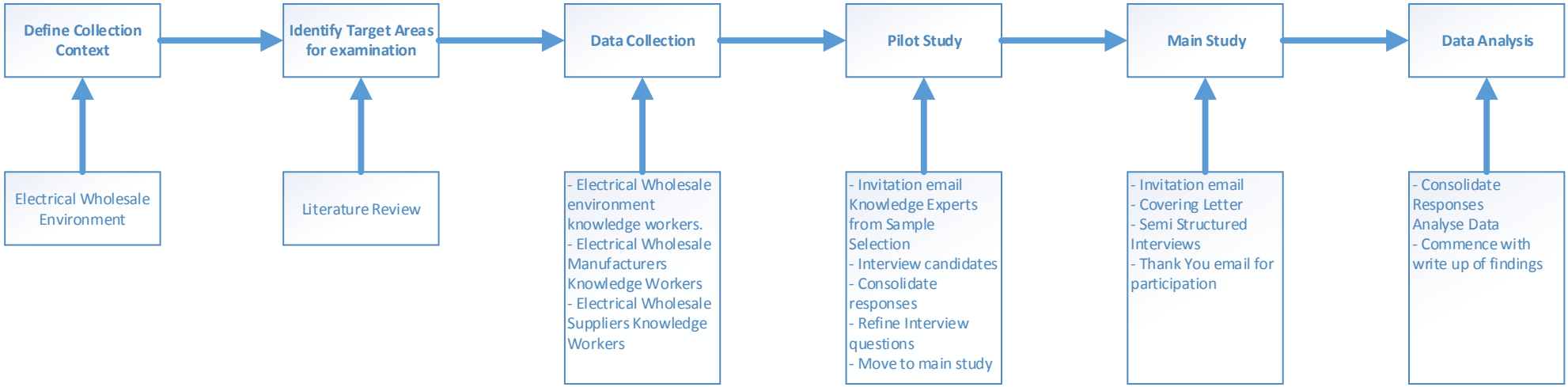

Figure 3.1 The process flow for Data Collection (Researcher 2017)

The primary data collection approach for this thesis is broken down into two inter-related stages:

Stage one – Consisting of a Constructivism approach using semi-structured interviews. An initial pilot study consisting of a target audience of 5 participants to confirm the questions used within the semi-structured interviews. Potential participants will be contacted by email asking if they will take part.

Stage two – Consisting of a Constructivism approach using semi-structured interviews. Selection is agreed via email invitation, asking for candidates to participate as part of the research project. Participants will take part in an interview process to give a deeper, richer response to questions than what would be achievable via survey.

3.6 Research Design

Research design defines the core components of the research activities required to achieve the desired outcome of the research project. There are several common definitions for the research design approach. Research design as a process for creating a tool for the collection of data to be analysed and measured as part of the research process which is based upon research question (Sekaran and Bougie, 2013; Saunders *et al.*, 2003). A research design encapsulates processes and procedures as part of a strategic approach of enquiry Yin (2014:9) shows five independent research methods; these are defined as experiment, survey, archival, history, and case study.

Table 3.5 Independent Research Methods (Yin, 2014:9)

Strategy	Forms of research quesiton	Requires control of behavior events?	Focuses on contemporary events?
Experiments	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

When reviewing these strategies, the researcher can determine the best approach and data collection mechanisms for use within this study. Each of these mechanisms playing a specific part in the collection and analysis of material to allow the researcher to identify a solution.

3.7 Pre-Question Generation

Prior to creating suitable interview questions for participants, the researcher performed a comprehensive literature review, identifying gaps in the literature. These gaps identified the need for a theoretical whole life cycle process framework for tying previous research together as well as a comprehensive way of extracting information from key knowledge workers.

3.8 Semi-Structured Interviews

Questions for the semi-structured interviews were created, based on the gaps found in the literature review. This work and the questions can be seen in Appendix 1. Prior to the definition of the final version of the questions, the information from the key areas under investigation was consolidated and refined to identify, crossover information and relationships between the key areas. The aim being to reduce repetition and maximise the quality of the questions contained within the semi-structured interviews. The interview questions focus upon the three key areas previously discussed:

- Knowledge Acquisition
- The Physical Organisation
- Knowledge Management Technology

The initial pilot study offered a first pass of the questions to get feedback on the credibility, clarity and relevance of the questions within the core areas of research. The first step, in researching the interview questions, was to identify the key literature within each of the corresponding areas: All candidates chosen to participate were done so due to their position as a knowledge worker within the defined research scope. To avoid single tier bias (Gerhart, Wright, McMahan and Snell, 2000), candidates were selected from different pools of the organisation.

3.8.1 Qualitative Approach

Qualitative research is a method of inquiry that uses analysis and interpretation to explain a phenomenon of interest (Auerach and Silverstein, 2003). This is of importance when analysing information across the typical organisational boundary. Qualitative methods are normally used when there is little known about a given issue or process, or when individuals function within a socially fabricated environment, generate an understanding of the specific issues of a paradigm as they relate to that environment or within the context of a specific situation (Hermanowickz, 2002; Kvale and Brinkmann, 2009; Patton, 1990; Roulston, 2010).

Using this approach allows for a qualitative descriptive enhancement of the complex research domain. This approach offers extended clarity that would not typically be visible if using a positivist approach. Qualitative descriptive studies comprehensively summarise events in every day terms, answering practical questions for practice and policy (Sandelowski, 2000).

This methodological approach is used because there are few studies that have considered the impact of the knowledge supply chain within this context and from the perspective of inter-boundary knowledge consumption capabilities. By this, knowledge itself becomes the focus of value and enrichment, not the processes it may support as part of other organisational capabilities. Thus, knowledge transfer itself becomes a form of supply chain, a knowledge supply chain, utilising knowledge assets as the object moving through the organisation. Therefore, any value is directly coupled with the idea of the enrichment of knowledge itself.

Using real-world related issues, coupled with theoretical concepts allow us to offer a theoretical framework that would address the issues of inter-boundary knowledge transfer via the proposed theoretical framework as well as offering a solution in the search to enhance theoretical concepts.

3.9 Pilot Study

A small pilot study was conducted initially, consisting of five candidates to confirm the credibility of the interview questions (Robson 2002). The research questions were verified using knowledge experts to ensure the credibility, quality and organising of the questions. From this, the questions were revised considering the relevant feedback before the full population was contacted for participation. The changes made were minor re-wording of several questions and did not impact the credibility of the responses obtained in the pilot study. The key areas of feedback were:

- The relevance of the questions and their appropriateness to the research topic.
- The structuring of the questions within the relevant sections and the sort order used to process them.

3.9.1 Pilot Semi-Structured Interview Questions

The survey of key knowledge workers within the professional environment is constructed in the three key areas of focus:

Section 1: Knowledge Acquisition

Section 2: The Physical Organisation

Section 3: KM Technology

The three individual sections comprise of the 24 questions that make up the entire collection base for the semi-structured interviews. Upon completion, the data is evaluated using Template Analysis using NVivo V11 and additional tools created by the researcher. The researcher is a software engineer and data architect specialising in these types of activities.

3.9.2 Pilot Semi-Structured Interviews

Semi-structured interviews were held on location, at the researcher's primary place of work and one other location. Interviews were recorded electronically for transcription later. At the time of the interviews, signed consent forms were collected from all five participants and are held by the researcher.

3.9.3 Open-Ended Questions

For open-ended questions, a coding mechanism needed to be developed to enable the responses to be effectively measured. Such questions, which permit answers not limited to fixed alternatives, are a source of subtle and often valuable information about reality from the point of view of the respondent (Montgomery and Crittenden, 1997). Montgomery and Crittenden (1997) also discuss that classification and categorisations should be developed from the responses and not be pre-determined. If the original codes, based on categories of interest to the investigator, fail to consider the respondents frame of reference, then a posteriori method can hardly be expected to eliminate this source of unreliability. On the other hand, a set of categories developed empirically from the responses to be coded will reflect the point of view of the respondent. (Montgomery and Crittenden, 1997)

- Interview participants are asked to answer each question in their own words. These responses are captured via audio recording and notes taken during the interview to back up the audio.
- Responses are usually categorised into a smaller list of responses that can be counted by the study team for statistical analysis. The method of analysis to be used is Template Analysis.

As discussed previously, there are areas of weaknesses for open ended questions; for example; it is possible for the researcher to generate assumptions prior to receiving

responses and try to fit them into preferred categorisations, this should be avoided. Although, investigation into previous research topics show that users who use tools such as NVivo do start with an initial set of themes as a starting point. It can also take a lot of effort to consume and digest the information, this needs to be carefully managed against value vs effort for the result. Also, the level of accuracy on larger groups or when trying to generate a sub-set of data to apply against the whole population may not be statistically relevant. However, a small set of open-ended questions can give insight into specific areas of the research domain not necessarily considered.

3.10 Interview Design

When designing the interview questions, it is important that the questions contained within are relevant to the literature review and the research question being answered. The two most common types of survey questions are closed-ended questions and open-ended questions. Open ended questions are used for the interviews, as it is a qualitative study.

3.10.1 Considerations for Interview Questions

Consideration must be given to a) the order of questions to be asked and b) the impact of sensitive questions (depending upon the research area). Other questions such as those with demographic properties or those which could identify a participant such as age or place of work should also be considered carefully. Considering the questions in such a manner allows the researcher to build a rapport with the participant and build trust. For the purposes of this research project, there are no personally sensitive questions. Predominantly, the information being collected is related to business processes as opposed to questions about individual personal attributes or beliefs.

Double-barrelled questions, are those which ask two questions in one, should never be used as they give a skewed response. An example of a double-barrelled question is, “How do you feel about your place of work and the people you work with?” This question is poor because survey respondents are asked to give one response for two questions

Researchers should avoid using emotionally loaded or biased words and phrases, keeping the questions as plain as possible and as close to the subject matter as possible. This will ensure that the responses from the candidate should be reflective of the questions and avoid where possible unexpected interpretation of the question beyond its proposed meaning. A certain level of interpretation is expected however, due the very nature of cognitive processing variations by the individual candidates.

3.10.2 Question Definition and Interview Direction

The interview questions were prepared from both the outcomes of the literature review and the researchers personal experience within the target domain. To keep in-line with a qualitative approach to the research activities, open ended questions were used to cover the three core areas impacting the research. To offer a more natural feel to the interview participants working environment, these were further broken down into five areas (see Appendix 1). During the interviews, the participants were encouraged to talk freely around the question and the researcher discussed the responses directly and where appropriate asked additional probing questions to dig deeper into these responses.

The original participant target was 20 with an initial pilot study of 5 participants to trial the credibility of the questions and responses. The initial pilot confirmed credibility of the questions and the researcher proceeded with interviews targeted at the full population. At interview number 16, it was felt that saturation point had been achieved based on the responses being given, however interview continued to confirm that this was the case. At interview 19 the researcher deemed that the responses had reached a satisfactory saturation level and the final interview was no longer required. All interviews were conducted during a two-month period over the summer of 2017 at various locations throughout the UK and focused explicitly on key knowledge workers within the researcher's professional environment. The first five pilot interviews were completed at the Durham and Peterlee office locations within a two-week period prior to initiation of the full data collection activity.

The interview strategy followed the following steps:

- An email to the participant asking for their participation and on acceptance, negotiation of a suitable date, time and location
- A ten-minute review of the purpose of the interview process and how the interview questions have been structured.
- The interview process itself and two-way dialogue between the researcher and the interview participant.
- Ten-minute post-interview discussion to get feedback on the interview process and the participants feelings on the process.
- Transcription of the audio recordings from the interviews in preparation for data analysis.

Due to the varying elements of the interview processes, the location, the participants role within the organisation, then it is assumed that all outcomes will inevitably differ slightly, even though the same initial questions are asked to all participants (Rubin and Rubin, 2005; Alvesson, 2003, Holstein and Bubrium, 2004).

Due to all participants working within the same target organisation, there are different levels of relationships between the researcher and the participants. This was deemed to have minimal effect on the openness of the candidates and generally all candidates provided positive feedback from the process, which is discussed later in the reflections section.

3.10.3 Participant Selection

An initial target audience of 20 Interview participants was selected for the purposes of data collection. According to Trigwell (2000), a participant count of 15 is typically sufficient to get a rich data set for qualitative analysis. Because of the availability of resources to the researcher, this was extended to 20 to try and ensure that the point of saturation was reached from the perspective of participant responses. As previously discussed, this was reached at participant 19 although the researcher had commitment from 21 participants if required for further collection.

Although all participants were knowledge workers, their roles differed from the perspective of levels of seniority within the target organisation. Figure: 3.2 below shows their relationship within the organisation.

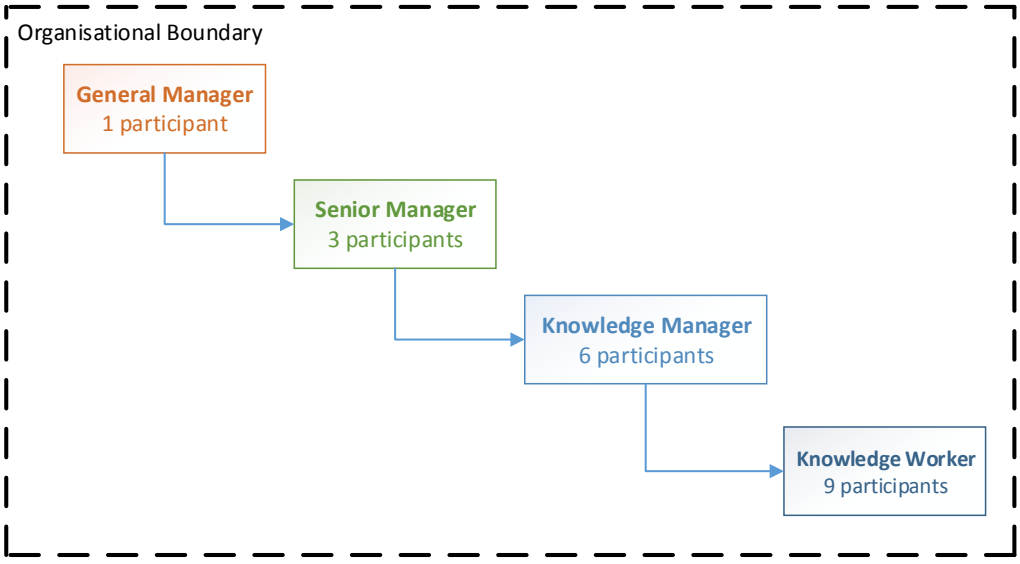

Figure 3.2 Interview participants based on role within the organisation

Note: The Figure above depicts the seniority levels of the organisation and not direct reporting responsibilities.

The participants were selected from every level of the organisation to try to ensure that different responsibilities had the opportunity to reflect opinions based on experience and seniority to try and collect as rich as possible data as part of the collection process. All participants have been responsible for the collection and management of knowledge during their careers. The number of participants size selected for the data collection was based on the need to gather a thick description and to enable a thick interpretation of each individual case (Denzin, 1989). The participant selection process was based purely upon the roles and experience of the participants and was not done through a gendered lens, refer to Table 4.2 in Chapter 4.

3.11 Data Analysis Framework

Analysis for this research project will be carried out using template analysis. Template analysis is also known as codebook analysis or thematic coding. This method is used widely and adopted for many research projects where qualitative analysis is required. The key emphasis of this approach focuses upon themes or aspects of data (King, 1998), using codification and categorisation as a method of identifying common themes. This approach uses explicit codes as the starting point of the analysis process. These are often derived from the questions generated from the literature review. Initially, a defined list of codes or "template" are created; this is based on theoretical perspectives, prior research, or preliminary scanning of the text" (Miles and Huberman, 1994:381).

During the coding process, themes are applied against the transcribed data and then collected into relevant hierarchical structures before being coded even further to a more comprehensive level. King (2004), discussed that for content analysis, codes are usually encoded at the beginning and are applied to the text to generate qualitative data. Furthermore, the initial codes or template are revised on an ongoing basis during the analysis phase.

From this perspective, template analysis is an inductive approach initially, as normally it starts with selected pre-defined codes, within the initial template. Before the template is constructed, the researcher must methodically work through all transcripts focusing on the research target. This will allow the researcher to revise the template, finally achieving the final structure by streamlining codes within the template. King (2004) discusses that the changes made in this process typically include insertions, deletions, scope changes and classification changes or enhancements. Therefore, template analysis becomes inductive, as observation of reality during the analysis phase extends the initial template. The "Template analysis" approach is utilised within this PhD research to investigate the elements affecting the research goal. The complete thematic coding can be found in Appendix 3.

3.12 Ethical Considerations

The following section depicts the ethical considerations given to this study.

3.12.1 Informed Consent

Participants should always be asked to give prior informed consent before participation. For respondents to give informed consent,

- The researcher must notify the participant of the purpose of the study, the basic structure of the process, duration and what it will be used for.
- The researcher must inform the participant that all questions are voluntary, and they do not have to answer.
- The researcher must inform the participant that they can withdraw from the process at any time.

Beyleveld and Brownsword (2007) have identified as fundamental elements of a valid consent that it should be an unforced choice (in the sense of freely given, as they explain) of the individual on the one hand and that it should be based on relevant knowledge and understanding on the other.

3.13 Organisational Consent

The researcher's current organisation agreed to ethical consent prior to any data collection activities commencing. All senior management and relevant parties where informed prior to initiation of the data collection process and were notified of participation by any direct reports or team members throughout the organisation.

3.14 Confidentiality and Anonymity

The notion of confidentiality is underpinned by the principle of respect for autonomy and is taken to mean that identifiable information about individuals collected during the process of research will not be disclosed without permission (BSA, 2004). It is imperative that researchers keep participants identities confidential if this is requested by the participant. To ensure confidentiality, researchers should apply codes to participants of which cannot be traced back to a participant within the study. Furthermore, all personally identifiable information shall be excluded from the study.

3.15 Anonymity

Anonymity should also be taken seriously, ensuring the anonymity of all participants within the study and this should be expressed to the participant prior to their involvement. This safeguard ensures the privacy of the participant and helps to put the participant at ease.

3.16 Chapter 3 Summary

For the purposes of this study, and to offer the best outcome for an effective theoretical framework, a social constructionist philosophy was determined as the best approach with a focus on interpretivism. Furthermore, this is seen to offer the most effective outcome for qualitative research, using an inductive approach to the data collection process.

Using template analysis and NVivo V11 to collect and collate the comprehensive data collection available. A node-based framework was developed to aid in the collection of the required data. The first stage being to conduct the interviews with the participants who agreed to take part in the study. An inductive approach whereby semi-structured interviews with key knowledge workers were carried out using questions based on gaps identified from the literature review. Initially, a pilot study verified the stability of the interview questions prior to commencing with the full collection process. The framework being populated by the transcriptions generated from the semi-structured interviews. Details of the data collection tools, processes and analysis are discussed in detail in Chapter 4.

CHAPTER 4: DATA ANALYSIS AND STUDY FINDINGS

4.1 Introduction

This Chapter reviews the qualitative data collected from the interview participants, critically analyses the findings and builds upon these findings to identify a theoretical solution. Based on the methods discussed in the previous Chapter, the researcher will use template analysis against the qualitative data and build upon a framework that aims to address the issues raised during the collection process.

Many of the participants within the interview phase, highlighted the need for processes or a framework to establish a way of effectively managing KM processes.

Throughout this Chapter, examples of transcribed responses from the semi-structured interviews are included and used to support the finding and analysis. All transcription data is represented in quotations and italics. Transcription excerpts are examples, pulled from the full data set, which totals approximately 102,000 words, and so cannot be included in its entirety.

Appendix 3 contains all the nodes with coded transcription and counts per node and further supports the corresponding findings.

4.2 Demographics: Semi-Structured Interviews and Interview Participants

This section gives an overview of the interview participants and associated locations that participated in the semi-structured interview processes. In total, 19 respondents were interviewed in person across 5 UK locations. All locations are part of the organisation being researched although some operate autonomously under the umbrella organisation. There was an initial pilot study of 5 participants to verify the credibility of the questions prior to completing the full interview process. The pilot study concluded the interview questions were valid and so the 5 pilot participants are also included as part of the overall 19 participants within the data collection pool. Initially, 25 participants had agreed to participate, however upon analysing data from interview 19, it could be seen that saturation point had been achieved from the responses.

The organisation comprises of approximately 4000 employees within the UK. All employees interviewed are defined as key knowledge workers within the organisation to avoid skewing results outside of the target research area. Interview participants were selected because of their role as a knowledge worker within the organisation. Table 4.1 below shows the average knowledge and experience timespans for the participants included as part of the semi-structured interviews:

Table 4.1 Timespans of experience for Interview participants

Area of Experience	Timespan in Years
Average Time as Knowledge Worker	18.79
Average Time working at the current Organisation	15.47
Total combined years of experience	357
Total combined years of time with Organisation	294

In addition to Table 4.1 above and the summarised timespan data, Figure 4.1 below shows the number of years' experience as a knowledge worker:

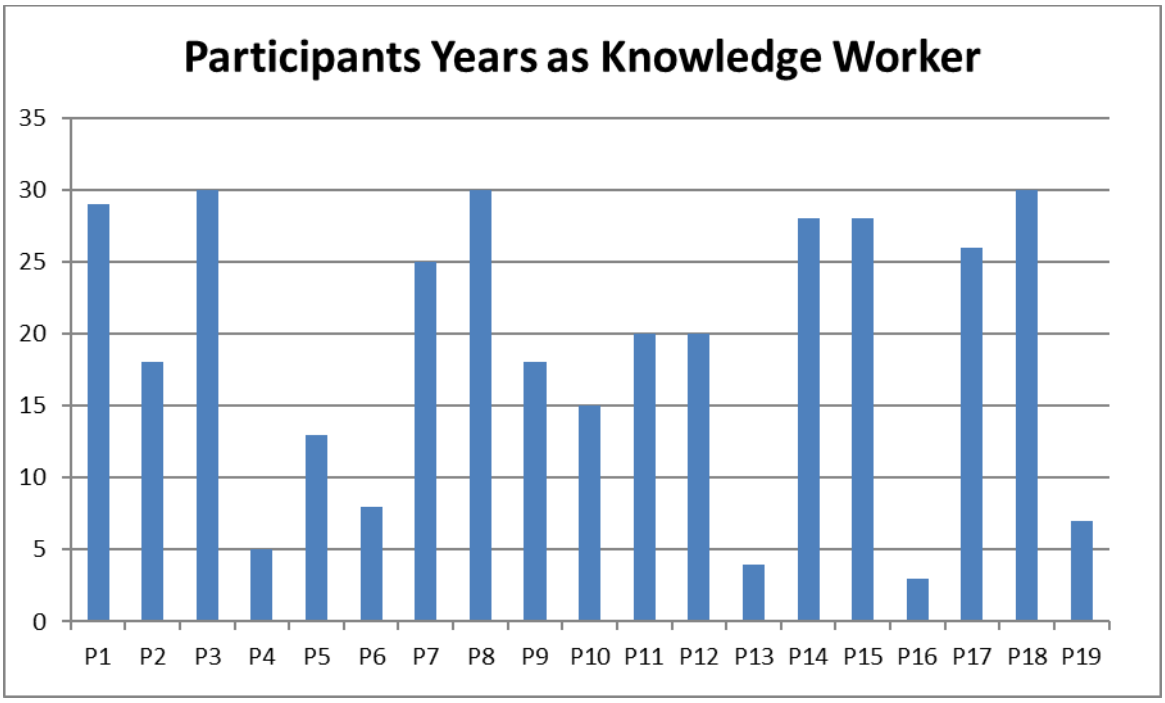

Figure 4.1 Experience as a knowledge worker by participant

The most experienced participant interviewed had 39 years of experience within the organisation, while the least had only 3 years of experience. In addition to experience in years the employees were further grouped by role type from Knowledge Worker to General Manager, with the General Manager being most senior and equivalent to a Chief Executive Officer. Figure 4.2 below shows this:

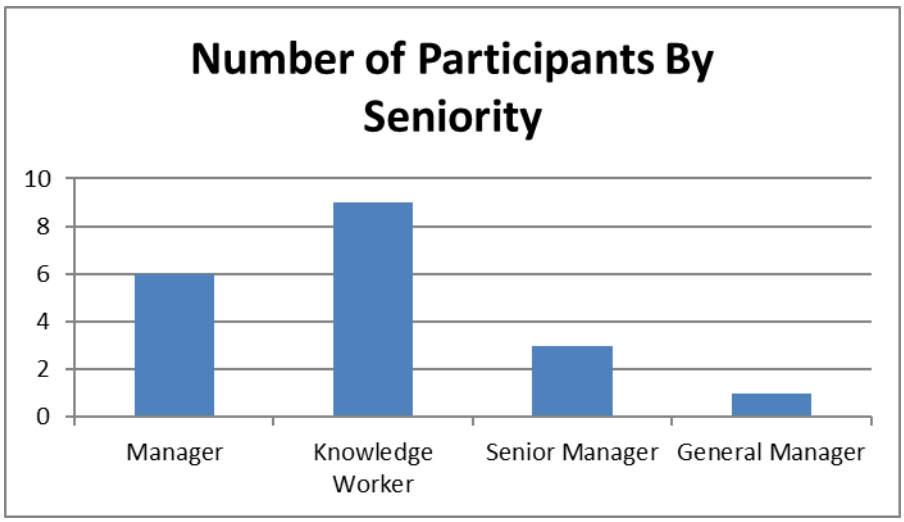

Figure 4.2 Interview participants by role type

Participants are based at several geographical locations across the UK. All locations are directly related to the organisation. By selecting participants from various physical locations, this ensured consistency in the roles and experience for the participants selected for the interview process. There was no requirement for geographic analytics. Figure 4.3 below shows the geographical spread:

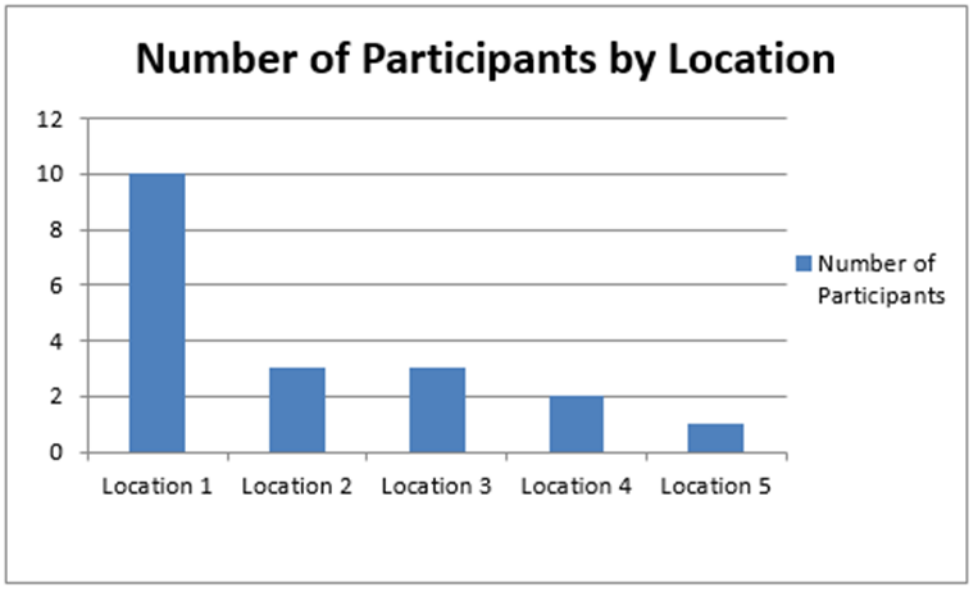

Figure 4.3 Interview participants by location

Table 4.2 Interview participants

Candidate Number	Pilot Candidate	Identified in Study	Role	Time as KW (years)	Date of Interview	Word Count	Gender	Location
P1	x	Participant 1	Manager	29	19/06/2017	6982	Male	Location 2
P2		Participant 2	Knowledge Worker	18	19/07/2016	5683	Male	Location 2
P3	x	Participant 3	Knowledge Worker	30	23/06/2017	3081	Female	Location 1
P4		Participant 4	Knowledge Worker	5	16/08/2017	3965	Male	Location 3
P5	x	Participant 5	Knowledge Worker	13	04/07/2017	5073	Male	Location 1
P6		Participant 6	Manager	8	01/09/2017	6427	Male	Location 1
P7	x	Participant 7	Knowledge Worker	25	19/06/2017	3884	Male	Location 2
P8		Participant 8	Senior Manager	30	16/08/2017	5478	Male	Location 3
P9		Participant 9	General Manager	18	24/08/2017	8213	Male	Location 4
P10		Participant 10	Manager	15	24/08/2017	4971	Male	Location 5
P11		Participant 11	Senior Manager	20	15/08/2017	6846	Male	Location 3
P12		Participant 12	Knowledge Worker	20	20/07/2017	8749	Male	Location 1
P13		Participant 13	Knowledge Worker	4	26/07/2017	2407	Female	Location 1
P14		Participant 14	Knowledge Worker	28	20/07/2017	3806	Female	Location 1
P15	x	Participant 15	Manager	28	23/06/2017	4246	Male	Location 1
P16		Participant 16	Manager	3	24/07/2017	3185	Female	Location 1
P17		Participant 17	Manager	26	19/07/2017	6394	Female	Location 1
P18		Participant 18	Senior Manager	30	15/08/2017	5965	Male	Location 4
P19		Participant 19	Knowledge Worker	7	04/09/2017	6394	Female	Location 1

Table 4.2 above shows the complete listing for participants of the semi-structured interview process. For anonymity purposes, the candidates' names have been changed to Participant #; age and time served information has also been removed and the physical locations have been changed to locations 1 – 5. Participants all work for the same organisation and cannot be identified by any other details listed above

4.3 Data Analysis and Study Findings

The primary focus of this Chapter is to analyse the qualitative data as part of the semi-structured interview process.

A process of template analysis and grouping was applied against the data, and graphical node structures are used to present the emerging data and relationships between the different data elements. The software used for the analysis process was NVivo V11. The dataset ensured that, in addition to the rich data collection, rich themes were built in accordance with qualitative research methods and offered a way of consolidating findings effectively. The themes allowed for the grouping of key elements directly affecting nodes within the template structure. This coupled with the capability of NVivo V11 to build relationships between node based structures allowed for the outcome of comprehensive node based clusters. These in turn were used to develop the KSC thematic framework as an outcome of the findings as shown in Figure 4.54.

As a starting point, as with any thematic review of qualitative data, three initial high-level nodes are introduced for the grouping and analysis process. These are Knowledge Acquisition (KA), The Physical Organisation (TPO) and KM Technology (KMT)

From the questions derived from the literature review, it is assumed that the need for a cross-boundary knowledge framework is a significant need of the organisation and therefore this research now begins to delve into the key elements that would make up an effective framework. The proposed theoretical framework is complex and comprises of three key areas that make up the complete life cycle approach. The three core areas are defined below as:

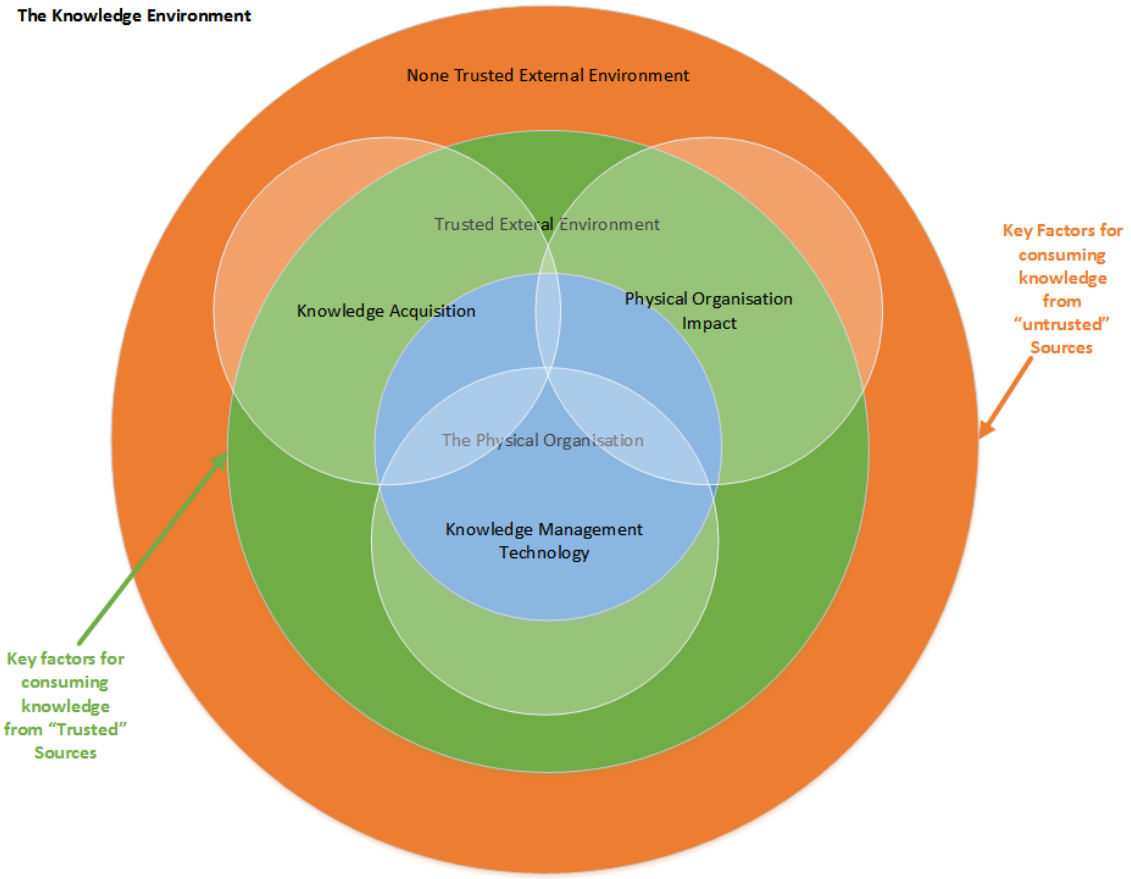

Figure 4.4 The targeted knowledge environment

The core areas defined above cover the areas identified from the data collection process that have a direct impact on the organisation's ability to be able to effectively manage knowledge as an asset. These areas are presented, based on the target area and the research question. As highlighted in Figure 4.4, Area 1 (The Physical Organisation), relates to the physical organisation and the existing processes that affect it. Area 2 (Trusted External Environment) relates to what the organisation perceives as external third-parties, but a level of trust exists between the organisation and these external organisation, enough to consider consuming knowledge directly from these organisations. Area 3 (None Trusted External Environment) relates to third parties beyond the organisational boundary where there could be trust issues in dealing directly with these organisations but there could be value in consuming knowledge directly from them.

4.4 Establishing the foundations for data collection

As discussed in 4.2 above, three high level nodes were established based on the research question to begin the thematic coding process: These were 1) external knowledge acquisition, the organisation's ability to consume knowledge from outside of the typical organisational boundary, 2) the physical organisation, to understand how the

organisation is affected by internal factors and 3) knowledge management technology. This is further illustrated against the research question below:

"How can the KM life cycle be detached from existing organisational processes as an "autonomous entity", taking into account the ***(1) knowledge acquisition, (2) physical organisation and (3) technical factors*** *required?"*

These initial nodes are shown in Figure 4.5 below and establish a basis for the rest of the coding process. Upon application of the base level nodes, the initial pilot study, which comprised of 5 participants, was completed. The pilot study, set the basic thematic structure for the full analysis phase. The emerging nodes are discussed in full throughout the rest of this chapter.

Initial transcriptions for the first 5 pilot interviews were approximately 29,300 words and were sufficiently rich enough to establish a basic node structure. Even at this early stage, it was beginning to emerge as effective based on the output of the literature review. The total word count for the transcribed interviews was approximately 102,000 words which were then analysed and applied to nodes within the initial node structure developed from the research question. During the interview process, it was beginning to emerge that data saturation point was beginning to occur. Originally, 20 participants were targeted for the interview process but at participant 19 it was determined that saturation point had been achieved.

Transcriptions commenced during the interview stage, with interviews being held at 4 locations over a 7-week period. Transcriptions took approximately 3 – 5 hours per transcription, equating to approximately 110 hours in total to complete all interviews.

Each of the three core nodes make up the key areas for pursuing further analysis towards a potential framework. These core nodes being used for the knowledge gathering activities (key area 1), feed the second key dependency for the dependent variables (key area 2) to be able to manage processes and knowledge within the organisation and finally (key area 3) ensuring the organisation has the technical capability to effectively manage the processes and digital assets as needed. Applying King's (2004) template analysis within NVivo V11, the nodes are mapped at a parent level as shown in Figure 4.5 below:

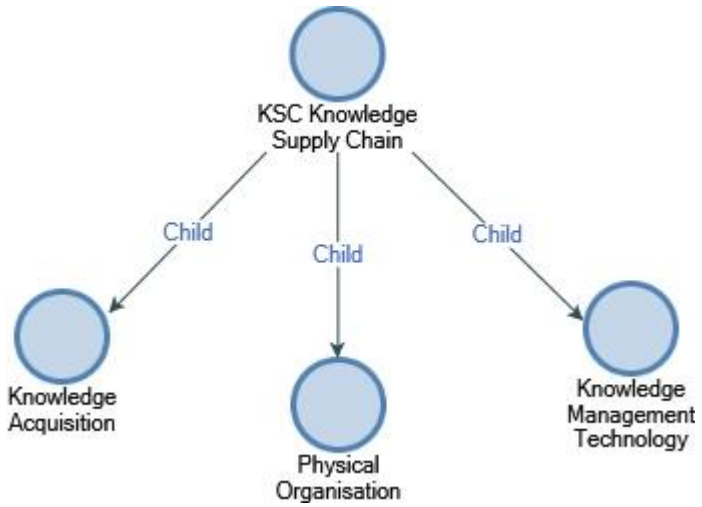

Figure 4.5 Parent Level Nodes

The parent level node for collecting and grouping all the thematic nodes is defined as the Knowledge Supply Chain (KSC). From this initial grouping, the three key areas for further investigation are identified and coded with a unique value Knowledge Acquisition (KA), Physical Organisation (TPO) and KM Technology (KMT) as shown in Figure 4.5. The next stage is to dissect each of the three key areas and identify key element and relationships between them.

4.4.1 Knowledge Acquisition

The initial acquisition of knowledge, particularly externally acquired knowledge poses a significant challenge because in the context of the professional environment, the key area factors can change without notice and potentially have a significant impact. For example, a single change in resource capability (i.e. an employee leaves the organisation from a selected KP) may render that feed redundant. This alone is only a single factor in the potential issues relating to the impact of the key areas that make up the knowledge acquisition flow. The predominant factors affecting of knowledge acquisition within key Area 1 are shown in Figure 4.6 below, followed by an explanation of how these nodes are derived:

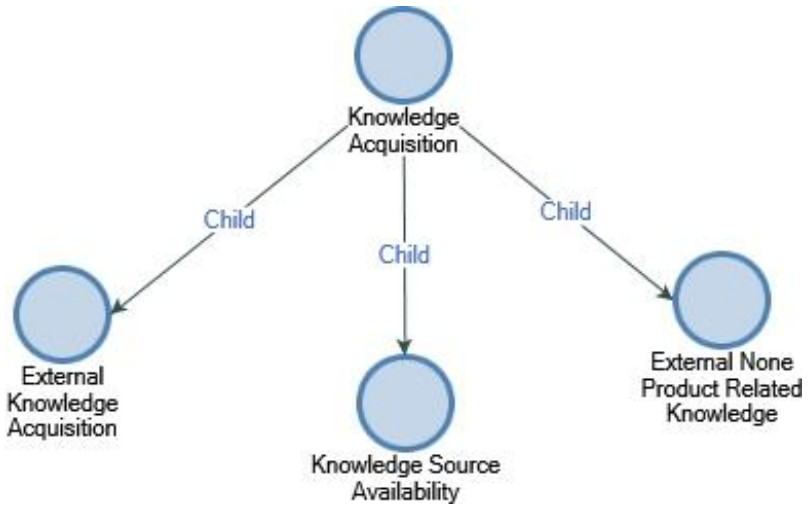

Figure 4.6 Knowledge Acquisition Child Node Relationships

From this, each of the child nodes will now be analysed inductively in more detail to highlight key issues and requirements in sections 4.3.2, 4.3.3 and 4.3.4 respectively.

4.4.2 Knowledge Source Availability

"Knowledge Source Availability" refers to the physically available knowledge sources within the overall research environment. These two providers emerged from the data and are discussed later in sections 4.3.3 (key knowledge providers) and Section 4.3.4.3 (consumers). The excerpts from the transcripts after Figure 4.7 also show the basic emergence of these two available knowledge sources. Typically, from the data analysis, two key areas are derived from the findings, 1) Key Knowledge Providers and 2) Consumers. "Knowledge Source Availability" refers to the physically available knowledge sources within the overall research environment. From the data analysis, two key areas are derived from the findings, 1) Key Knowledge Providers and 2) Consumers; these two providers are discussed further in sections 4.3.3 and 4.3.4.3, respectively. The excerpts from the transcripts after Figure 4.7 also show the basic emergence of these two available knowledge sources. Figure 4.7 below shows this relationship:

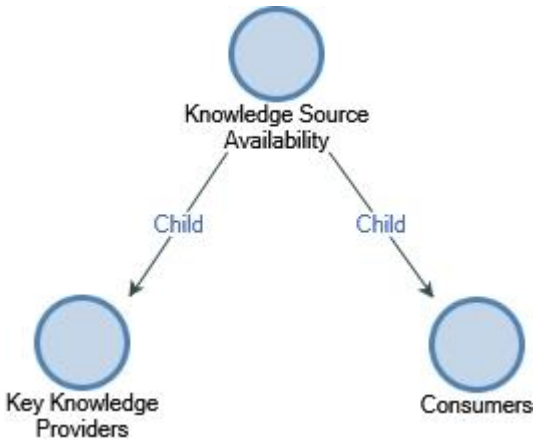

Figure 4.7 Knowledge Source Availability

From this we identify below that as well as having key knowledge providers with a need to feed into the organisation's KM process, there is also a need to consume a feed from consumers. Typically, the consumer is the end of the process, however, findings depict that there is value from also feeding knowledge back into the KM creating a cyclic process. This is reflected in the comment from Participant P9 who expressed:

"if it is something that is legislatively driven, it gives us quite a strong communication angle when we are speaking to our customer and the marketplace who are the ultimate consumer"

Consumers as knowledge providers is discussed later in Section 4.3.4.3. However, consumers as a source for knowledge within this environment is extensive, therefore the source of this knowledge need to be considered carefully. Sources of knowledge come with both pros and cons. This would be expected when approaching knowledge consumption from the perspective of not limiting knowledge sources flowing into the organisation. From an advantageous perspective on the acquisition of knowledge from external sources, participant 12 expresses:

"it is key! There is nothing better in this world than being given good information to be able to do your job."

This reflects a direct impact on making day to day knowledge processing easier. Participant 9 then went on to explain why knowledge from a trusted source has such a positive effect:

"You need one-digit difference for instance, between 3182Y and a 3082Y, they are totally different cables and if you get them wrong, it can come back with serious consequences. For instance, because one is flame retardant and one isn't"

This is also significantly important because it is the first time we see a relationship between the external source of knowledge and the potential impact it has upon existing knowledge processes within the organisation. Figure 4.8 below depicts this relationship:

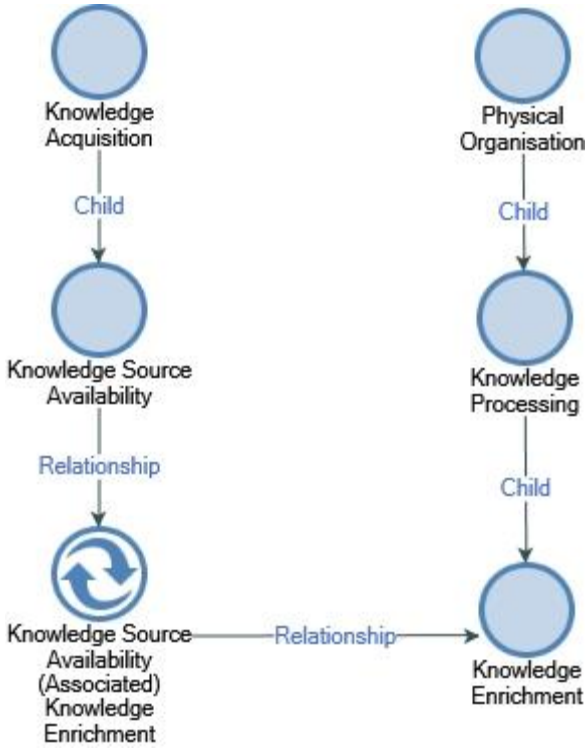

Figure 4.8 Relationship between the external source of knowledge and internal knowledge processing capabilities.

In this scenario, participant 9 identifies the seriousness of the consequences about knowledge having a direct impact on the consumer when it is not articulated effectively. In addition to "trust" in where the knowledge is sourced from, there is a relationship requirement to the physical organisation for processing this knowledge effectively. This is covered further in The Physical Organisation later in Section 4.3.9. It is shown above, to depict the relationship for clarity.

As the organisation begins to consider the relationships required for which knowledge to consume from which knowledge suppliers, then we begin to move from the requirement to have knowledge sources to what are the key values required to define a knowledge source. These need to be considered separately for both external knowledge providers and end consumer feedback into the cycle. Here, key values emerging from the transcripts will play a crucial role in the selection process. Participant 13 expressed concerns about availability and the selection process as:

"we often get all of the wrong information. I think we would be able to get what we need and also get it quicker if we had direct relationships with knowledge suppliers"

Although this is a simple enough requirement, there are distinct differences between knowledge provider relations and consumer knowledge provider relations. Typically, the consumer will always be the end user of knowledge provision from knowledge providers, therefore consumer knowledge would form a different purpose to the original knowledge acquisition and definition i.e. feedback on services, products or application vs usage and availability.

In addition to the different sources of knowledge from different knowledge providers, there is also the element of commodity providers or those with competing goods or services. In this scenario, consideration needs to be given to which sources are most relevant. If all sources are of a high quality, how do you avoid saturation? Participant 9 expressed that as well as similarities in the knowledge consumed, there could also be underlying issues such as commercial viability and competition:

"you are constantly working with that and for me it comes from a variety of different places. Sometimes you'll see a product and competitors beat us to the punch and on occasion there is an element of subtle plagiarism possibly."

Participant 12 also re-enforces the argument of availability vs saturation but also introduce the issue of recall.

"It has got to be an inevitability surely; the only downside is that repetition is a key"

Therefore, the knowledge provider selection process becomes more relevant as the key elements affecting the knowledge selection process become more prevalent. As well as prevalence, pro-active knowledge providers also need to be considered carefully. Pro-active knowledge providers may be pushing knowledge rapidly for their own agenda. However, a pro-active approach to building up knowledge provider relations with external sources is typically seen as more positive than negative. Participant 14 expressed:

"in my experience some suppliers are very proactive in sending something once a month, then you have suppliers who don't send anything for literally years and they expect the branches to call them and they just don't supply us with anything"

Here participant 14 expresses the importance of regular updates for knowledge to remain valid, but also, they emphasise the frustration of a lack of knowledge from other providers. The distinction between "core knowledge providers" (CKP) and "none core knowledge providers" (NCKP) begins to emerge and the ability to have different types of providers. This distinction will be broken down further later in Sections 4.3.4.2 and 4.3.4.3 respectively.

4.4.3 Key Knowledge Providers

From the data in Section 4.3.2, the importance of key knowledge providers begins to emerge. Whereas previously the organisation considered knowledge from all source equally, there are emerging patterns which differentiate requirements based on the originating source. Key knowledge providers are seen to bring more than knowledge about products or services to the table but also knowledge about the environment, regulatory information or general marketing trends to impact the environment. Participant 9 reflects on this; their organisation's need to consume marketing rich knowledge due to their narrow marketplace within the industry:

"the key information we'd get for location 5 would be information about the rapidly evolving marketplace. It's technology centric and as old technology is being phased out there is new technology being brought in. So that information is of vital importance as much as it influences key decisions."

The technology being discussed here is related to the massive move in the LED (Light Emitting Diode) market and the issues the organisation face in keeping up to date for this narrow product type but within a broad global market space. As the organisation defines these types of products as commodity items, it is crucial that external knowledge comes from valid sources, as the impact can be significant on commercial viability. Participant 1 re-enforces this point further:

"it is all well and good recording it once, but it becomes outdated. Things have a life-cycle so there needs to be set points for review in ensuring what we hold is still current. I think that is an area where we could be better at"

The importance of timeliness and validity now begin to emerge, but only for CKP. This is re-enforced further by participant 10 who discusses:

"Sometimes the suppliers are complacent and don't give us that information in time. The ones that we have good relationships with do. The ones we don't have good relationships with, I suspect for one reason or another, maybe we're not a big customer, we might not be getting preferential treatment and the communication might not be filtering through to our business quickly enough. Where, if you have a centralised team, chasing these suppliers for the information, periodically, maybe thigs would be different"

Participant 10 also discusses here that timeliness is not only a measure of the status of knowledge assets but also the speed at which it is collected and maintained. Furthermore, how this is affected by current organisational structures and the lack of a centralised

organisational process. The physical organisation and organisation structures are discussed later in Sections 4.3.9 and 4.3.9.8 respectively; Figure 4.9 below shows this relationship for clarity:

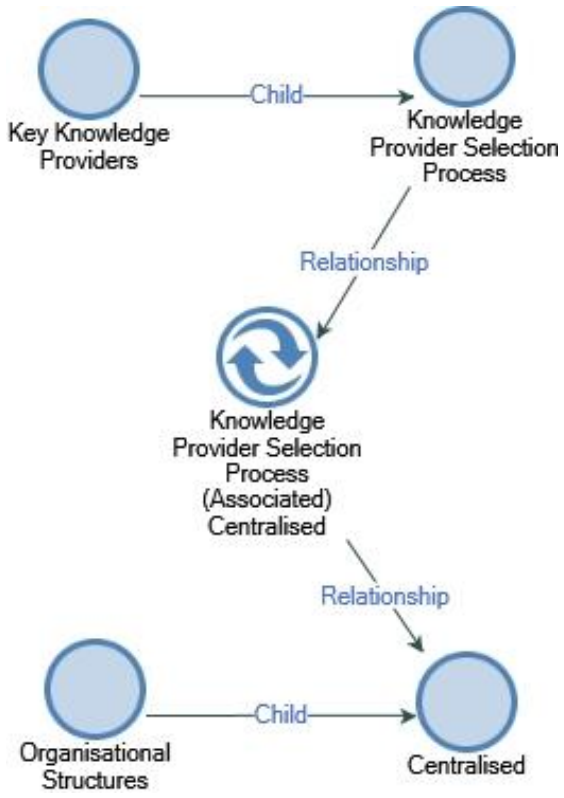

Figure 4.9 Relationship between the external source of knowledge and internal knowledge processing capabilities.

NCKP are typically smaller or emerging organisations who predominantly focus on high sales and growth, therefore, the same level of trust, as a requirement, is not emerging from NCKP. This is further re-enforced by participant 9:

"The thing that comes to mind for me is "licence to trade" suppliers. They have been through a mild vetting process and clearly, they are trustworthy. They have some integrity and all the rest of it and for me I'd rather focus on them and for whatever reason we need to go further afield, and that might be product driven or price driven etc., we can reach out to these other people, they are not excluded from us, but the nucleus of what we are dealing with needs to be reputable"

The importance of the ability to select values for CKP emerges from this statement and shows the importance of specific values to use in the knowledge supplier selection process. However, the importance of still being able to access knowledge from other KP remains a key requirement.

4.4.4 Knowledge Provider Selection Process

The Knowledge Provider Selection Process as it is referred to it here, relates to the difficulties for inter-firm relationships and differences between the consuming organisation and the knowledge provider. They have a direct impact on the capability to generate effective knowledge and knowledge processes based on a knowledge sharing requirement as discussed previously within the literature review (Keupp *et al.*, 2012; Woiceshyn and Daellenbach, 2005). This has a direct impact upon Inter-Organisational Knowledge Communities in addition to the impact upon relationships between the selected knowledge supplier and the organisation. From the data discussed in Sections 4.3.2 and 4.3.3 above, there as three key areas which define the KPs as shown in Figure 4.10:

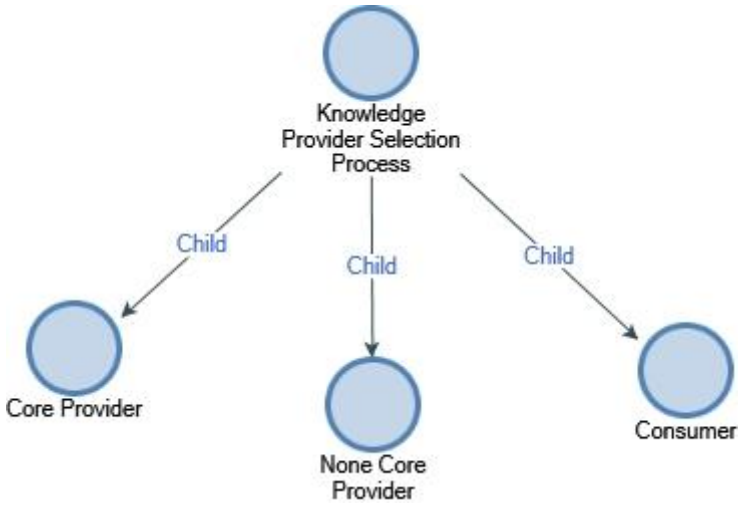

Figure 4.10 Primary Available Knowledge Channels

The investigation of the importance of effective supplier selection is focused upon as a crucial factor of any potential theoretical Framework.

Previously in this section, KP were discussed, now this is broken down further to begin to consider the different KP types and the key values that affect each of these KP types. The findings from the data showed that there were different requirements for consuming knowledge from different knowledge sources, however there are distinct similarities for the key values required within each of the three sources shown in Figure 4.10 above. This will be discussed in more detail in Sections 4.3.4.1, 4.3.4.2 and 4.3.4.3 when discussing the individual source types.

Some factors affect the source selection process directly however, such as the source selection pool size. The source selection pool size is defined as the number of available knowledge sources the organisation has access to. For this organisation, currently, this is

approximately 31000 potential knowledge feeds. Emerging out of the data is the discussion of quantity vs quality of knowledge. It is generally accepted that the larger the number of sources, the more difficult it is to manage knowledge assets. However, restricting this pool will inevitably have a commercial impact. Therefore, it is essential that a balance is achieved between quality vs quantity and which key values are used for determining which provider falls into which group. Participant 10 explains:

"We are a large organisation; we have 400 autonomous branches selling across the UK. For each town, region, their customer base is going to be so diverse and what sells well in London doesn't necessarily sell well in Newcastle or Manchester. Having choice will cater for everybody's demand"

This clearly defines the need for a significant knowledge source pool. This is reflective of the need to remain consistently competitive within the marketplace. Participant 7 re-enforces this idea:

"Yes, great value in a large source. I'd like to put a cash value on it but there is an undefinable value in it as well. In my experience, for certain customers we we're their quality provider and they wouldn't even look anywhere else"

Even though Participant 7 expresses the value in having this very large source of knowledge, they also allude to the fact that there is an undefinable value in this approach and begins to discuss the value of "quality". It is here that consideration needs to be given to the difference between a CKP and a NCKP. Participant 9 discusses the values of reducing the knowledge pool to enhance the quality of the knowledge asset:

"working with less suppliers means I can spend more time building up rapport with these suppliers, which is, for me, crucial"

Although this could have a commercial impact, there would be an advantage in consuming less and maintaining this to a higher standard. However, Participant 7 suggests that there is a hybrid approach to this by not limiting the number of sources but having a "preferred" or "CKP pool" within the knowledge selection process to maximise both commercial effect, quality and consistency:

"If you reduce the number of knowledge suppliers it's easier to manage. The larger you are the more difficult it is to reduce these suppliers, across the nation the customer will want different things"

At this point, the key values for each of the three potential knowledge sources as shown in Figure 4.10 need to be considered from the findings. These key values will be used to define the minimum requirements that would be effective within the current research environment.

4.4.4.1 Core Knowledge Provider

A CKP would be any KP who can be defined as a "trusted" source of information. Many of the interview participants stressed the importance of having a level of trust with a KP when the aim is to consume such knowledge or generate knowledge assets with limited additional enrichment. Participant 19 highlighted this requirement:

"For our subscribed suppliers, we really trust them, you really have to trust them to get the full benefit. If you choose the wrong partner you could have all kinds of issues, like you could have invalid information shared, our valuable information could be taken"

Furthermore, Participant 19 goes on to discuss the value in having many potential trusted sources who can feed into the organisation:

"We've got so many different suppliers we work with, some are really excellent, we know all the data will come in, on time, in the right format"

Participant 15 also re-enforces the importance of trust for a CKP but also considers this from the position that this knowledge will, at some point, be consumed again beyond the organisational boundary:

"Basically, it is trust and reliability then you know if there is something that needs to be changed then they (knowledge suppliers) will let you know. They are then going to want to tell us because we are putting this back out in the field and it could cause them issues too"

From this statement, we see the need for a framework that can re-distribute knowledge back beyond the organisational boundary to the final consumer as part of the overall process. The trust dependency has a more crucial impact here because there may be scenarios where the knowledge is simply passed through the organisation and this knowledge must only be from a trusted source. Participant 11 discusses these concerns and the impact of having a broader source of knowledge without controls in place:

"that is the danger of spreading your net wider, you are going to catch a lot more invaluable information. You have to make sure once you have all of that, if your process is doing the filtering then you have to spread your net as wide as you can"

This definition identifies the need to consume knowledge from NCKP but with the relevant controls in place for each source. The clear message emerging is that "Trust" is a key value for CKP, selected to be part of the knowledge acquisition process. Participant 19 discussed the positive effect of consuming knowledge from trusted sources:

"We know, through many years of experience, that data is not going to have any errors in it, they're like a trusted source, it's one of our trusted sources. That's the cream, for us"

Trust itself is not an independent value and has an impact on other elements of working with a trusted KP. Participant 14 discussed the potential effects of the trust relationship which a provider:

"You need to have trust. It must be commercially viable for each side. The information shared, needs to be correct or it's not going to work. Both parties must get on, have a good relationship. And, probably you should contact the same person all the time, have one person on their side, have one person on this side"

This discussion emphasised not only the need for trust but trust as part of a relationship with a KP. This is only viable for a CKP as this relationship is not always possible with a provider. It also emphasises the need to have an explicit point of contact with a KP, or specifically a subject matter expert (SME). From this emerges the need for a physical relationship to exist for a CKP to be able to consume knowledge externally from a trusted source. This is shown below in Figure 4.11:

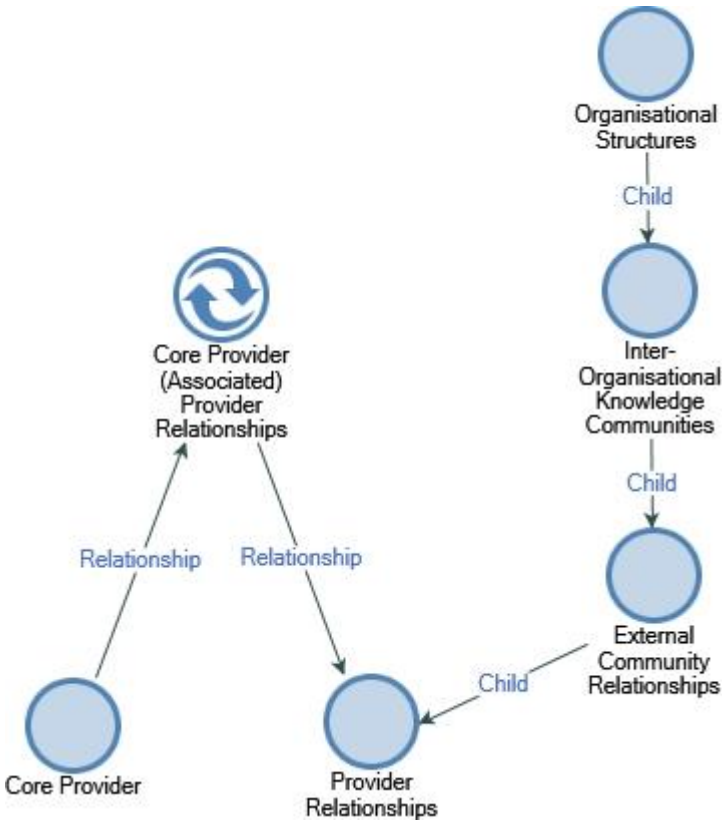

Figure 4.11 Trust Dependencies between knowledge acquisition and the physical organisation

Figure 4.11 above shows the dependency between the physical relationship of the organisation and the external KP and the impact of trust as part of the relationship. In addition to the physical relationship element, trust has a direct impact on the physical knowledge or knowledge assets consumed and how that is managed. Participant 16 alluded to this by stating:

"we would choose suppliers who we know will provide quality data and regularly. If they aren't reliable at provide information, then they are not a quality supplier"

Both quality and reliability are important factors when selecting a CKP; the trust factor assumes that both elements will be of a sufficient standard that limited internal enrichment would be required. This in term would mean that the knowledge could be consumed, managed and re-distributed without a significant chance of error arising. This would have a positive impact on processing times and availability, this would not be achievable for NCKP. Participant 8 addressed this point:

"I think that discussing the factors with suppliers and customers always helps. Whether you accept the information you're getting, and again you are going to filter it through and

put it back into your own environment to see whether it's going to be beneficial to you or useful to you"

These kinds of discussions are only possible with core providers due to the physical relationship that would exist between the two parties. From these relationships, we now see two additional key values arising Quality and Consistency which emerge as a requirement for an effective relationship. Validating these details with a provider prior to consuming knowledge will ensure that a level of validation exists at both the provider and the internal organisational environments. Participant 4 discusses the importance of validation for consuming quality information:

"The validation in their company, in their quality systems, their credentials, have they worked with other people"

Furthermore, it brings credibility into the forefront and the KP ability to work effectively based on their performance with other organisations. Currently, the organisation only deems a knowledge supplier credible if they have traded for more than 5 years or is a governing body or issuing authority. Therefore, we can consider two additional key values for the selection process Credibility and Longevity emerging from the data. Other factors such as co-operation could differentiate a provider between core and none core, for example Participant 19 discusses:

"If the supplier isn't cooperative that really holds up the process, we wait for them to fill in gaps. Some suppliers are good, but some have the same problems every time. Sometimes a supplier will give us a data dump and we have to work through it to get what we need, that takes the most time because it's usually a complete mess"

When a provider is not deemed to be co-operative, reliable or credible then that provider would not be deemed a CKP. Therefore, they would fall into the remit of the none core product provider key requirements. This would then consider likely enrichment requirements that would not be needed otherwise. It may be that an additional level of assistance is required for some core providers, simply due to their own capabilities. Participant 17 explains this impact:

"Understanding of what each party needs. It's no good us asking them to send us X when their system won't do that, and they don't have a computer, just paper and pen. We have to be able to work with that person with what they have got"

Here is a scenario by which the KP is pro-active and trustworthy, yet their physical capabilities affect their ability to efficiently transfer knowledge. In these cases, a KP

should fall into the remit of a none core provider but with a level of trust which allows their knowledge transfer to be enriched and processed. Typically, this scenario would be considered when there was a significant commercial gain in consuming from the provider. Commercial viability will always inevitably be a contributing factor to the selection process. Historically, the organisation focusses upon high value providers irrespective of the KP key values being considered, however this landscape is beginning to change, as it does not always work out as a lucrative option. Participant 1, discussed their frustration with the current process:

"I think this is a very clear message from the company of who we want to be dealing with but without ever wanting to take the next step in saying we do not want you to deal with the rest. This is because there is a revenue stream that continues to come from the rest"

The last 12 months has seen a clear decision from the organisation that steps should be taken to manage knowledge suppliers more effectively and try to maximise opportunities with core providers. Participant 1 goes on to discuss the value of working with well-known brands rather than unknown brands to maximise knowledge quality and availability. However, as discussed previously limiting knowledge streams could potentially affect revenue:

"A brand with perceived value, let's take Brand X as an example. This is not a particularly competitive brand, but it is one that a customer will buy into and pay more for"

Therefore, brand emerges as a key value for the CKP. Although, this supplier of goods is not particularly competitive, it offers a consistent revenue stream and can be considered a core provider. Currently, this brand within the organisation does not offer the same levels of knowledge for their products, data sheets, technical manuals etc. but they do offer a high level of trust and communication.

For the first time we begin to consider the accumulation of the key values for the core supplier selection process as independent variables as not all key values necessarily need to be satisfied to be a core provider.

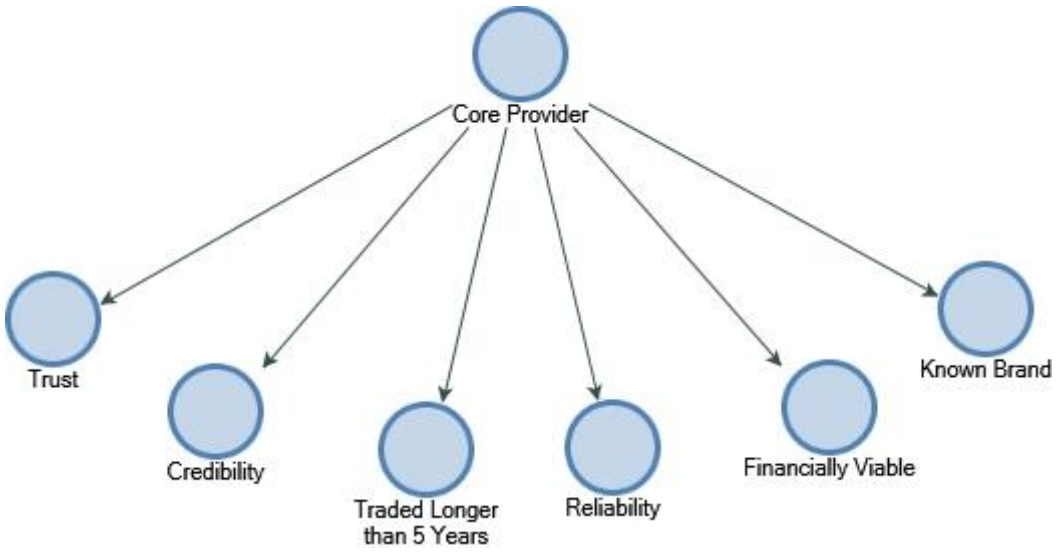

Figure 4.12 Core Knowledge Provider Key Values

In Figure 4.12 above the key values required for a CKP have emerged from the findings as potential independent variables for the selection of a CKP. They are defined as independent variables because not all key values need to be achieved to be a preferred CKP. Three of these key values should be considered as mandatory for an initial selection of a core provider. These are Trust, Credibility and Reliability as a minimum starting point. The other key values could be used to re-enforce the stability of a KP, possibly even providing a way of measuring competing knowledge source providers, where a decision-based approach is required to select from more than one supplier.

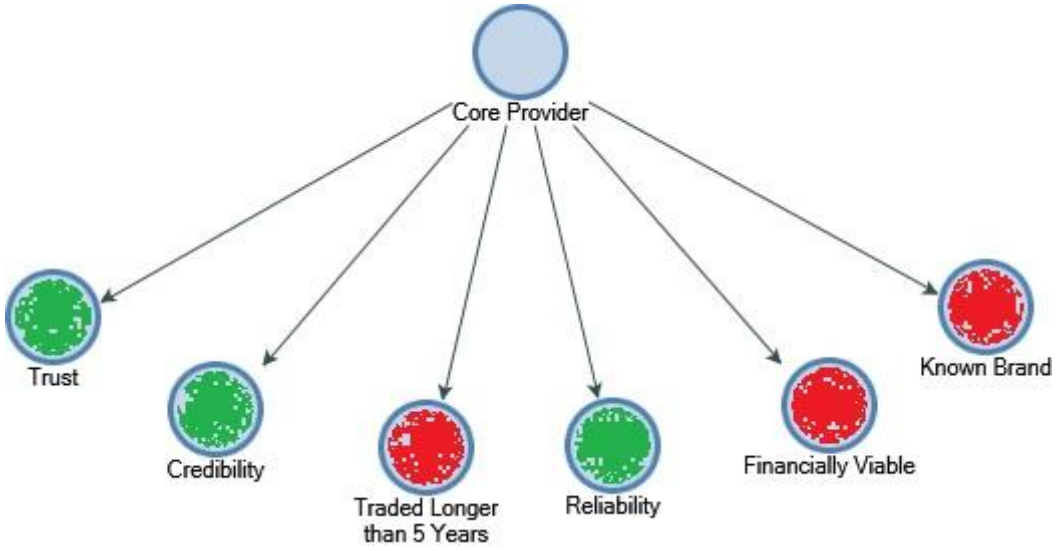

Figure 4.13 Core Knowledge Provider Mandatory Values

In Figure 4.13 above, the minimum values are highlighted in green to define the selection process for the core provider. Initially, traded for longer the 5 years i.e. longevity was also considered as a mandatory requirement but as highlighted from the findings, markets

such as LED are moving so quickly, with so many new providers, longevity is not necessarily a fair indicator for a trusted source.

4.4.4.2 None Core Knowledge Provider

The definition of a NCKP is any knowledge source provider that the organisation chooses to consume knowledge from, which falls outside the definition of a CKP as discussed in Section 4.3.4.1. The approach to consuming knowledge from a none core provider is more heavily scrutinised due to the unknown trust element of the selected source. In addition, the fact that they do not contain any of the key values required to become a CKP.

The initial benefits of allowing a NCKP is that the source pool is significantly larger, and it allows the organisation to consume knowledge from any other external source. This does mean however, that there will be a significantly larger overhead for managing and processing knowledge or knowledge assets. Even though the costs may be higher internally, the consensus is that consuming knowledge that adds value should always be considered. The findings emerging from the data re-enforce this, Participant 16 suggests:

"if we have got a successful company out there who are willing to help you then why not take that help! They may be a step ahead"

This is also re-enforced by Participant 6 who also agreed with not restricting the organisation to dealing with only CKP:

"Personally, I don't think you should restrict who we are dealing with. I think you should trust the people who are on our external committees to share"

Even though participant 6 confirms that an external source should not be excluded because they are not a core knowledge source, they re-enforce the argument that decision-making processes and controls need to be in place to manage these sources. This level of management or control is required because not all short-term trading suppliers are potentially viable. In contrast to Participants 16 and 6, Participant 1 errs on the side of caution:

"It is quite difficult to do that with confidence when the company you are building a relationship with has only existed for 18 months and the company has actually only been around for 5 years"

This assumes there is a relationship being built with a provider, but this will not always be the case. The consensus is that a large pool with controls is the most effective overall

approach. Participant 4 highlights the value of consuming from disparate knowledge sources but again emphasises the need for effective controls to manage the process:

"If you have the resources and the structure in place to organise and manage the data then more would be better in my opinion. You could restrict yourself if you turn people or information away, whether it was market research or whatever. I think if you can manage the load that is coming in in an efficient way, then more would be beneficial to the company"

Participant 4 goes further and discusses the importance of structure and resource in place to manage any knowledge being consumed. A relationship begins to emerge here between the knowledge acquisition process and the physical organisation, more specifically the physical team structure and the dependency on SME. This will be discussed in more detail in Section 4.3.10.3. However, the SME now emerges as the first key value as part of the none core supplier selection process. In addition to Participant 4, Participant 18 also alludes to the same requirement:

"Having a large source, in my opinion, it has got to be a good thing. So, for 30,000 potential knowledge suppliers you have to rely on individual experts to produce the information to give to you guys"

Here we see the need for SME to be strategically positioned within not only the organisation, but also the KM process to allow incoming knowledge to be effectively managed. The comments from participant 18 above express the need to have SME embedded as part of this process. Not all potential knowledge sources are up to a sufficient standard that the organisation would consider viable. Furthermore, it would be unrealistic to expect SME available for each source, therefore, internal SME should exist within the internal organisation, ideally as part of a pool of knowledge resource. Participant 1 re-enforces this argument:

"There are an awful lot of suppliers who really aren't up to the standards that we want. Erm, so I think yes, we are going to be slowly evolving into a different culture"

Even though Participant 1 highlights the concern of working with sub-standard KP, they also acknowledge there is a need to move forward. However, Participant 1 was concerned about the overwhelming availability of knowledge within the current environment:

"Nobody wants to deal with all of the knowledge suppliers on the system when you speak to most senior managers"

This is typically a concern due to the lack of process within the organisation currently and the disparate approach to handling KP and knowledge. As discussed previously, an internal pool of SME would help to alleviate this issue by processing/transitioning knowledge into knowledge assets.

The definition between core and none core knowledge within the provider selection process now begins to emerge as a more definitive factor as part of the acquisition process. The approach of not excluding any sources of knowledge for the organisation is favourable as the consensus is that this level of flexibility is what has made the organisation successful in many areas of the business. Participant 14 re-enforces this fact:

"Flexibility is what makes Location 1 unique, if they can get it they will"

Flexibility is a common term emerging from the data and will appear frequently throughout the finding. With flexibility, comes additional overhead for managing and processing knowledge as previously discussed. Unlike CKP, disparate or none core providers will inevitably have a reduced level of quality, or attention to detail. Whether this is due to size of the organisation or the lack of SME for example, would differ from provider to provider. Participant 19 highlights some of the crucial issues when working with none core providers:

"you have some who will send out data or information, completely out-of-date, you have to check it, go back and forth with them, you have to understand if it's wrong, you have to go through it line by line, field by field, it's a pain. If we don't do that we would get errors in the system, you just can't take it for granted that it's correct"

Here we see the emergence of a clear relationship between knowledge acquisition and KE. KE is the process of managing and transforming knowledge into internal knowledge or knowledge assets for further use. This is a skilled activity and SME are crucial to this process. Enrichment is covered later as part of Section 4.3.9 The Physical Organisation and Section 4.3.9.1 Knowledge Processing. Figure 4.14 below shows the relationship between the knowledge acquisition process and the enrichment process capability requirement:

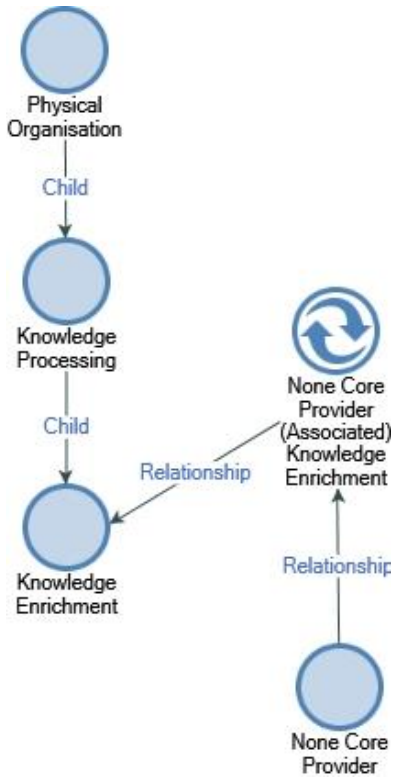

Figure 4.14 None Core Knowledge Provider Enrichment Relationship

Enrichment processes for a none core provider is a crucial requirement of knowledge consumption to verify the quality and consistency of the data, but also to ensure that existing knowledge or knowledge assets are not tainted by poor externally acquired knowledge. Participant 19 re-enforces this relationship:

"With those types of knowledge providers, we always check the data, they can't be trusted ever. Some products don't sell, they're maybe ready to be obsoleted on the system, so we don't put any effort into those. It shouldn't be processed, we just leave it and our efforts are more focused on taking them off the system and keeping the system up to date and clean"

There are a lot of knowledge assets that are typically associated with a physical product, from data sheets, guides, regulatory notifications and safety notices to more generic assets such as videos, interactive training materials etc. Other assets, such as safety notices, regulatory and market shifts can also be completely non-product related and therefore exist as their own independent entities and as such, need to be managed as such. Due to the volume and variety, enrichment is a vital component but as already discussed, is dependent on SME as well as process capability. This fact further re-enforced by Participant 19:

"The negative is you have all of that data to maintain. If most of that data came from bad suppliers who aren't good to work with that is going to be a massive effort"

This level of effort however, can be balanced through financial viability and increased revenues. In recent history, the organisation had a small-scale program which employed knowledge managers in a small area within product management that proved to be successful and commercially viable. Therefore, it would be viable to apply the same approach across the overall KM domain. Inevitably, commercial viability is a common factor within most commercial organisations and their decision-making processes. A common theme emerging from the data is that commercial viability of a NCKP should be considered as part of the selection process. Participant 1 suggests:

"financial checks on the stability on a supplier is crucial, so if they have a big batch problem they introduce, are the big enough to stand by this problem and deal with it or are they going to run for the hills"

In this scenario, posed by participant 1, they suggest there could be significant financial implications dealing with none core providers unless their fiscal capability, to withstand a significant failure within the market place, was guaranteed. This includes any significant issue where the cost of the issue could not be met by the external partner. In such circumstances, the wholesale organisation would take the impact, often with significant financial consequences. Participant 9 also re-enforced this concern from a product failure perspective:

"so, when you get down to the nitty gritty with the supplier, you ask how can you confidently give me a warranty for 5 years, they talk about premature/forced aging tests, so they'll stress test something to simulate accelerated aging. We had to take commercial decisions because we carry the burden"

In this example, participant 9 is referring to the risk of international relationships where the organisation had failures with Asian suppliers and the inability to recover losses across international boundaries. This type of issue tends to be the exception rather than the norm however, and was a hard lesson learnt from experience. The approach of continuing to consume from such providers remains commercially viable. This being re-enforced further by participant 1:

"I think all the time there is an opportunity to make turnover and make some profit. It is a difficult decision for someone to make to put barriers in that way"

Participant 1 suggests the impact on putting barriers in the way of profitability and the decision-making process is a very difficult one to justify. Typically, it has emerged from the findings that a top down commitment to the knowledge process would aid in the decision-making process but only by empowering people within the organisation to

support this. This is covered in more detail later as part of the analysis of the physical organisation. Therefore, from this it can be surmised that commercial viability can be defined as a key value of the NCKP selection process. In addition to commercial viability, another key factor being raised from interview participants is the effect on the timeliness and availability of the required knowledge. In a commercial wholesale environment, sometimes timing is crucial to remain competitive. As discussed previously for the LED market, timing is crucial due to the rapid changes in technologies, regulation and availability. Participant 9 expresses the need for timely transactions:

"For us, it's getting the information initially, it's the time delay. Once we've figured out we need it, we have to allow an amount of time for people to get it together and send it to us"

Participant 9 also expresses the additional time component required for the internal enrichment processes. As shown previously in Figure 4.14, there is also a direct relationship emerging for timeliness to enrichment. From the data, timeliness does not only impact the commercial viability of the knowledge process but also the effectiveness of knowledge as an asset. Knowledge that is outdated or no longer viable is also potentially a factor in success. The LED market as an example, has overwhelmed the lighting industry due to its high performance, longevity of product life and significant cost savings. However, the organisation currently has years of knowledge for lighting pre-LED products. Although these products remain in circulation, the high likelihood is that all lighting product will become LED; the organisation must now decide if it will keep all previous knowledge of these products and technologies. Inevitably, knowledge should always continue to evolve but types of knowledge should be archived and/or disposed of where it is no longer viable. This will be discussed later during KE but again clearly identifies the relationship between knowledge acquisition and enrichment as shown in Figure 4.14 Participant 1 re-enforces this:

"I think we could limit the amount we are having to manage by possibly a life cycle of suppliers that have not been traded with for a period"

Considering the purpose of the knowledge being consumed could offer a significant saving on the amount of time required to process knowledge. Timeliness itself could be determined to be subjective and different people would have different opinions on how long some knowledge should be retained. Participant 6 suggests:

"I think we need something that flags up every month or two months that shows we have not had any updates"

"I think information that is years out of date should be reviewed and maybe we should review having them on system"

Here we see two different responses from Participant 6, one with the need for knowledge refreshment and for it to remain current by notifying a person i.e. the SME and, retention and the need to build in suitable archive or destruction policies suitable to keep knowledge current and viable. Timescales and retention periods could differ significantly from a CKP and NCKP. For example, with a CKP you can have a trust relationship built upon mutually beneficial outcomes. However, with a NCKP, these may be disparate and have no relationship and therefore, knowledge refreshes or general data updates could be difficult to manage. Where a trust relationship exists, an effective process of knowledge transitions and data updates can be scheduled and managed to suit the mutually viable needs of each party. However, the emphasis upon timescales for disparate or NCKP lies solely with the organisation and as such, becomes an organisational factor to determine. For example, how much resource and effort should be allocated against sourcing knowledge updates within this environment. This in some cases is dependent upon specific areas of the target domain. Participant 1 alludes to this fact:

"Product in certain areas can change even more frequently. For example, LED lighting in the last 6 months is huge, and we need to manage these changes internally. The changes in these product types are so fast that the technology they are created with are changing almost with every product release, even though essentially they are the same product."

In this scenario, the LED market is extremely valuable and consists of both established CKP, but also new key players to the market, with the ability to have a significant impact on market share. For this example, typical CKP would be in place i.e. key brands and established organisations, but due to the value and volatility of this market, additional effort would be expected to be applied to consider both feeds and impacts of none core providers. An example of key factors to monitor, are those providers moving from a none branded to a known brand in a very short period and the potential impact on the organisation from a fiscal perspective. Therefore, from the findings coming out of the data, the following ley values defined in Figure 4.15 begin to emerge:

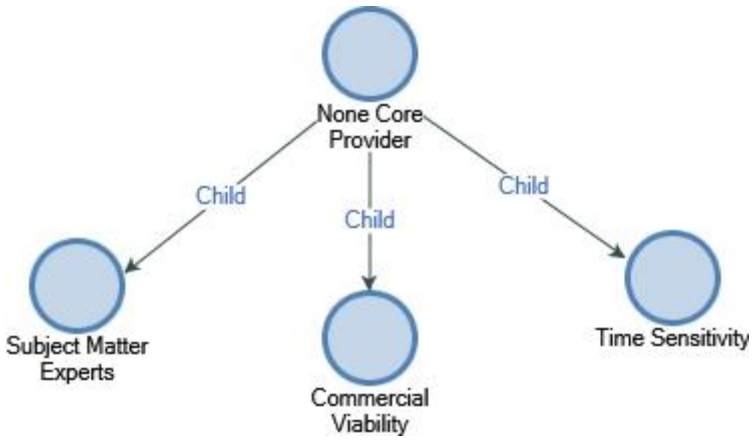

Figure 4.15 None Core Knowledge Provider Key Values

These key factors should be applied as a minimum against a NCKP, prior to consuming knowledge to offer the maximum protection against diluting existing knowledge sources.

4.4.4.3 Consumers

A consumer knowledge source is a unique knowledge source, typically, an end customer or other knowledge consumer who has already received a feed of knowledge from the organisation. However, they offer enhancements or adjustments for that feed or other feedback that would be mutually beneficial for both the organisation and the consumer. In this scenario, knowledge goes full circle from initial provision from a KP, through the organisation to the consumer and finally re-entering the organisation as a knowledge source provider. Figure 4.16 shows this cycle:

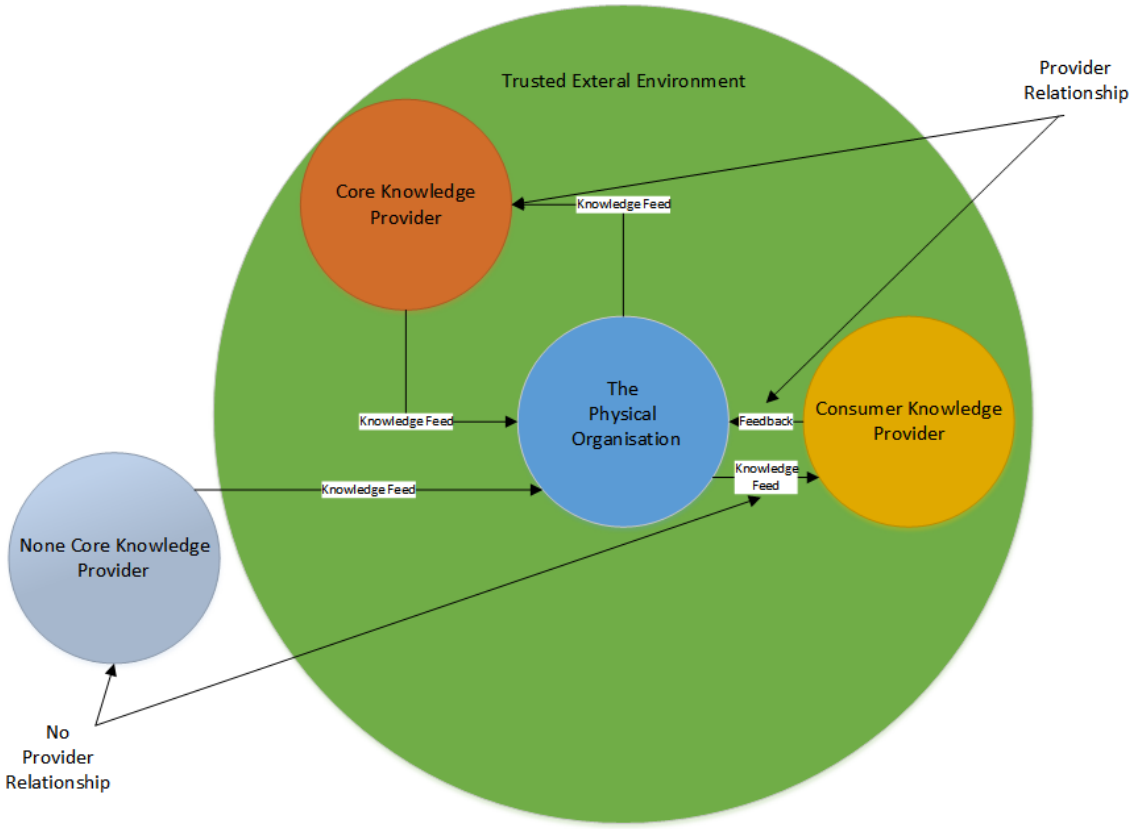

Figure 4.16 Consumer Knowledge Provider Cycle

Figure 4.16 above shows the consumer as the destination of knowledge within the knowledge flow life cycle. At this point, knowledge potentially can return to the organisation in the form of feedback. There could be an argument here for only consuming knowledge from trusted consumers to avoid potentially harmful negative feedback from disgruntled consumers. However, this could be avoided by passing consumer feedback directly through the none core provider process instead of managing it as a separate knowledge source type. This in turn would allow the organisation to prioritise consumer knowledge more effectively. Participant 18 discussed the potential management issues relating to the volume of feedback:

"we have so many customers and so little time, it's hard to keep up"

The importance of managing this flow of knowledge from the consumer emerging out of the data has been acknowledged and can be addressed as part of the knowledge source selection process. This would be an evolution from existing processes as consumer feedback is not currently addressed. This is an important factor for the organisation as they have long been recognised as knowledge experts within the industry, however, recent shifts in competition and products within the marketplace have raised concerns that the organisation needs to evolve. Participant 18 discusses:

"We've been recognised by various people as the place to go to because we do things the right way, we try and evolve and learn and follow and utilise the information that your team bring to the table, which is constantly evolving, so we have to evolve with it"

Being recognised as knowledge experts is important to the organisation, subsequently they are currently undergoing a re-branding exercise to re-enforce this with existing customers and external partners. Historically, this has been handled manually with knowledge experts within branches offering direct knowledge to consumers through experience and direct relationships with external KP, however, the change in knowledge delivery through technology has seen a shift in the delivery of knowledge as a digital asset rather than in-person communication or guidance. This communication has also come back from the consumer and this process needs to be managed, transforming knowledge into effective digital assets. This relationship and the need for this process is acknowledge by the organisation, Participant 12 suggests:

"It would be nice maybe within the company if he could go, hang on let me just check our information blog, type in what the customer is asking and hopefully it would go, these are possible suggestions, is this what he is looking for? Then you could grab a user manual, a datasheet or suppliers contact details and you can then say to the customer, yes I can get you that information"

Furthermore, Participant 9 re-enforces this requirement but also goes further to highlight the importance of regulatory or legislatively driven knowledge and of passing this on to the consumer:

"Clearly we need to achieve a balance there. So, if that is something that is legislatively driven, that gives us quite a strong communication angle when we are speaking to our customer and the marketplace who are the ultimate consumer, in terms of explaining all of the changes"

Although this offers no direct commercial gain, it offers a service of professionalism to the organisation's consumers. This helps building more effective trust relationships with the consumer. It isn't enough that the visibility of such relationships only exists between the consumer account manager and the consumer. These relationships should be visible throughout the knowledge life cycle process to ensure a consistent service offering, independent of the people or the purpose of the knowledge application. Participant 10 alludes to this point:

"The business needs to communicate within the network, this is what we're doing, go out there and promote it"

This also re-enforces the requirement that externally acquired knowledge is shared effectively within the organisation as part of the knowledge flow. This will be covered later in Section 4.3.9 Physical Organisation. Participant 10 discusses the importance of how acquired knowledge is filtered through the organisation:

"everything needs to be filtered down appropriately to everybody. Sometimes what happens is information is passed down from a source and it only gets distributed to a part of the business, where someone needs to make a decision when that information is given, whether it needs to be companywide information or selective"

The way knowledge is processed is partially affected by the KP as discussed here. However, this is limited to the key values that have been discussed for each of the knowledge source types. Further impacts on knowledge flow and processing will be covered within Section 4.3.9 Physical Organisation.

What has emerged so far from the data is the basic structure and relationships for the knowledge source selection process as shown in Figure 4.17 below:

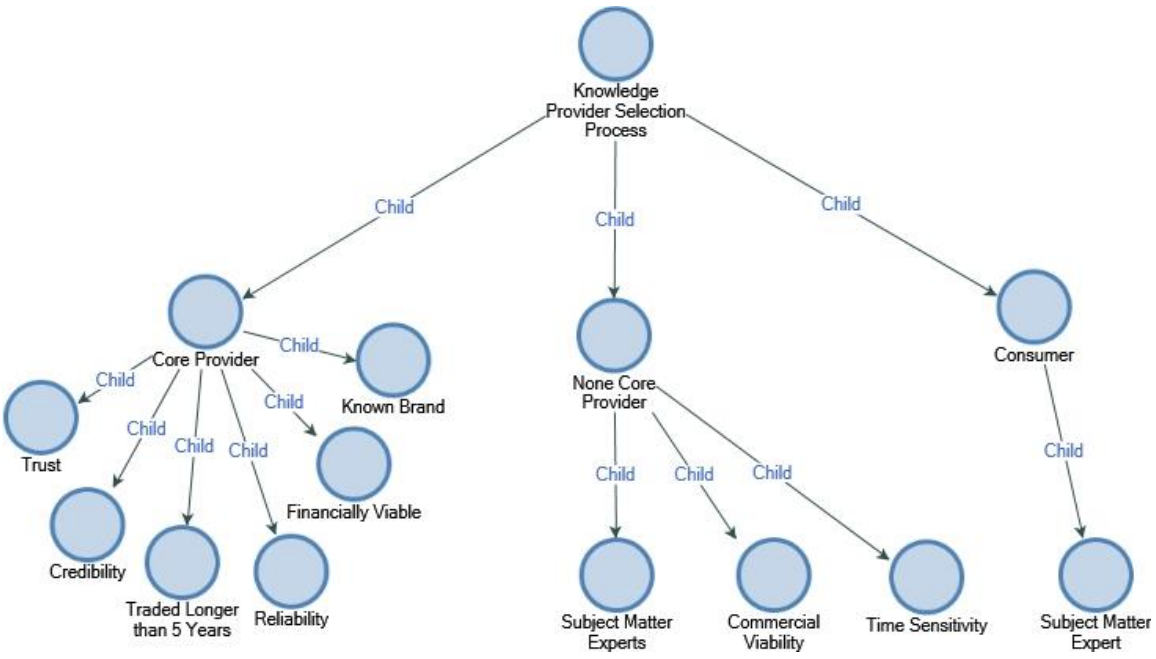

Figure 4.17 Knowledge Source Selection Process

From this, effective KP selection key values are identified that can be used to allow for the process to move onto the next step of the physical knowledge acquisition process.

4.4.5 External Knowledge Acquisition

Discussed in the previous section was the important factors for choosing KP and the issues relating to making the correct selections. Within this section, the key factors affecting the physical knowledge acquisition process are considered and how they align with the KP selection process. The definition of the external knowledge acquisition process is:

"The physical ability of transferring knowledge into the organisation to commence with enrichment activities"

For this to be effective two key factors are considered a) Knowledge Selection and b) knowledge type consumption.

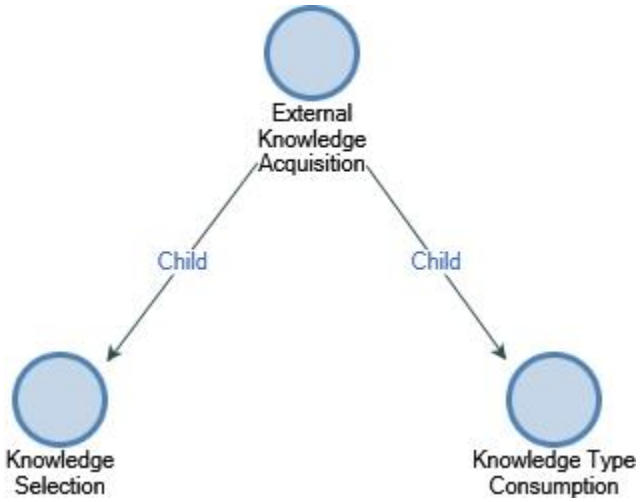

Figure 4.18 External Knowledge Acquisition

Figure 4.18 above shows the two key factors emerging from the findings. Knowledge Selection is the activity of choosing which knowledge to bring into the organisation for further analysis and enrichment. This should not be confused with knowledge selection at the point of enrichment whereby knowledge is streamlined and selected to further advance existing knowledge within the organisation. Knowledge Type Consumption: relates to the physical knowledge types and how they should be consumed i.e. tacit, explicit or none explicit, definitions of each shall be discussed in Section 4.3.7.

What is being acquired is no less important than who is providing the knowledge, but the two areas need to complement each other to ensure both the KP and the knowledge being provided can be optimised to its maximum positive effect. Current, the organisation under investigation does very little in collecting knowledge from outside of the organisational boundary. This is not due to a reluctance to do so but rather a lack of

processes and effective framework to address this need. Participant 1 re-enforces this finding emerging from the data:

"We do very little of that, gathering knowledge from outside of the organisation. I think if you look at recent examples, we were looking at (consumer) feedback from the online experience, Erm I think that clearly showed how developing that and improving it and making it better moving forward would add value"

Many participants recognised this need for a framework but very few could articulate this requirement due to its complexity. This complexity comes from the diverse range of skills and crossing of boundaries, both internal and external to the process, but essentially remains a single flow of knowledge across boundaries with genuine benefits for the organisation. Participant 11 discusses the implications and complexities of the current knowledge flowing into the organisation:

"In a market place that changes as quickly as ours, taking market information and doing something with that information whether it be building a new product or a direct or indirect impact relating to that initial information, the use of that information from beginning to end has got to happen quickly. You measure that in weeks, like 12 weeks, not 12 months. Product development in our business is less than 6 months. If you have not brought a product to market from concept to launch within 6 months you're back to the drawing board."

Timeliness was discovered previously from the perspective of the knowledge supplier selection process. However, in this example timeliness also relates to organisational performance in addition to availability and retention. Knowledgeable organisations do not necessarily process the knowledge as rapidly as they produce it. Therefore, the speed of knowledge transfer is as important as knowledge availability. Particularly for information flows rather than explicit knowledge assets. For example, the data administrators need a significantly faster flow of information to keep information such as product information or pricing details valid and consistent as opposed to knowledge that may be relevant to fluctuating market places or regulatory changes. Participant 13 who actively processes both information relating to products and the knowledge assets consumed to support them:

"It helps us in our business. We work on information on a product, new products, changes in products, basically it's all the information we need to build up our product portfolio. Keeping pricing and product information up to date and current for the business"

Participant 13 also re-enforces this point but also the importance of having this direct relationship with a KP:

"because we could get better information. We could get information without them, but it wouldn't be as good. We would get better quality information if we got it all directly from the supplier, or at least you would think we would."

In this scenario, participant 13 is referencing the issue relating to the current internal process and the lack of a relationship within the organisation. Currently, sources can not only come from external providers but also internal resources who have the relationships with external providers. Currently, there is no relationship management within one single area of a defined process and as such relationships are disparate. Typical issues include duplication of data, lost knowledge assets, lack of access to SME, all of which influence the acquisition process. These issues are cover in more detail in Section 4.3.9 Physical Organisation. However, Figure 4.19 below shows the relationship here:

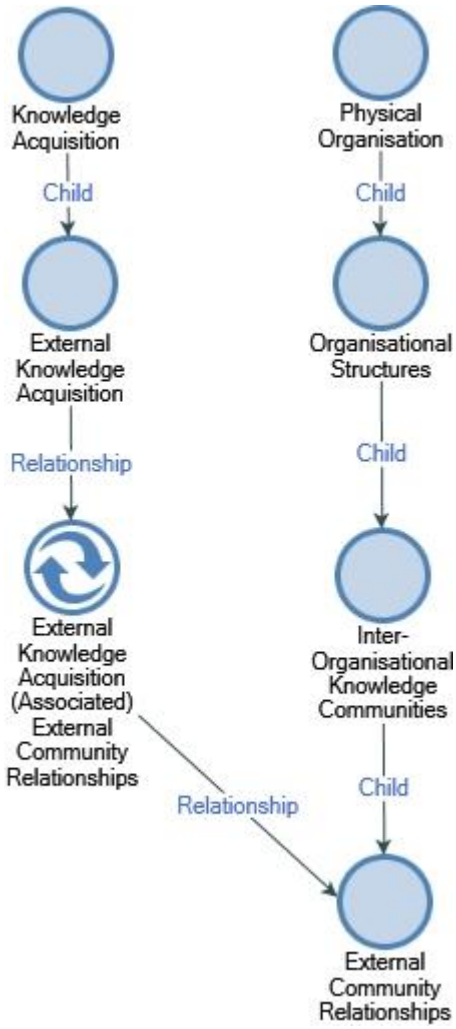

Figure 4.19 External Knowledge Acquisition to Provider Relationship Dependency

What emerges from the data is the further strengthening of the requirement for a framework to be able to pull all the key factors together. The lack of definition in the current processes is further re-iterated by participant 11:

"Your start is very clear and very well defined. You don't get it and make it up as you go along because you've got your information in. That information has come in, everybody in the chain should know exactly how's that's getting processed, where it's getting fed to, and what people in the chain are doing with the information. To go back to one of the first questions, keeping it compact and as shallow as you can"

The lack of processes or a relevant framework within the organisation is part of the reason the acquisition process is far too broad and unmanaged. This argument is re-enforced across the organisation from participants in different roles. Participant 6 also shares concerns with the current approach:

"At a low level, if you are constantly getting the same queries, you are obviously not learning from passed mistakes or errors."

Participant 6 goes on to re-enforce the importance of externally acquired knowledge but also the frustrations within the current process and the inability to learn from it:

"If it's something as soft as knowledge, how do you measure if you've learnt from it or not? If you put something new into place that has been an example from another industry, so for example, our customer website. Where we have taken on board another suppliers example, who has a much more up to date, more functional, better website, we've taken that knowledge and turned it into a working product. So, it's vitally important that you take on as much as you can from outside."

This scenario articulates the need to learn from knowledge acquired and the difficulties posed within this area, particularly with the potential volume of knowledge availability. As with provider selection, knowledge selection requires the relevant level of knowledge from a SME to begin to define what will be consumed as part of the initial acquisition process. Again, participant 6 suggests the requirement for a level of measurement for the acquisition process:

"I think there are very few ways of measuring whether you have learnt. Knowledge is free from the outside world. You need to make sure it's something useful, you're not just taking all the gossip and hearsay and information that's possibly not as pertinent and not as worthwhile spending as much time on and turning that into something that is a waste of time. Determining what is useful knowledge is incredibly difficult task"

There are two key values that are emerging from this, the availability of SME as part of the acquisition process and the availability of meaningful knowledge. The initial selection process could potentially include large volumes of knowledge to disseminate, enrich and distribute. However, there is perception of a clear advantage of doing so within the organisation. Participant 14 alludes to this fact:

"if a customer wants information, he should be able to go the website and find that product on the website and any other information should be there because we can't store that much on our MIS, for example the description is very small, it's limited, so you could have a bigger source, more information on the website. The customer could go in and find anything they need. If it's not there, they might I move on to somewhere else"

This is a very competitive organisation with very clear objectives when it comes to retaining consumers and third-party relationships. Therefore, this requirement to be able to offer knowledge assets in all their connotations is vitally important, especially from the perspective of remaining competitive within the marketplace. Participant 14 suggests:

"if you're not up to date, in terms of what competitors are doing then you'll be quickly left behind, which leads to all sorts of problems. It's important we liaise with our customers and use that information to our benefit. There is always someone who's prepared to offer information. But, you must get it from more than one source. So, you get examples of what's going on with aspects of other businesses, so you can get a clearer picture."

Participant 18 also re-enforces the potential commercial impact of poor knowledge choice based on a recent marketplace example:

"it's a very competitive industry out there, especially in the light industry where in the last 2 years, price deflation of products had bordered on catastrophic to the business. We've gone from selling a product that was £100 18 months ago, and now is less than £20."

This scenario relates to the massive technological impact of the LED market and how rapidly changes are occurring. This example identifies the need for rapid knowledge acquisition and selection is crucial as changes within this market typically occur daily as opposed to weekly or monthly. It also has the adverse reaction of rapidly rendering existing knowledge assets redundant compared to other areas of the industry in recent times.

One of the key advantages of being a well-known market leading organisation is that they are a very favourable choice for providers of knowledge, products and services.

Participant 2 emphasises the organisation's current position and organisational perception from a supplier's perspective:

"I know most suppliers want to be on our database because of the success of our company, we tell them this is our new standard, and this is how we do it. Not dictate but say we have done this to make it better for you first, to make it easier and if you want us to show you how to do it in this format we will."

This example shows a benefit from the organisational perspective because of knowledge or knowledge assets can be provided in clean and consistent methods, this can have a significant impact upon processing capabilities.

4.4.6 Knowledge Selection Process

The initial knowledge selection process is emerging as a crucial first step when working with KPs in determining which knowledge should be chosen for further consideration or enrichment. There are many factors to consider for this initial selection including commercial viability, trust, integrity, internal enrichment requirements and value beyond the commercial value to consumers. For CKP, the process is somewhat simplified as you have several key values that have been adhered to before knowledge is considered from these providers. However, for none CKP, additional care is required for the selection of knowledge that will be allowed to enter the organisation's knowledge flow. Provider selection has been discussed previously in Section 4.3.4, however, this is now re-visited to determine the key factors for defining which knowledge should be selected from which suppliers, Figure 4.20 below shows the relationship between KP and knowledge provision.

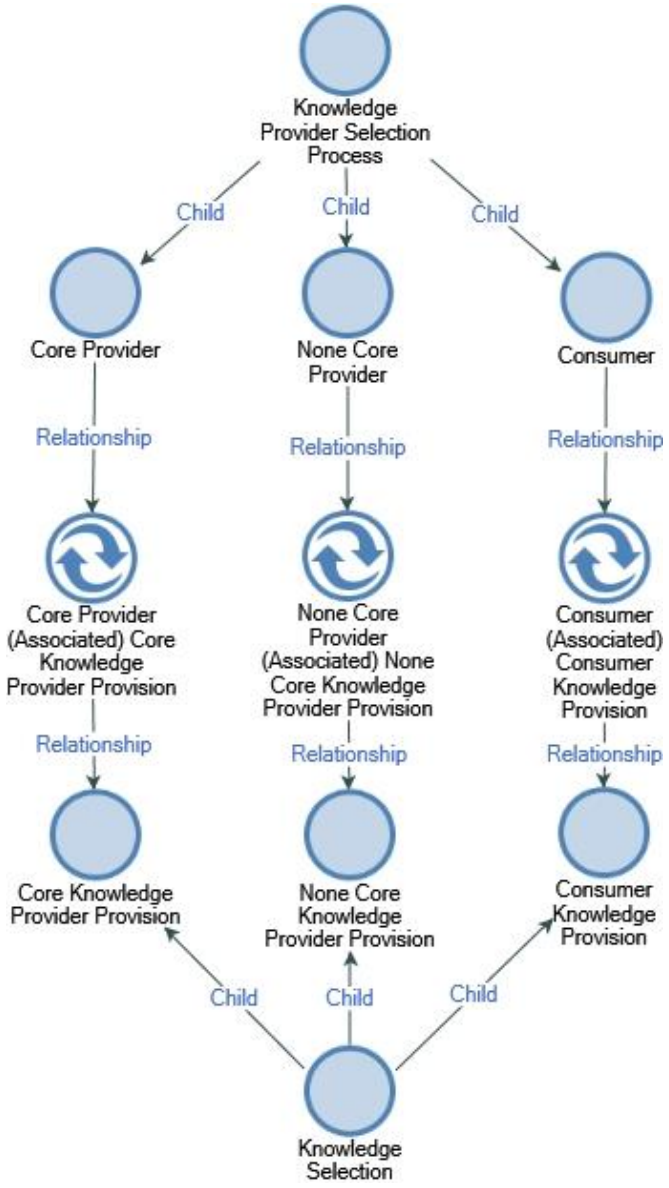

Figure 4.20 Knowledge Provider Dependency to Knowledge Provision

4.4.7 Knowledge Type Consumption

Knowledge type is defined as the initial knowledge status at the point of consumption. Historically, knowledge can be defined as Tacit and Explicit. Tacit being knowledge that is not easily transformed into a structure for storage and re-use. Explicit being knowledge that is easily recorded and stored for future use. For this research and additional type, unstructured knowledge, is knowledge that could be defined as explicit but never processed in a meaningful way. When considering the knowledge types being consumed, knowledge availability must also be considered. Knowledge availability in this context refers to the currently available knowledge within its consumption state i.e. pre-enriched before committing to the knowledge store. Figure 4.21 below shows the key factors affecting knowledge type consumption:

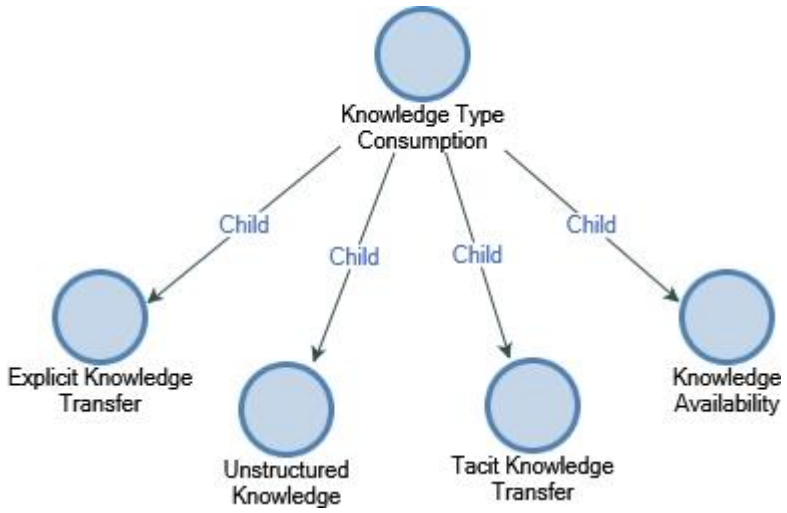

Figure 4.21 Knowledge Type Consumption Factors

Here we see the four factors affecting the acquisition process and will be discussed further in Section 4.3.9 Physical Organisations for potential impacts. There can be a variety of knowledge assets available for consumption. These can be defined as

- Product Information
- Application Information
- Regulatory/Legislative Requirements
- Marketing Information
- Technical Documents
- MSDS
- Imagery

The above is not an exhaustive list but offers a flavour of the types of knowledge areas flowing through the organisation daily. Often, relationships can exist between the asset types, each in turn influencing the knowledge flow. Some knowledge is shared between assets, for example Technical Specification data may be included as part of a product specification, a data sheet or an application guide. Therefore, it is important to understand that knowledge is made up of a series of shared attributes that when combined, create the required knowledge asset. Typically, the attribute definition and the knowledge asset creation would be generated at the enrichment stage of the life cycle process. Enrichment will be discussed later in Section 4.3.9.1 Knowledge Processing. An example of the complex environment and the varying requirements for the knowledge assets can be seen when looking at the following observation from Participant 9:

"I have 5 companies, so for location 5, the key information we'd get would be information about the rapidly evolving marketplace. It's technology centric and as old technology is

being phased out there is new technology being brought in. So that information is of vital importance as much as it influences key decisions. So, we have A Lamp that is being banned, we have a stock management issue there in terms of existing inventory, how much we have, how long will it last, do we need to buy more, is it a finite ban, all these are considerations. On the other end of that is, have we got a replacement product ready, when is that coming in, what is the balance between the product that is going out and the one that's coming in. Clearly we need to achieve a balance"

In this one statement, affecting a single product, there is a clear requirement to know many different factors affecting not only the product but also the organisation. Participant 9 is the most senior person within the location 5 organisation and iterates the need to know a) the valid placement of the product within the marketplace, b) The technical capabilities of the product in question and its replacement product, c) Regulatory information on why the product is being banned, d) The technical justification for the replacement product and why it will be legal vs the banned product, e) Stock control and stock replenishment information.

This is a clear example of the complexities of determining which knowledge to consume for further enrichment. If you multiply this by the 1.6 Million products currently supported by the organisation, then both the size of the task and the importance of a supporting framework become very clear. The ability to use forecasting and churn analytics against knowledge assets also plays a significant role by allowing these types of decisions to be made as early as possible. This can strongly impact an organisation's ability to remain competitive and so it must act as rapidly as possible to market change and regulatory implications. This is further re-enforced by Participant 10:

"Getting knowledge from the market place, what future demand is and then understand and analysing and making judgement calls as to what the right thing to do for the future is, using the present knowledge"

Within the organisation, selling products is a goal but not the only goal. So far, the factors affecting a product have been discussed, but the wholesale environment is greatly impacted by regulatory requirements and this has a direct impact on products and sales. Regulatory requirements are considered no less important and, as such, play a key part in the types of knowledge consumed. Participant 9 explains:

"I think in terms of regulatory bodies, legislation that type of thing, it would be hugely beneficial to have a pool of people and access to people beyond our own company. Simply because whatever we are talking about it is a mandate, it is what it is, it's a rigid

thing based on fact and you are not giving away an advantage by speaking to people externally."

From this statement a relationship between knowledge type and third-party relationships begins to emerge. Inter-organisational relationships are discussed later in Section 4.3.9 Physical Organisation. Figure 4.22 shows this relationship:

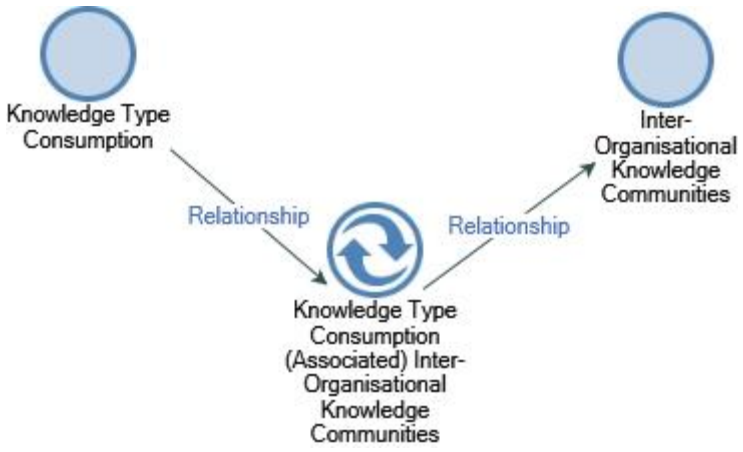

Figure 4.22 Knowledge Type Relationships

Just as a sound understanding of knowledge the regulatory environment is important to the organisation, it is also important to its consumers. Typically, consumers can be anything from small contractors to national organisations and governing bodies. Therefore, marketing also plays a crucial role in the re-distribution of knowledge. Regulatory knowledge is often distributed with product specific knowledge as part of the marketing process. This can be considered from two perspectives 1) Market research and investigation into the current and future landscapes to understand key issues and where future opportunities lie and 2) Marketing and Sales as part of an offering to a consumer. Participant 11 strongly alludes to key factors in what to consider when acquiring knowledge in this area:

"If you're looking at the market and going to do some research on what you need to do on performance, whatever factors you happen to be looking at if you're not putting a product out into the market place within 6 months of doing that, then you have to re-visit it. You can't afford to do that because you are adding more time onto the end of it, forget the cost, that's not the issue; if you're at the end and you think right, I've got this product and it's a year since we researched it so we're going to finally set the price and you're 100% and the market's moved on in that time then forget it, you have to go back to the start"

This example shows the importance from a marketing and sales perspective and how not consuming the correct knowledge at the correct time could have a commercial impact.

In addition to product, regulatory and marketing knowledge, Service Provision is a key deliverable for the organisation. Service provision does not directly offer commercial viability to the organisation but offers value to the organisation through provider and consumer relationships and relationships with other third-party organisations such as governing bodies. Participant 6 re-enforces the importance of service as a tool for the organisation:

"Yes, in any sales environment, service is often key and second only to the pricing in this sort of industry. But you also need to gain knowledge from your customer about what they are looking for. It might be knowledge they give to you, a template, something as hard as a tender document, this is what we need you to provide us. Or it might be something, tacit, soft, you might know this guy likes to chat for an hour and if you see him for an hour he'll give you a sale just because you're willing to listen to him. So, it's a mixture of something as rigid as a framework that you have to stick to or just knowing the person themselves"

The statement from participant 6 above shows the diversity of the types of knowledge required as part of the knowledge acquisition process. It covers everything from existing digital assets through to tacit knowledge and the relationship with a SME to try and transform such tacit knowledge to a digital asset. Participant 18 also re-iterates the importance of service as part of the services offered by the organisation:

"One word – Service. Service isn't a product, you can't pick it up off the shelf. It's people dealing with people and that generally comes down to the service you can offer out of your business. You must get into the minds of these guys and almost try and become their friend. We are colleagues and we are friends to an extent but it's in business, not necessarily social. Getting people to interact with you as a business and your staff, your colleagues, your products, is a way of selling yourself. That is most important to us, across all the 5 companies, service is our priority."

The examples reviewed in this section show the diversity of knowledge and the implications for capturing such knowledge. Finally, for this section, participant 3 expresses what is required succinctly:

"You have to have the knowledge to ask the right questions, so that when we are enriching we need to understand what is needed, we cannot just put any information we want. We then learn on-going as the external knowledge consumption changes"

Sections 4.3.7.1, 4.3.7.2 and 4.3.7.3 go into detail about how the needs of each of the knowledge type could be addressed.

4.4.7.1 Explicit Knowledge

As covered within Chapter 2 Literature review previously, explicit knowledge can be defined as:

"Explicit knowledge can be formalised and codified and is sometimes referred to as know-what (Brown and Duguid, 1998). It is therefore easy to identify, store, and retrieve (Wellman 2009)"

Explicit knowledge from the perspective of this research relates most specifically to CKP. CKP, as trusted sources of knowledge, have already been established as such using the key values or that provider as defined by the governing organisation. Because explicit knowledge by its very nature is already defined and available for use, it is surmised that such knowledge could only be viably consumed from providers who fit this criterion. Figure 4.23 below defines this relationship:

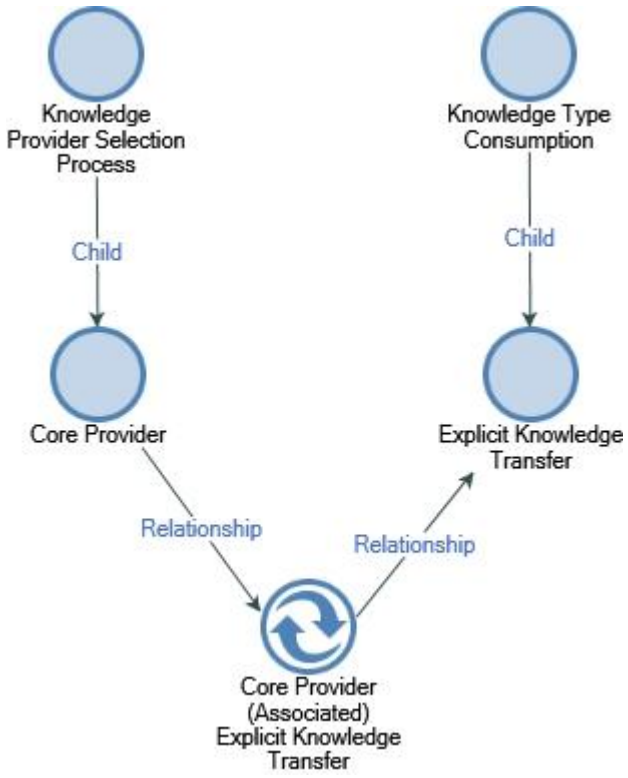

Figure 4.23 Core Knowledge Provider and the Trusted Provider Relationship

This level of control offers a level of protection against consuming none relevant knowledge into the KM process. As the expectation of the knowledge being acquired is high, the focus transitions to processing of the explicit knowledge. It is envisaged that explicit knowledge requires less enrichment but no knowledge entering the organisation

would be trusted 100%. Issues are more typically related to quality and consistency rather than value. For example, Participant 16 suggests:

"We can probably amend some of the descriptions ourselves just to make them shorter. But anything to do with pricing or part numbers is really important so we couldn't second guess that, that needs to come from the supplier."

Participant 15 also discusses the issue of quality:

"Normally, they are the manufacturers of the products, so their information tends to be correct, but that isn't always the case"

As participant 15 alludes to above, typically product or knowledge suppliers are the experts within their given field so there is a level of expectation that the knowledge being acquired is reliable. In cases where this is not true, the organisation tries to work with the provider to enhance the quality of the knowledge coming out of the source organisation. This has a positive impact for the provider and the consumer. For CKP this is feasible but not always achievable, however this is more prevalent with none core providers. Participant 1 discusses the difficulties in communicating changes with a provider:

"I could see suppliers being controlled in a way, but I cannot see us being able to control the flow of knowledge from them"

In such cases where providers are unwilling to work with us directly to enhance the knowledge process, participant 1 suggests:

"I would think we should have to question whether that supplier is performing at a level you would expect from a supplier. If they couldn't provide technical data for their own products"

Therefore, as discussed during the provider selection process, a KP would move from being a core provider to a none core provider. However, most providers who are currently defined as core providers work hard in ensuring their knowledge is continually updated and communicated when requested. This is re-enforced by participant 11:

"Normally, external suppliers are good because they are making the products, so they know all of the attributes and are constantly checking them and updating them"

And, participant 4:

"There is a lot of technical information that we gain from other suppliers. Whether we've brought a product in and they have supplied us with the technical information, so it's helpful so we don't have to carry out the extent of the tests, just batch test them and see like that"

Therefore, we can surmise that if we apply the relationship between the core provider and explicit knowledge as discussed previously in Section 4.3.4.1, there should be sufficient control over the knowledge entering the organisation from the perspective of explicit knowledge.

4.4.7.2 Unstructured Knowledge

For the purposes of this research, unstructured knowledge is knowledge consumed from external sources that requires enrichment to give it value as a knowledge asset. Unstructured knowledge can theoretically be either tacit or explicit in nature. For explicit, it could be consumed from digital asset format source but not in a meaningful way. Enrichment processes would be required to bring this into a stable format that could be used for internal processes or to be re-distributed. Tacit, in its very nature requires transformation directly into a suitable explicit format, where feasible, and should be in a reasonably structured format to allow for this transformation to occur. Tacit knowledge is seen as a valuable resource to the organisation, although currently little is done to capture this knowledge in a meaningful, re-usable asset format. Participant 10 discusses its value:

"I have no products in the business relating to this marketplace, the information and stats I get from going to seminars and supplier meetings make me understand the bigger picture. For the future and for my perspective it's better to be in in from an early stage and develop the product category for future sales"

From the perspective of the organisation, this refers to knowledge affecting the market place, trends in sales, regulatory information and other areas that are now specifically tied to products or services. There is a need for the organisation to learn and understand the environment it operates in. Participant 10 further re-enforces their previous comments:

"Getting knowledge from the market place, what future demand is and then understand and analysing and making judgement calls as to what the right thing to do for the future is, using the present knowledge"

From this, the market place clearly has an impact on knowledge collection and its effect on the organisation. This in turn has an impact upon organisational strategy and its ability

to operate in an optimum way within that market place. This is as much to do with how an organisation is perceived from outside of the typical organisational boundary and those impacts that are related to the importance of brand as well as products and services. Senior level employees stressed the importance for the consumption of such knowledge with passion, for example Participant 11 discusses:

"Strategically you've got to. You do this strategically, so non-product related information you might find within market research. It ultimately is affecting other things you do in the business that aren't product related. Our marketing team are doing plenty of non-product related activity as well. We might be designing a new company introduction brochure, a marketing company video, where you maybe don't see any products, but you must get certain messages out to the market place to give the customers a view of what you are like as a business, so those are non-product related issues, energy, government spend, trends in the market place, tends in the building sector. I.O.T is a big buzz word in the building trade now and that isn't really product related, it's all kind of fluff as I call it. It's to get these things as digital assets!"

In addition to showing the importance of knowledge consumption beyond the product or service, it also answers Q1.3 from the Interview process: What value do you think there is in consuming knowledge relating to non-product related information?

This type of knowledge acquisition tends to be less structured by its very nature but is no less important, however, it requires significantly more enrichment to be effective. Here a relationship between Unstructured Data and Knowledge Enrichment begins to emerge as shown in Figure 4.24 below:

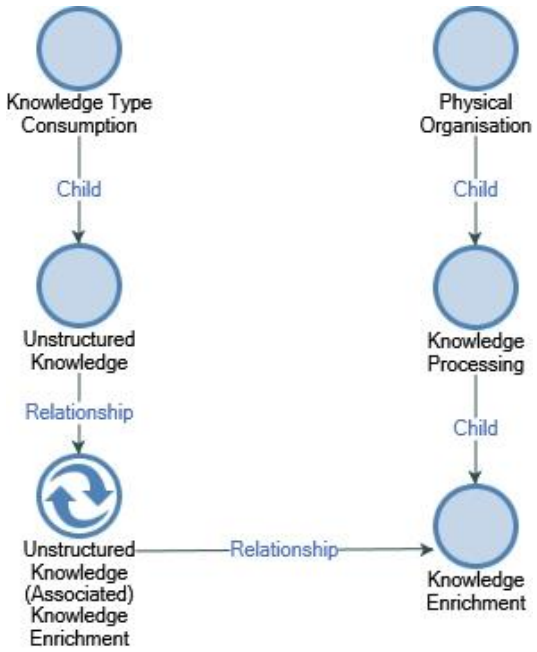

Figure 4.24 Relationship between Unstructured Data and Knowledge Enrichment

Although enrichment is a key element to effectively transform unstructured knowledge to an asset, it is also dependent upon SME to define the initial selection for further enrichment. Participant 10 previously alluded to this fact, this is also re-enforced by participant 1:

"I think its well known that having good product knowledge will win you some business but if you haven't got sales skills and easy access to lots of other knowledge other than just product knowledge then you miss the sale, they are the bits that probably make a bigger difference to a customer"

As with the relationship between unstructured knowledge and KE, this further strengthens the emerging relationship between the knowledge acquisition process and the physical organisation as shown below in Figure 4.25:

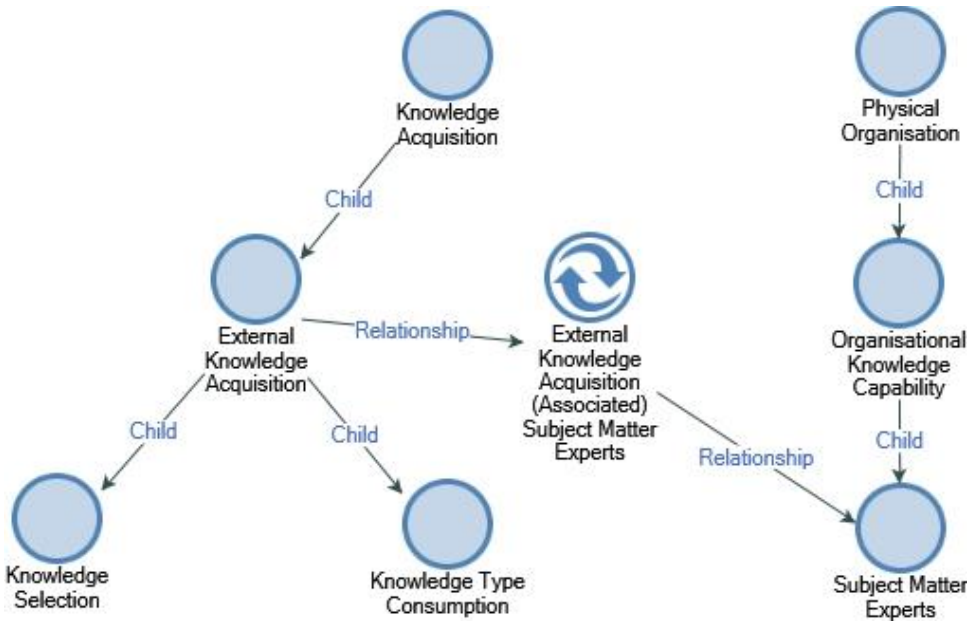

Figure 4.25 The relationship between EKA and SME

The organisation recognises access to a lot of experience and knowledge from its long serving SME but also that this is not utilised to its full effect. This is one of the key factors that could be addressed by efficient placement of knowledge experts within the knowledge supply chain process. This will be discussed in more detail within Section 4.3.9 Physical Organisation.

4.4.7.3 Tacit Transfer

Tacit Transfer is defined as the requirement to translate vocalised knowledge into a physical digital asset via the enrichment process. This has historically been a complex activity requiring SME and sufficient resources to support this activity. As previously discussed within Chapter 2 Literature Review, tacit knowledge is difficult to share (Wang *et al.*,2006; Nonaka and Takeuchi, 1995) and attempts to share can be expensive, ambiguous and time consuming (Kogut and Zander, 1992). However, the value (Reychav and Weisberg, 2010; Davenport and Prusak, 1998) and availability of tacit knowledge (Mooradian, 2005; Buckman, 2004), makes these activities crucial for organisations. This ability to transfer tacit knowledge is identified within the organisation as a genuine key value, if it could be introduced. Participant 9 reflects their frustrations at what is being lost and not recorded:

"A big thing for me is speaking to people. I think so much is lost, the actual information itself, clearly that can be sent to someone electronically, it could be a document etc., but surrounding that information there is instruction, you know, what are we doing with this information?"

As participant 9 discusses, interaction with people within inter-organisational communities exists but not utilised. For tacit transfer to be effective, these relationships need to exist. This is also re-enforced within the literature. Tacit knowledge transfer requires close working, including regular personal contact and trust (Goffin and Koners, 2011). Continuous conversation through frequent work activities repeatedly builds both tacit and explicit knowledge (Nonaka, 1994). The transfer of tacit knowledge is emerging from the data as a social interaction but as part of an applied framework to ensure that process is managed correctly. Participant 6 alludes to this fact:

"It might be something, tacit, soft, you might know this guy likes to chat for an hour and if you see him for an hour he'll give you a sale just because you're willing to listen to him. So, it's a mixture of something as rigid as a framework that you must stick to or just knowing the person themselves. I think knowledge is always built on by discussion with the interacting parties. So, you get more if you talk more"

For the tacit transfer, there is a dependency emerging from the data for three crucial relationships to co-exist. These are shown in Figure 4.26 below:

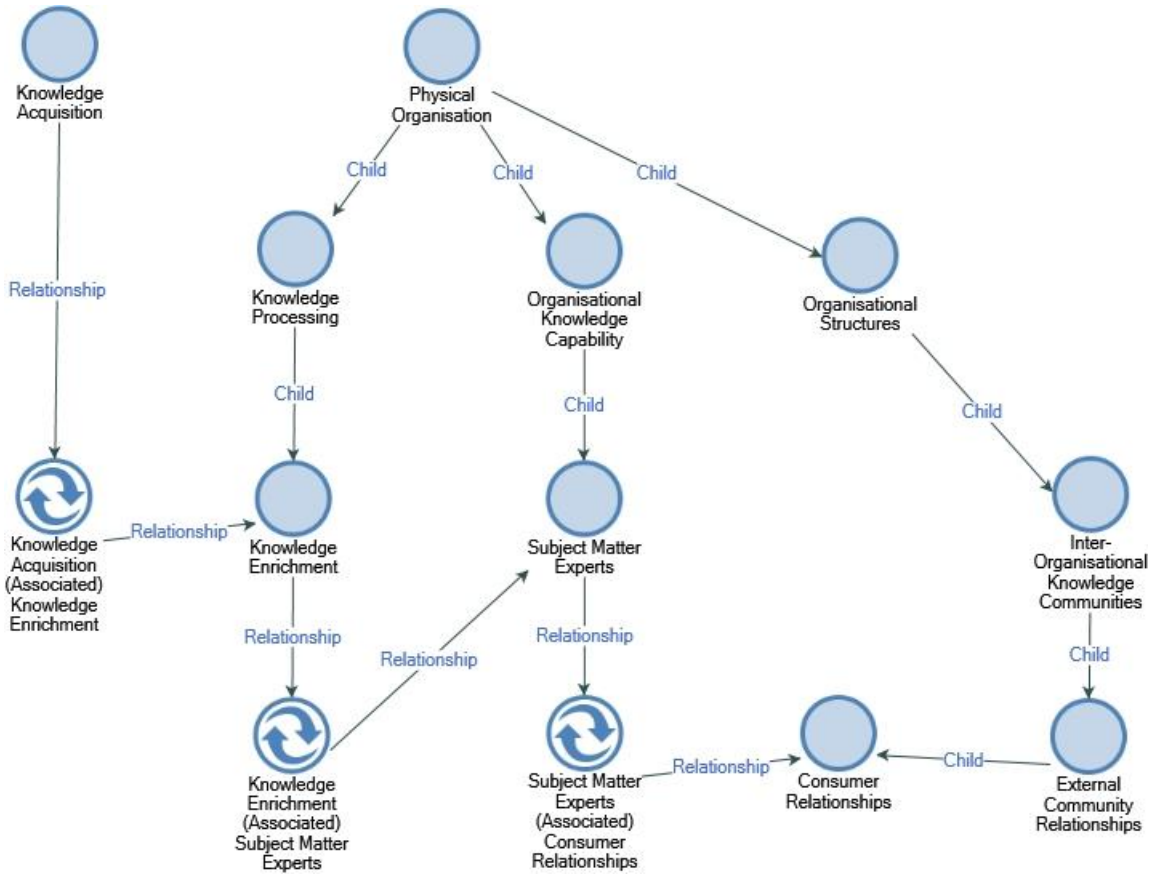

Figure 4.26 The EKA <> SME <> Consumer relationship

As shown in Figure 4.26 above the tacit transfer of knowledge for the external knowledge acquisition process requires 1) A direct relationship between EKA and KE 2) A direct

relationship between KE and the SME and 3) A direct relationship between the SME and the external Consumer (and the CKP, this is covered in CKP to SME relationships discussed in Section 4.3.4.1). This complex relationship structure allows for the tacit knowledge transfer to occur in situations where such knowledge is viably transferable. Although complex, there are clear benefits in the application of such a framework as is emerging from the data. The value of such knowledge is discussed by participant 6:

"Knowledge can flow one way (Explicit Feed), but is it as valuable as something that you have discussed? I don't think so. I think knowledge is always built on by discussion with the interacting parties. So, you get more if you talk more"

In addition to the value gained in strengthening knowledge about the organisation and supporting products, there is also feedback from the organisation that this would clearly benefit organisational services. Participant 18 reflects this requirement:

"One word – Service. Service isn't a product, you can't pick it up off the shelf. It's people dealing with people and that generally comes down to the service you can offer out of your business. You must get into the minds of these guys and almost try and become their friend. We are colleagues and we are friends to an extent but it's in business, not necessarily social. Getting people to interact with you as a business and your staff, your colleagues, your products, is a way of selling yourself. That is most important to us, across all the 5 companies, service is our priority."

Irrespective of the knowledge application, the existence of a relational based framework as shown in Figure 4.26 above would allow for the tactic transfer of knowledge into useable knowledge assets.

4.4.8 External Knowledge Acquisition – Section Summary

This first section of the data analysis process highlighted the key issues emerging from the data relating to the knowledge acquisition process. This was initially grouped into three sub-sections before being analysed further. These sub-sections were 1) Knowledge Source Availability, 2) External Knowledge Acquisition and 3) External non-product related knowledge. Each of these sub-sections were further analysed looking for patterns within the data relating to the key issues affecting the organisation's ability to consume knowledge from beyond the typical organisational boundaries. Figure 4.27 below shows the high-level overview of the hierarchical node structure, identifying how each of the key areas are related.

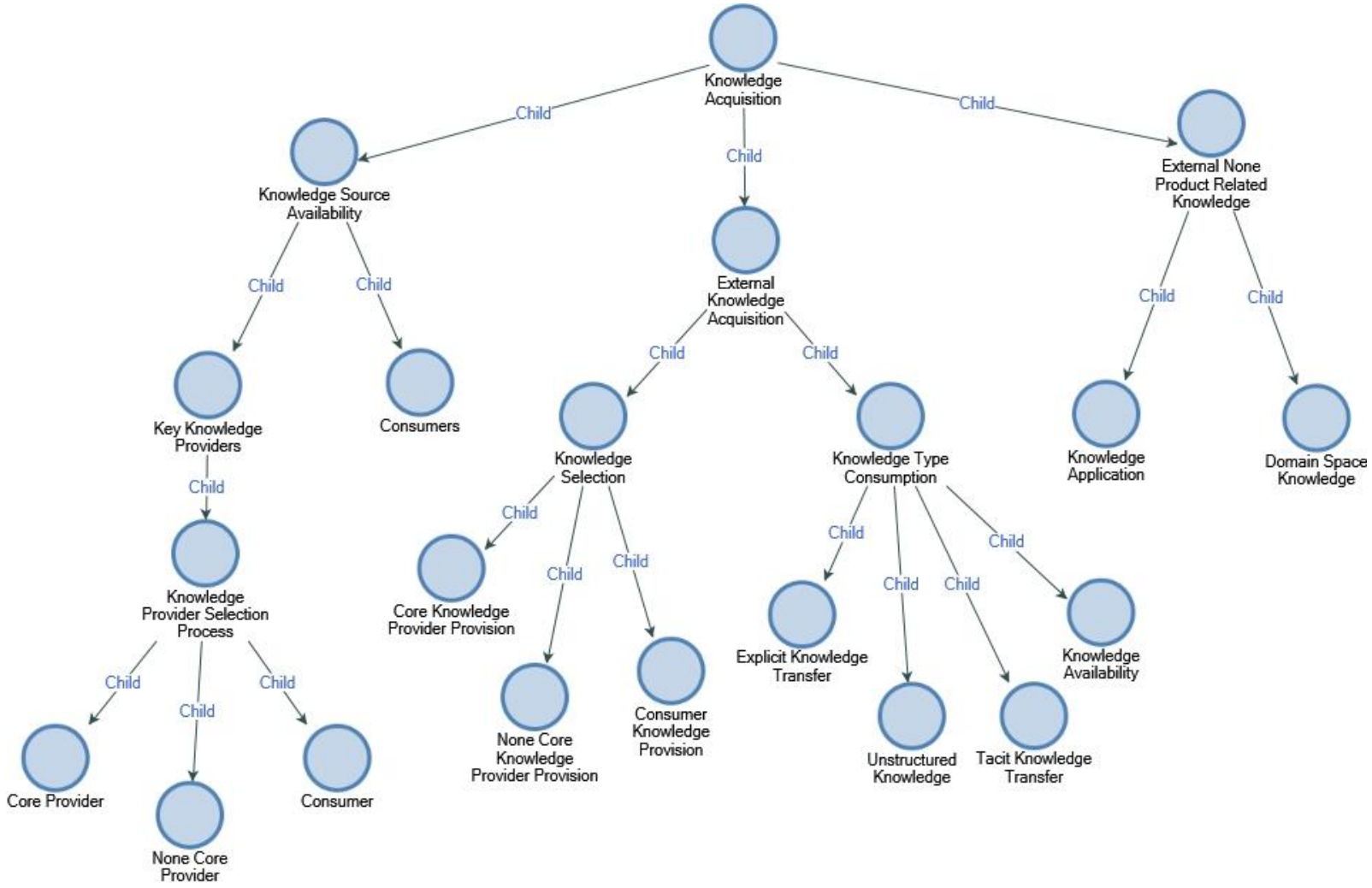

Figure 4.27 External Knowledge Acquisition Node Hierarchy

4.4.9 Physical Organisation

The next stage of data analysis relates to the initial nodes set up for the physical organisation. The physical organisation considers all factors affecting knowledge from a physical perspective within the organisation. The parent level node structure for the physical organisation can be seen in Figure 4.28 below:

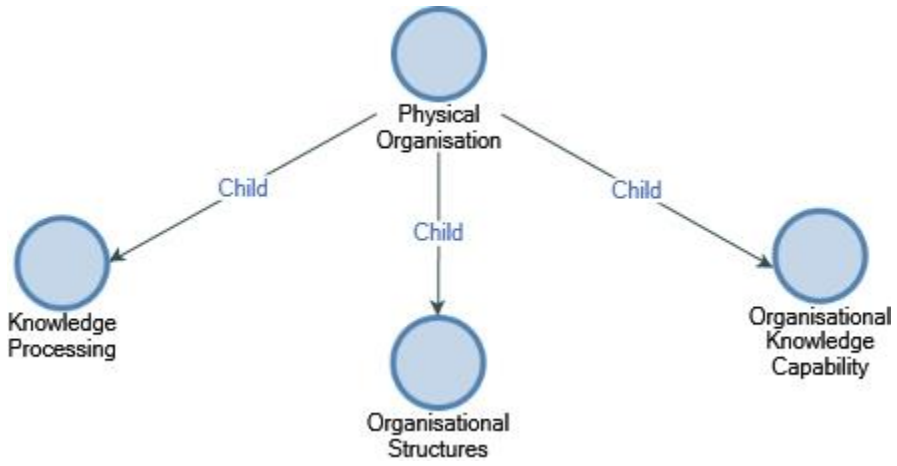

Figure 4.28 The Physical Organisation – Parent Level Nodes

The physical organisation has three child level nodes which combine the findings from the data. 1) Knowledge Processing combines all findings emerging from the data which affect knowledge processing activities. 2) Organisational Structures combines all key factors relating to the physical organisation and organisational capability requirements. 3) Organisational Knowledge Capability combines all factors relating to physical resource capabilities and learning opportunities. At the highest level, these three areas were identified as the key areas affecting the physical organisation and its ability to be able to effectively manage knowledge as an asset.

Sections 4.3.9.1, 4.3.9.8 and 4.3.10 will go further and dissect each of these three key areas and analyse the emerging consistencies from the semi-structured interviews.

4.4.9.1 Knowledge Processing

Knowledge Processing is defined as the actions or processes required to consume and maintain knowledge as physical data assets. Knowledge processing emerges from the data as a key factor in an organisation's ability to build knowledge assets. Knowledge processing itself is not an independent process, there are many considerations emerging from the data that would need to be able to derive an effective process. In addition, depending on the knowledge workers role and position, knowledge processing offers a

different perspective. Participant 16 discusses the importance of knowledge flow as a crucial factor in the process:

"at the minute we like everything via email, so we can track it. Nothing over the phone, also then everything can be printed or saved or whatever else we want to do with it. For a tool, we use Excel a lot because that is a good one because we can do our work in it and then read the data straight into the database without having to do it manually"

In addition to knowledge flow, participant 16 identifies the dependency on technology for the first time and having suitable tools for processing knowledge. Technology will be discussed later in Section 4.4 Knowledge Management Technology. Furthermore, Participant 16 re-enforces the requirement of knowledge flow but also the need for process flexibility to allow the organisation to be able to adapt to change in the source provision process:

"we need to change our process to manage where the knowledge is coming from"

The need for process flexibility is a common theme emerging from the data as a key requirement for an effective knowledge processing capability. Participant 16 comments above are further re-enforced by participant 15:

"Yes, we are constantly looking at how to streamline the processes using the people we have got. There are a few other things I would like to get done as well but obviously you can only do it bit by bit."

The ability to be able to consume and maintain the correct knowledge flowing into the organisation aligns with previous findings and the importance of having the relevant SME aligned appropriately, with processes to ensure that only the most relevant knowledge is consumed. Participant 19 re-enforces this overlap within the knowledge processing requirement:

"I think we should control basically all knowledge coming into the organisation. We should control where it's used more than we do now, like I said to make sure it gets to the right person or right area. If you don't have an overview of everything, you really don't have a KM system, you just have a load of pools of data. They seem to fight that because you need the right knowledge, the right people at the start of the process, the problem here is people with product knowledge are being valuable in the branches selling to customers. That's where they think they need that knowledge. They don't see the value of having that experience in a team like ours. But if they were in our team, we could work clever and we'd have more success"

In addition to the overlap between knowledge flow and KE, there is an emergence of a relationship between knowledge processing and organisational structures. The dependency upon SME in the generation on knowledge assets continues to be a theme from the findings. Figure 4.29 below shows this relationship:

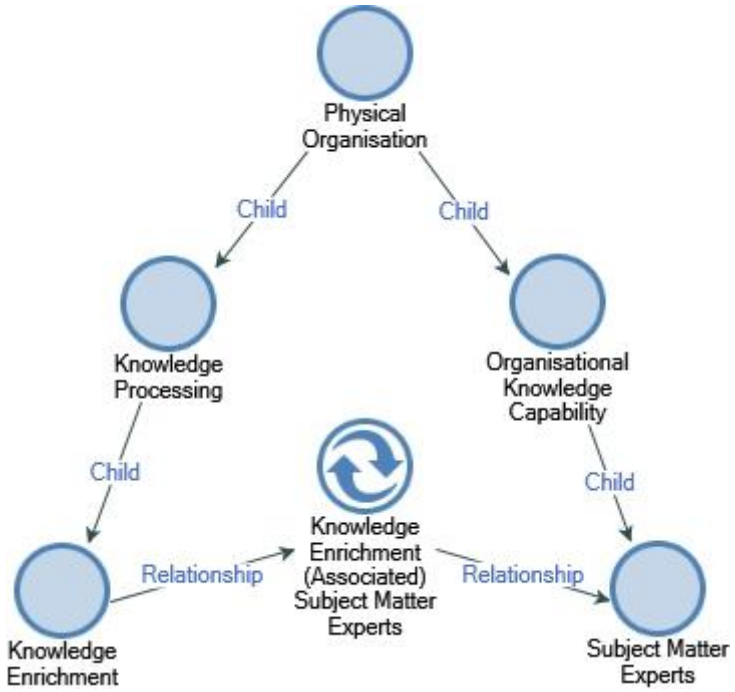

Figure 4.29 Dependency on SME for Knowledge Enrichment

The dependency upon the SME has been discussed previously in Section 4.3.4 but is becoming more prevalent within the knowledge processing environment. The SME are expected to determine what knowledge has value, but also what physical attribute and information are required to construct the knowledge asset. Participant 15 discusses this point:

"that is for the knowledge managers to decide, is it a relevant attribute, enrichment or is not really relevant."

In addition to the initial knowledge selection and enrichment process, performance also emerges as a potential issue. The selection process will determine the knowledge asset viability and associated items, however there is still a significant chance of poor performance if the relationship between the knowledge acquisition process is not aligned with the enrichment process. This was discussed previously in Section 4.3.4 KP selection and emerges again here as discussed by participant 16:

"in busier periods we would really struggle to get those done and may need to be put aside or get a temp person in to manage those. But we have to go off importance and which suppliers are licence to trade and have to put those first."

This comment refers to the importance of licence to trade suppliers. From the perspective of KM CKP, the level of trust (or expected stronger level of trust) is higher with these providers. The relationship and importance of trust between CKP and enrichment emerges as a key factor within the enrichment process. Certainly, from the perspective of the performance of internal processes based on the quality of consumed knowledge decisively selected by SME. From the data, there are three key areas emerging from the data, these are shown in Figure 4.30 below:

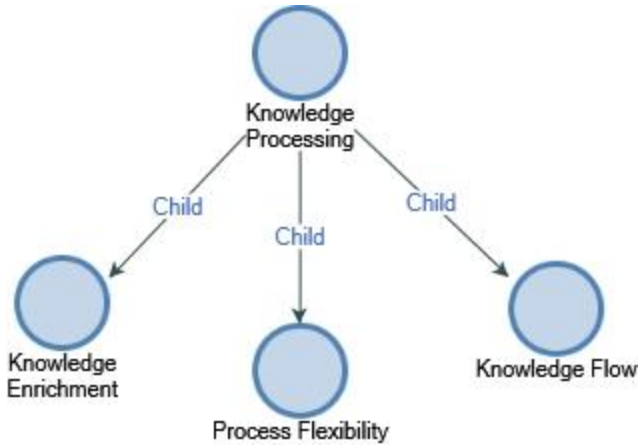

Figure 4.30 Key areas affecting knowledge processing

The three key areas above will be further analysed in more detail in Sections 4.3.9.2., 4.3.9.6 and 4.3.9.7.

4.4.9.2 Knowledge Enrichment

Knowledge Enrichment (KE) is defined as the physical processes required to create, manage and maintain knowledge within an organisation. From the data collected, KE elements have been transferred into nodes that correspond to individual functions of this process as identified by the interview participants. Enrichment is predominantly focused on shaping knowledge into useable assets. This capability is emerging as one of the most important key factors that needs addressing but also one of the most difficult to understand. Participant 6 discusses the values and issues in attempting to carry out activities currently within the organisation:

"Knowledge is free from the outside world. You need to make sure it's something useful, you're not just taking all the gossip and hearsay and information that's possibly not as

pertinent and not as worthwhile spending as much time on and turning that into something that is a waste of time. Determining what is useful knowledge is incredibly difficult task"

As participant 6 discusses knowledge selection is a difficult task, however the relationships discussed previously in Section 4.3.4 between the acquisition and selection process with the SME would be an approach to consider for resolving this issue. This aligns with comments from participant 13 who discusses not only the importance of the SME but also the interpretation of knowledge:

"Everybody's idea of enrichment is completely different, and some people just put far too much information in and it is just not needed. People like our Product Information Manager knows what it needed and what a Customer may need to see"

This re-enforces the view that relevant SME are required to play a crucial part in the process, as experience plays a part in the ability to define the knowledge being used as part of the enrichment process. However, participant 6 discussed further that the SME alone is not sufficient. The placement of this person within the process also plays a key part in the overall process:

"It would have to go through the people in the know; they'd need to pick out what information is required. The right people in the right place to go through the data and see what's needed, what's not, what you want to show off, what you don't."

Participant 6 further re-enforces this position by discussing:

"You might be given a bit of knowledge that doesn't on the surface seem like it's particularly pertinent to your industry but maybe you haven't got the ability to understand it, if you don't have the experience"

From this comment, participant 6 is expressing the concern about the initial stages of the enrichment process and the impact it may have upon existing knowledge, unless that knowledge is deemed to be pertinent to a specific area. Upon selection of relevant knowledge, the enrichment process can move on to the key elements that define the knowledge asset. Participant 11 discusses the transition from decision making to knowledge generation:

"Like any data it's got to be consistent from beginning to end. It's got to be comprehensive, it should be as large a piece of information you can get. It must be accurate. Those are my three buzz words with any data. It should be up to date as well. Those key elements have got to be in the information. In terms of the process itself, other

than those generalisations, I think the people who are using the information and ultimately deciding how that information is put into the market place, you must try and keep that chain as narrow as possible all the time. The more steps in the chain, the more people in the chain who are looking at the information and deciding what to do with it and passing it onto somebody else and then are no longer involved in it, the more people you've got in that the more you get lost and distorted information"

4.4.9.3 Enrichment Key Values

A common theme of the importance of knowledge experts continues to emerge from the data for enrichment. For this process, three key values begin to emerge that affect the information pertaining to the knowledge asset generation process 1) Consistency, 2) Accuracy and 3) Timeliness. Timeliness has already been discussed in Section 4.3.4 as part of the KP selection process and its relevance, particularly if consuming knowledge from a none core provider was discussed in Section 4.3.4.2. Consistency and accuracy will be dependent upon the source selection and the level of enrichment may differ significantly dependent upon this factor.

For 1) consistency, this emerges from the data many times from different participants and is a prominent key value. Participant 1 explains:

"It won't come into us in the same format because out of all of our knowledge suppliers, they are all doing their own thing to no rules, but if we want to make it suitable for our customers then we need to do what we have been talking about and make it consistent"

Participant 1 discusses consistency from the perspective of provider to consumer relations but participant 6 also highlights the need for consistency but more from the perspective of the technical capabilities of the organisation:

"So standardisation, make sure it's consistent but also making it's validated, so not just allowing suppliers to write straight to our databases, making sure we're putting it through a check."

Here an overlap emerges from the physical processing of knowledge (process and technical) to the effect of sharing this knowledge with consumers (consumption) and its viability. This is further re-enforced from participant 4 who discusses the issue of having differing information through the lack of consistency:

"I would say the accuracy and consistency of information, from my point of view, with not using STEP as much now, we find ourselves seeing different information from different

places – for example, the website is slightly different to the catalogue which could be different to a flyer we send out so continuity across the company"

The comment above also re-enforces the relationship between consistency and accuracy. Where consistency is referring more to the flow of knowledge and its comparability to similar knowledge assets, accuracy is focused specifically on how correct the knowledge is. The accuracy of knowledge emerges from the data to be more important than consistency and appears to reflect a different set of issues to those identified from consistency. Participant 6 alludes to the types of issues from the perspective of accuracy:

"it's making sure that you're passing on the right information, the valid/correct information, any useful information as well as adding value to what the supplier gives to you. It's another balancing act of making sure you are giving everything the customer needs and if possible information on top of what the customer needs or wants."

This comment shows the direct impact upon a customer or consumer, initiating from the provider but potentially being affected by the enrichment process if consistency and accuracy are not applied. Furthermore, a relationship emerges between the impacts upon the acquisition process. This relationship already exists and was discussed previously in Section 4.3.5; however, we now see this relationship from a different perspective. Participant 4 also re-enforces this relationship:

"The three areas where I get my information from are really vital and this is not always the same. When I see that this information is different, it tells me that people can't be bothered"

This observation also highlights the potential misunderstanding of the knowledge asset. Also, it identifies the impact on the level of effort applied during the enrichment process and the importance of validation to ensure that it has been applied effectively. This impact also has a potential effect on the consumer if it is not effectively processed, resulting in inconsistent or inaccurate knowledge filtering through. This is identified by participant 6:

"But equally for the customer to know that what they are receiving from us is what they have asked for and anything else they receive, not from us, on the same product or same topic, could be detrimental to what we have given them. I think protecting it is vitally important so both the customer and ourselves are protected from knowledge that may not do us favours"

This identifies a potential commercial impact but also a potential risk factor associated with what is shared with consumers. Furthermore, it is important that the accuracy and

consistency is maintained over time. Changes to existing understanding could also lead to potential issues as discussed by participant 11:

"Capturing changes that affect data and knowledge is a big issue. So that part of it – managing change control – and keeping up to date is probably the same thing as keeping it accurate, but it sometimes isn't. So, to re-iterate keeping it accurate, up to date, comprehensive are the key parts"

In addition to the impact of accuracy and consistency, timeliness and change control also begin to emerge from the data. Change control will be covered in more detail in Section 4.3.9.6 Process Flexibility. Timeliness of knowledge is referring to its viability and effectiveness in its current state. Knowledge timeliness emerges from the data from many different perspectives, with no one being more important than the other. Participant 14 discusses it from the perspective of internal process mechanisms and considering a pro-active approach to enforcing the viability of current knowledge status:

"You need something regularly. I think we should go back and ask them (providers) for some information every year or when a change happens like a price change or a product change, that's when we need to know as well"

This argument identifies the need to ensure knowledge is not only consumed and enriched but also maintained continuously. This is something re-enforced by many of the participants interviewed. Participant 4 discusses:

"For us, it's getting the information initially, it's the time delay. Once we're figured out we need it, we have to allow an amount of time for people to get it together and send it to us"

The impact of timeliness emerges from the perspective of a) the ability to ensure that knowledge assets remain viable and b) it is available on time for the associate need.

The three key values coming out of the data emerge as key values for the enrichment process, Consistency, Accuracy and Timeliness. Figure 4.31 below shows this relationship:

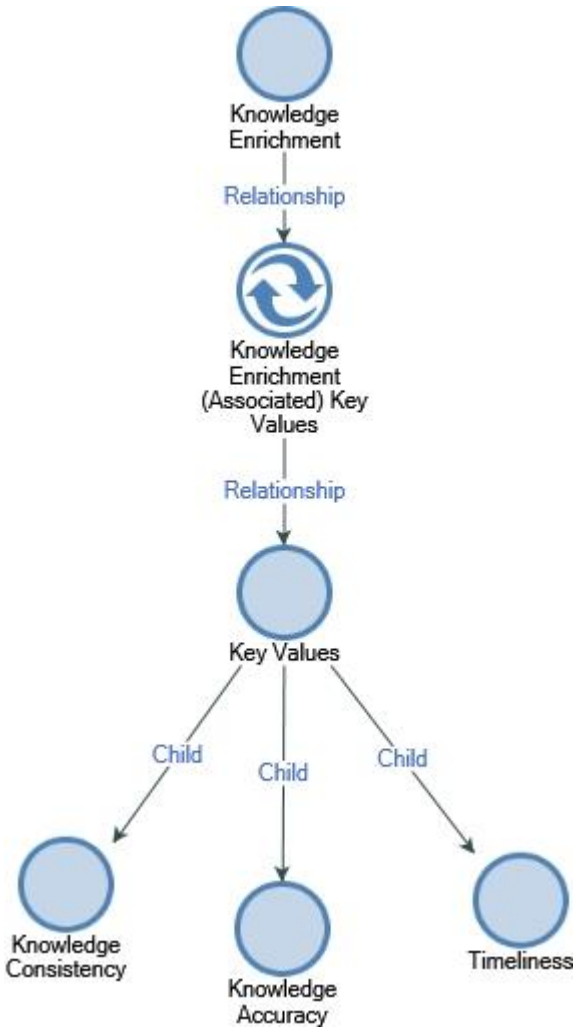

Figure 4.31 Key values of the enrichment process

These three key values make up the fundamental factors affecting the enrichment process when considering the physical knowledge. In addition to these findings, the effect of each of these varies depending upon the source or enrichment type.

4.4.9.4 Enrichment types

Enrichment types are defined as the source of the knowledge being enriched and the differences in how that knowledge would be enriched. The key values remain consistent, only the process changes to accommodate the needs of the acquisition or maintenance requirement. Enrichment types can vary depending on the source, one of the most difficult sources identified is tacit. The difficulties of capturing tacit knowledge were discussed within Chapter 2 Literature Review; however, the organisation does see value in trying to capture such knowledge and transforming this into useable assets. Participant 6 discusses:

"An example might be you want to engage a group of cable suppliers, get a group of people maybe from the frontline, from the branch, product management, data entry, get representation from many different departments who consume the knowledge in different ways and just get them to talk it out. What's good, what's bad. You would learn a lot from that"

From this comment emerges the requirement to capture knowledge from groups of knowledge managers or SME. This raises two key factors 1) the importance of trying to capture the knowledge and 2) the importance of inter-organisational communities, these will be discussed later in Sections 4.3.9.7 and 4.3.9.11, respectively. This need, for a relationship to exist between communities, continues to emerge as re-enforced by participant 3:

"I do think you need to do this and communicate with the reps. They work with customers day in and day out and have far much more access to customers than we do, and this is valuable knowledge. They probably do more than most of the sales force. You can use this to build good relationships which then leads to going on-site to work with our customers and suppliers. Because we get this knowledge, it helps us with our enriching because we have had first-hand experience"

Tacit knowledge transfer continues to emerge from the data as something that could be further utilised if processed effectively. The process itself needs to offer a level of flexibility, as will be discussed later in Section 4.3.9.6, but the concept of being able to capture this knowledge remains consistently understood as viable. This is further re-enforced by participant 6:

"I think if you are going into a meeting like that and looking for a specific outcome, something you can write down and say this is what we got, or we've got this Excel file listing where we can work better, you're almost setting yourself up for a failure. If you go into it with an idea, it doesn't always work like that. So, structure is great but allowing free reign to talk through as a group is a better way to generate real ideas, sharing"

The requirement for an approach to capture this tacit knowledge is clear from the perspective of the organisation, this would need to be clearly defined and considered. However, this is the converse of explicit knowledge that would be expected to be significantly more effective.

Explicit Knowledge by its definition would be more explicitly structured therefore easier to process during the enrichment process. Participant 19 discusses this factor:

"We've got so many different suppliers we work with, some are really excellent, we know all the data will come in, on time, in the right format, we can quickly and easily load that data onto our systems, no hassle. We know, through many years of experience, that data is not going to have any errors in it, they're like a trusted source, it's one of our trusted sources. That's the cream, for us."

Although participant 19 discusses the value of consistently good knowledge flowing into the organisation, this would be dependent upon the provider relationships as discussed previously in Section 4.3.4. A level of trust would need to exist to allow this flow to be consumed directly. The more explicit the knowledge is, the more effective it is from both the perspective of performance and knowledge required to enrich it further. Participant 6 expresses the potential issues faced even when consuming explicit knowledge:

"Standardisation is a big one. Because we receive information from so many different suppliers or providers, we need to make sure we're getting a basic level of information at the very least to ensure we can hand it on to our customers, users, consumers and make sure they can get the bare minimum of information out of it"

Although this comment addresses the requirement for standardisation to aid in the enrichment process, the emergence of non-standard knowledge is also apparent and as such would need to be considered for a higher level of enrichment, from a more knowledgeable SME, for example. This is not only beneficial for the organisation but also the provider, especially if this is a non-product provider. Participant 12 discusses the difficulties and benefits of explicit consumption:

"I think the more technical the product, the more beneficial it is to the supplier. The simple fact is, they will probably impart more bespoke knowledge on that product than a generic product, like a plastic box, piece of cable or a glam pack. All the attributes of those products are pretty much the same, so it doesn't matter who you speak to, they are all going to come out with pretty much the same criteria, for that product. However, if you speak to someone like let's say Semen's, and they are bringing in a new range of digital contactor changeover switches. They are imparting their knowledge for that product for that group of people and probably thinking to themselves. If they pick up a Sangano version on that, it is not going to be the same. And that is where the knowledge comes in"

In this scenario, the implications of being able to understand the intricacies of explicit knowledge and how to further consume and enrich it are discussed. In some cases, the variations are so small, only a SME would identify the differences. From the perspective of explicit knowledge, participant 8 also suggests the opportunity to consider national standards adoption to aid in the process:

"For this factory, I've been a great believer in the ISO9001 quality systems so that you have set procedures in terms of document control and where and who you allow to have drawings or company information. So, how that information you received in and turn into designs, drawings, patents, into graphic work, it's all your intellectual property, you do need to have control over it"

Although standards could be adopted to a degree, they would be more pertinent to extremely explicit sources where control could be applied across the whole data set, knowledge or information. This could affect the fluidity and flexibility of the enrichment process. Although, some of the individual elements could be factored into a defined process to allow for the consumption of more accurate information. Participant 15 alludes to this point:

"we should set some basic templates of must have requirements. It could be done by ourselves or it could be done at the point of negotiation with a supplier"

This point also re-enforces the need to define what should be captured at the initial stages of the process with an emphasis upon provider relationships as discussed in Section 4.3.4 Knowledge Provider Selection Process. Also emerging from the data is that even though explicit acquisition offers significant benefits from the perspective of both performance and accuracy, it still needs to be physical verified prior to consumption and enrichment. Participant 12 discusses this point:

"You get a datasheet and there is all kinds on there. Some of the stuff, we just don't need to know, and this is where I would like to think that our product knowledge comes in and we can say, don't need that, or that, that's a must etc. But that is then, where do you put it because it is not all just dropped on a website or into an excel sheet, its knowing how to break it down and where to put it"

The enrichment types have the same requirement to have input from SME as part of the process. It is at this point, assisted enrichment of explicit knowledge plays a key part in the process. A good as any enrichment process is applied, no knowledge being consumed is without a minimum level of validation to ensure it is fit for purpose and is being enriched for the correct channel/s. Participant 6 discusses this requirement:

"it's making sure that you're passing on the right information, the valid/correct information, any useful information as well as adding value to what the supplier gives to you. It's another balancing act of making sure you are giving everything the customer needs and if possible information on top of what the customer needs or wants"

Here a relationship emerges between the enrichment process, the SME and knowledge flow. Knowledge flow will be discussed in more detail in Section 4.3.9.7. The relationship can also be seen in Figure 4.29 discussed earlier in Section 4.3.9.1 Knowledge Processing, however this relationship is extended further in Figure 4.32 below to show the impact upon knowledge flow:

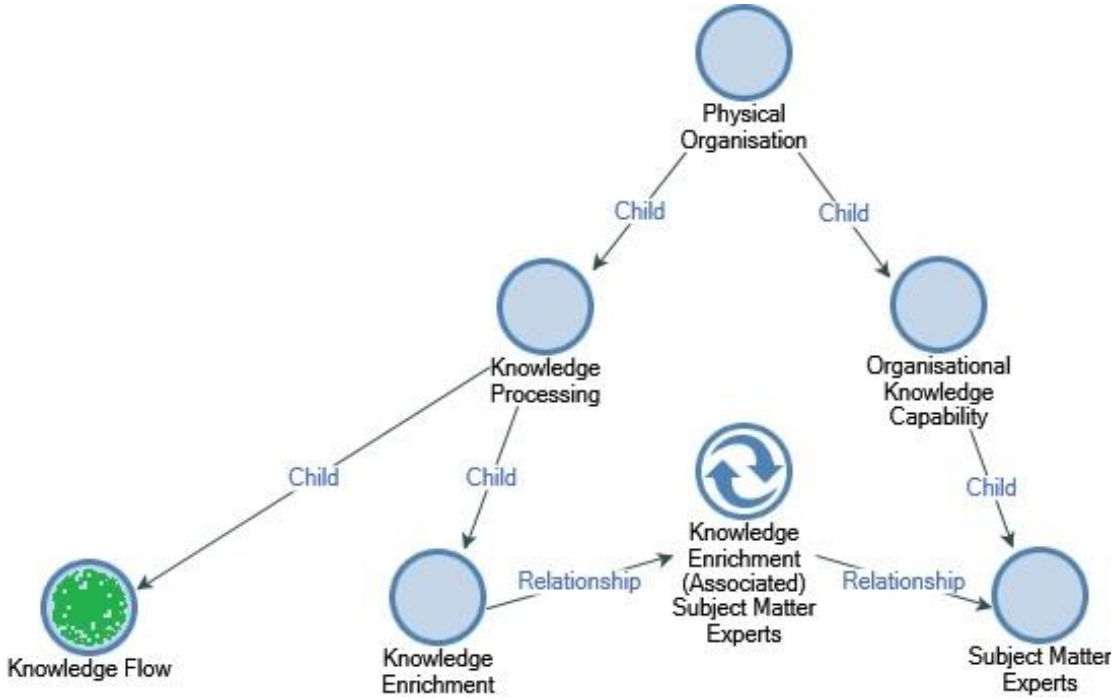

Figure 4.32 Relationship between SME, KE and Knowledge Flow

Although we discuss knowledge flow in detail later in Section 4.3.9.7, it is worth highlighting the requirement emerging from the relationship shown in Figure 4.32. The importance of the SME being correctly positioned within the process to verify validity of knowledge and its purpose. Participant 15 highlights this requirement:

"So, which one do we believe, or which one is correct, it could be that maybe the smaller lumen, and as things progress (manufacturing process) the lumens output has increased but this information as not been updated everywhere and this is where they need to have a central data point"

Here participant 15 highlights the issue of understanding the required knowledge to ensure that the correct understanding is applied against the correct knowledge asset. Some areas are so closely defined that minor difference can have significant impacts if not applied correctly. Participant 13 discusses the ability to apply additional knowledge to the enrichment based on the knowledge available at the outset:

"we can tweak the quality of the information ourselves, so long as we have got the basic information that we need to know"

This identifies the importance of the relationship of the SME to the enrichment process. However, the role of the knowledge manager and the data processor can be blurred, dependent upon experience. Typically, this role is defined as product or project managers who have migrated into KM to address this requirement. Participant 15 is such a role and identifies the values of this approach:

"And it is also a double effect because the people that were doing the enrichment, which typically had to be re-looked at and then re-worked are now doing a more comfortable job for them by attaching data sheets and instruction manuals which does not need any product knowledge"

The SME role does not exist in a silo, typically the SME works within the KM environment and hand in hand with the data processing team. Participant 15 alludes to this point in the comments above and how this relationship needs to exist. This will be covered later in Section 4.3.9.8 Organisational Structures. Participant 17 re-iterates this perspective from a data processing point of view:

"I don't think it's important that they are familiar with the kind of products that the company does. That's totally not relevant. I think it's the other way around, I think it's to be able to put into words what information we need"

Although these are two points of view from different roles within the organisation, a balance clearly needs to exist to ensure accuracy and consistency.

4.4.9.5 Enrichment Issues

Within enrichment, there are a broad range of issues that will not be discussed comprehensively, however, the main issues are highlighted for completeness. Participant 13 highlights the following:

"Things getting missed, updates being sent in that have not been captured because of the changeover process"

This is discussed further in Section 4.3.9.7 Knowledge Flow.

Participant 13 goes on to state:

“we often get all of the wrong information. I think we would be able to get what we need and also get it quicker if we had direct relationships with suppliers.”

This is discussed further in Section 4.3.9.12 Provider Relationships.

Participant 13 also states:

“I think it makes a big difference understanding the information you are working with each day, otherwise you are not going to know if the information you are entering is actually correct. But if you know something about the knowledge you are working with, you are going to know if it doesn’t look right or not”

This is discussed further in Section 4.3.10 Organisational Knowledge Capability.

Participant 13 also states:

“Yes definitely, because we should only accept information in certain formats and normally we only accept Excel or PDF formats but not all of our suppliers know this, and we get all sorts of formats sent through that we just cannot work with”

This is discussed in Section 4.3.9.5 Enrichment Issues.”

Participant 14 discusses the following issues from their perspective:

“If new people come in or if anyone is unsure, as long as they shout up and ask for help, then there is always somebody who can spot something in the data that might go wrong, there is always something we can do if something does go wrong. If we input the wrong information, we can deal with that.”

This is discussed further in Section 4.3.9.8 Organisational Structures.

Participant 14 also states:

“Yes, it’s the training. We need to be careful, especially with the bigger suppliers. The data for the bigger suppliers is going to have a bigger impact at the branch level because of the frequency of use of that data. So that could have real commercial impact.”

This is discussed further in Section 4.3.10 Organisational Knowledge Capability.

These issues can appear within differing areas of the existing organisation but reflect the common issues emerging from the data and are intended to give a flavour of the impacts

of enrichment. From the enrichment elements discussed within this section, the following Figure 4.33 highlights the relationships between KE and knowledge types:

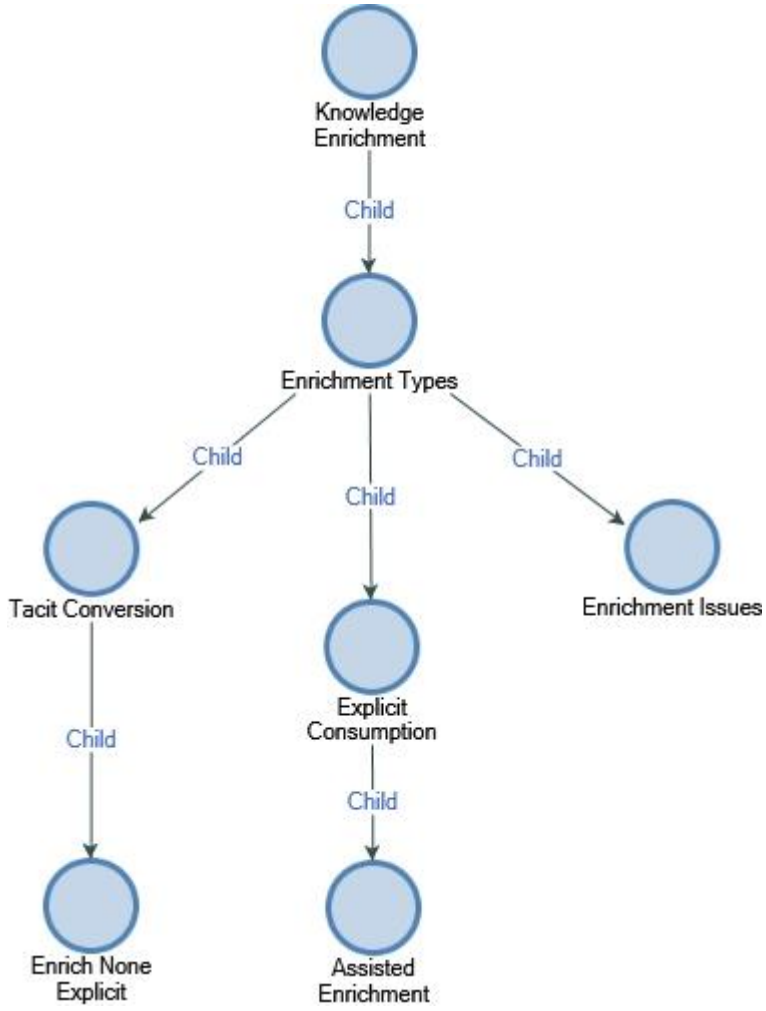

Figure 4.33 Knowledge Enrichment Types

For the application of these knowledge type within a framework, flexibility of the knowledge process must be considered.

4.4.9.6 Process Flexibility

Process flexibility is defined as the ability of the KM process to be able to adapt to knowledge capability requirements. The adaptability of the organisation is a key factor emerging from the data. Participant 4 discusses:

"you need to comply with your look and brand, but then again you have to get the correct information across from the supplier. So, there would be a need to be something in-between, but it's got to be quite flexible. I think we have a level of flexibility, to a degree. It's down to us what we use/show and what we say. From a data point of view, it would get confusing and complicated because every product is different, every product range is

different. But the important thing is to get the right information to the customers, so you need to be very flexible"

The comment above highlights the key issues relating to physical product information and how this is delivered to the consumer. In addition, there is a clear concern about the effect of poorly defined assets having a direct impact upon the organisation and the perception of its brand. This example relates directly to the complexities within certain areas of the business where products such as LED have such a significant impact due to the rapid development within the marketplace. Participant 14 re-enforces this argument and infers the relationship between learning and flexibility:

"we learn from product changes. How the LED came forward. LED replaced ordinary lamps and other industry changes like that"

As discussed previously, LED can have a life span of 6 months and therefore, the capability to adapt to change to such rapid technological changes is a crucial factor within this environment. Although this applies to all knowledge acquisition, this is reflected significantly from a commercial viability perspective. Participant 14 re-enforces this point:

"we should be flexible. I think if the branches want to sell something, the more experienced people will know it can be sold in a branch. In our team, we look for the same things all the time and so that is the starting point. When you start to enrich it, you dig a bit deeper and then if it goes into a catalogue you look"

This example shows the same relationship emerging within the enrichment capabilities whereby the SME, the data processer and the need for a flow for the enrichment process has a clear benefit. Thereby a relationship emerges between process flexibility and knowledge flow. Certain levels of flexibility do exist within the organisation, specifically within the data management area. Participant 14 alludes to this:

"I think we're quite flexible. We accept what comes into us but then we'll also chase any missing information. But then we're rigid in the rules we have for adding that product to the system. The rigid processes ensure the right information is added to the system, but the flexibility is there in other parts of the processes where it's needed"

Process flexibility here however pertains to the collection of missing knowledge to complete the enrichment process. This also only relates to Licence to Trade suppliers which account for 180 of approximately 31000 currently available knowledge sources. However, the organisation does acknowledge that flexibility is a required factor within knowledge management, but this needs to be addressed at the knowledge acquisition and

enrichment processes as opposed to the data management function. However, this minimal approach to flexibility should not be discounted as the relationship with these trusted suppliers could offer a potential insight into better approaches than currently applied by the organisation. Participant 15 refers to this supplier relationship and its potential benefits:

"I think we could pick up a lot from the suppliers and vice versa, I think some of the processes we have would them and I imagine they would have processes we could incorporate, it is about making these types of processes as streamlined as you can"

Participant 19 also re-enforces the value of this relationship with the supplier:

"If we show them flexibility, even a little, it helps to keep relationships sweet. If they think you are flexing for them, helping them out, they are more likely to flex a little for us and maybe you can meet in the middle"

Although participant 15 discusses streamlining processes and the incorporation of knowledge processes learnt from external sources, this needs to be balanced. One of the key factors emerging from the data is that of autonomy which the organisation strongly identifies as the key factor for its success. Participant 9 discusses the potential concerns of removing autonomy through streamlining:

"if the process is too streamlined that it takes away of autonomy it could have a negative effect. I was talking to someone earlier about a competitor. Very successful they have gone from web to shops, the organisation is very successful in shops and now we're moving to web. In my opinion, an experienced and knowledgeable person in a shop beats the web every day of the week"

This comment reflects the value of the knowledge expert from the perspective of the face to face consumer experience. However, the organisation is currently investing significantly in new technologies and the transfer of this knowledge to useable knowledge assets is a key factor in this approach. The organisation wishes to maintain this perception of knowledgeable resources within the marketplace, by working towards the transitioning of tacit knowledge to re-useable knowledge assets. Participant 9 discusses the importance of the organisation's position as a knowledge leader:

"We've been recognised by various people as the place to go to because we do things the right way, we try and evolve and learn and follow and utilise the information that your team bring to the table, which is constantly evolving, so we have to evolve with it"

Although flexibility is typically emerging here as a key factor in the knowledge consumption and distribution process, it also offers additional benefits as discussed by participant 3:

"If it turns out rubbish and people don't like it then we change it. We need people from branches working on the ground and people like you who have the expertise to evaluate what we need and come up with solutions "

In this example, participant 3 discusses the capability of being able to recover from a change to the process that may not have been successful. Therefore, flexibility also emerges as an impact for process maintenance as well as process flexibility.

4.4.9.7 Knowledge Flow

Knowledge flow can be defined as the physical flow of knowledge throughout the knowledge life cycle process. Knowledge flow relates to how the knowledge moves through the knowledge life cycle process. Knowledge initially starts from an external source, whether this be tacit or explicit. This knowledge is then consumed by the organisation, enriched and then distributed to consumers via an appropriate delivery channel or mechanism. Knowledge flow can be affected at any stage throughout the life cycle and is dependent upon the processes and resources within that life cycle.

The flow of knowledge presents its own difficulties, participant 11 discusses this:

"The more it gets touched, the worse it gets. And in all elements, not just in terms of it changing and not being accurate but also in reinterpretation and how useful it is and how it's going to be used. The person who first gets it might think it has some use in one area but by time he's handed it over 4 or 5 times the person at the end has a different view. Rightly or wrongly. So, you keep that team and you keep that chain of command as short as you can. It helps the flow of information from a to b go quicker"

Dissecting this example, there are many key factors including access to information, enrichment and channel selection. Specifically, there is a key issue with the number of people involved within the process and accessibility to the same information. From this emerges a relationship between organisational structure and KM technology. Already discussed in Section 4.3.9.4 is the relationship between enrichment and the SME as part of the enrichment process. However, this directly relates to the number of resources directly affecting the knowledge asset creation process. Figure 4.34 below shows the required relationship between the knowledge worker and KM technology:

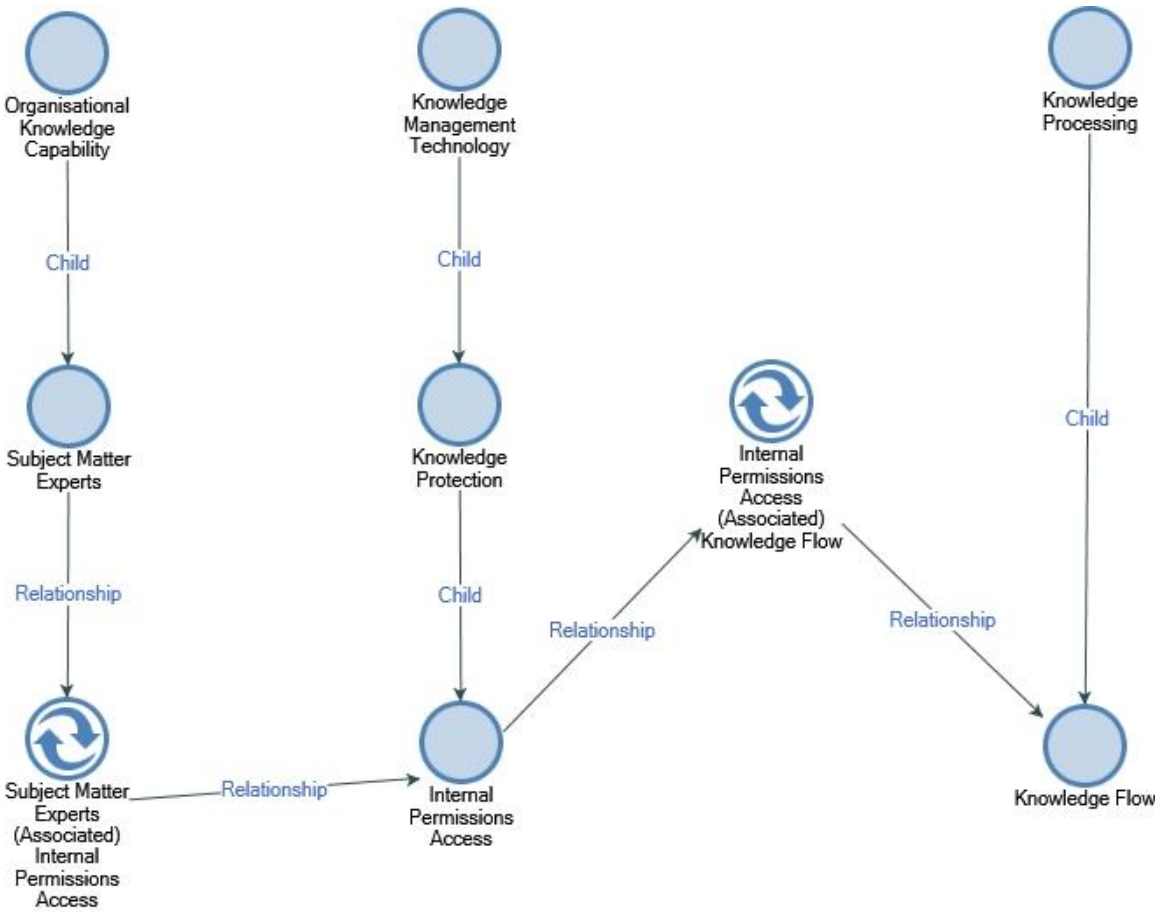

Figure 4.34 Knowledge workers and KM technology

This relationship emerges as a required level of control to define the access to knowledge during the enrichment process. Control of access to knowledge being an issue raised previously by participant 11, with the premise of potentially having a positive impact upon performance in the flow of knowledge. Performance is a factor that is raised several times within the data, participant 17 re-enforces participants comment on performance:

"The time it takes to gather all the bits of information that you need. Not just the price but the right description and everything. We need to get it all in at the right time"

In addition to performance, access to knowledge also highlights the issues relating to poorly managed or enriched knowledge. Participant 9 highlights the issues relating to this:

"So much is lost or misinterpreted. You can have conflicts and just going back, stripping it back and going back to the beginning"

This highlights the current inefficient flow of knowledge within the organisation with significant efforts required to rework assets. Organisation of knowledge is a key element,

from this perspective, to ensure the flow of knowledge gets to the correct resource at the correct time. Participant 4 identifies this requirement:

"I think efficiency of getting products from an idea to market would be important. In terms of data, it would be being ahead of where you need to be and organising it correctly"

The impact of knowledge not being managed at the correct stage of the process could impact both the consistency and accuracy of knowledge. However also emerging from the data is the impact upon an organisation's ability to learn from this knowledge. Participant 19 re-enforces this finding:

"If people are looking at that knowledge with a view to acting on it, then the organisation will learn from it. If you don't know what the information is telling you, someone else might, so sharing it could important. I said before about looking at financial results, it might not be any use to me to try to fix supplier information or a process related to supplier processes, but a sales guy could maybe use it and act on it. So, it's the same information but it's just in someone else's hands. So, getting the right information to the right people is really key to learning"

This comment highlights the need for the organisation to be able to learn and develop from the knowledge it is consuming, as a key factor in the overall process. Knowledge flow is affecting this when knowledge is not being consumed by the relevant knowledge worker at the relevant point in the process. Participant 12 discusses the impact upon the consumer of ensuring the knowledge assets have been created and maintained effectively:

"They (Consumers) can make their own decisions, providing we as a company have given them everything we can to help them and we will do our utmost to get you more if required. Can you make your decision based on everything we have given you there? If they can, then I don't care whether we have used one datasheet or five datasheets and a user manual. If they have reached a conclusion, then we have done our job"

Participant 12 identifies a positive relationship as an outcome of ensuring the flow of knowledge and addressing the knowledge effectively. The consumer is the final element of the knowledge flow cycle and ultimately, if the knowledge asset or assets are fit for purpose, then this should have a satisfactory outcome.

4.4.9.8 Organisational Structures

Organisational Structures are defined as the physical organisation of human resources and their impact on knowledge processes. The findings emerging from the data identify a variety of impacts based on different processes affecting KM in different ways. The following section reviews these observations and identifies the impacts and barriers. The three key areas emerging from the findings are 1) Centralised, 2) De-centralised and 3) Inter-organisational Knowledge Communities, each of which shall be discussed in Sections 4.3.9.9, 4.3.9.10 and 4.3.9.11, respectively.

These three concepts emerged from the pilot study as areas of further investigation and after initially being identified as having potential impact from the literature review in Chapter 2. Figure 4.35 below shows the initial theme:

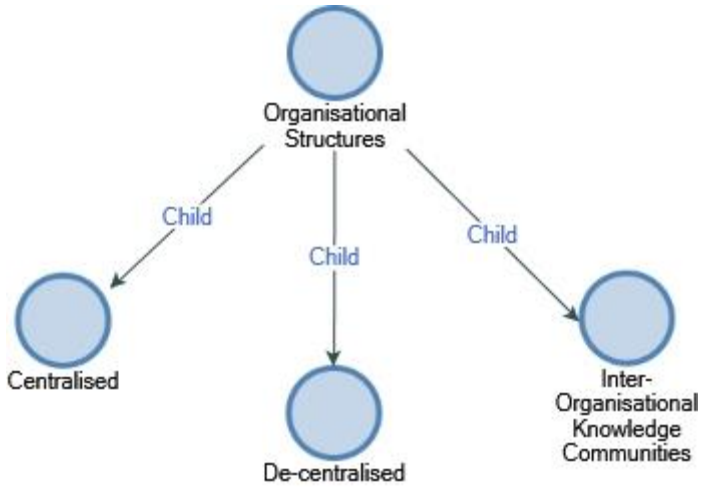

Figure 4.35 Initial theme for analysis the impact of organisational structure on KM processes

This structure forms the basis for the following analysis within this area, further identifying the key elements that are crucial for the identifying an effective solution proposal.

4.4.9.9 Centralised

Centralised refers to the centralisation of resources and processes from the perspective of rationalising knowledge life cycle capabilities from acquisition through to distribution to achieve the same goal. From the data, there are differing opinions on approaches that would be most effective from the perspective of knowledge management. Furthermore, centralised can mean different things to different interview participants; this will be reviewed further to try and rationalise these concepts into a common understanding. Participant 14 discusses the concept of centralisation from the perspective of teamwork:

"I think a centralised approach, where we work closely with the data in one team. In our team, we have a variety of people who have worked in different parts of the organisation so if someone has a query, we can get the answer from within the team. Somebody nearly always knows the answer and it's basically a shout out in the office, it's quick to get the answer"

This discussion clearly focusses upon the benefits of people working together from a physical perspective and the benefits that face to face interactions offer. Furthermore, it highlights the advantage of having knowledgeable resources who have had experience from other areas of the organisation as part of this physical team. Not all participants agreed with a fully immersive team structure however. Participant 11 argues:

"Everyone working from home with no central point and all getting together month on month in a holiday express somewhere is the wrong end of the scale. Completely sticking your head in the sand and saying it's 1950 and everybody should be in the office, I'm not interested in people working from home approach is the other end of the scale. I think the right balance is in the middle. Yes, you need a face to face around the table dialogue, you get much more out of that dialogue than you do any other digital replication of that, whether it be email, skype, whatever, you don't get the same as you would with 6 or 7 people around a table"

This discussion argues that although there are clear benefits from physical resources interacting with each other face to face, this does not have to be a rigid structure that requires resources to by physically located within the same location. Participant 11 also discusses that home working or remote working could potentially have a negative effect. This response comes from an organisational culture where people not being visible during working hours could impact their performance.

Physical team structure however, is not the only impact from centralisation. There is a perception that centralised resources are more effective resolving issues when structured in such a way that resources can call upon each other. Participant 10 highlights:

"Sometimes we rely on the suppliers to notify us of changes or price increases etc. Sometimes the suppliers are complacent and don't give us that information in time. The ones that we have good relationships with do. The ones we don't have good relationships with, I suspect for one reason or another, maybe we're not a big customer, we might not be getting preferential treatment and the communication might not be filtering through to our business quickly enough. Where, if you had a centralised team, chasing these suppliers for the information, periodically, maybe things would be different."

Although participant 11 alludes to the point that resources working together could enhance productivity, they also identify issues with provider relations and their interaction with the organisation. This example refers to the relationships not being good, based on the previous analysis of KP, this type of provider would be defined as a NCKP. Furthermore, these relationships should be considered as part of inter-organisational communities which will be discussed below in Section 4.3.9.11. Figure 4.36 shows this relationship:

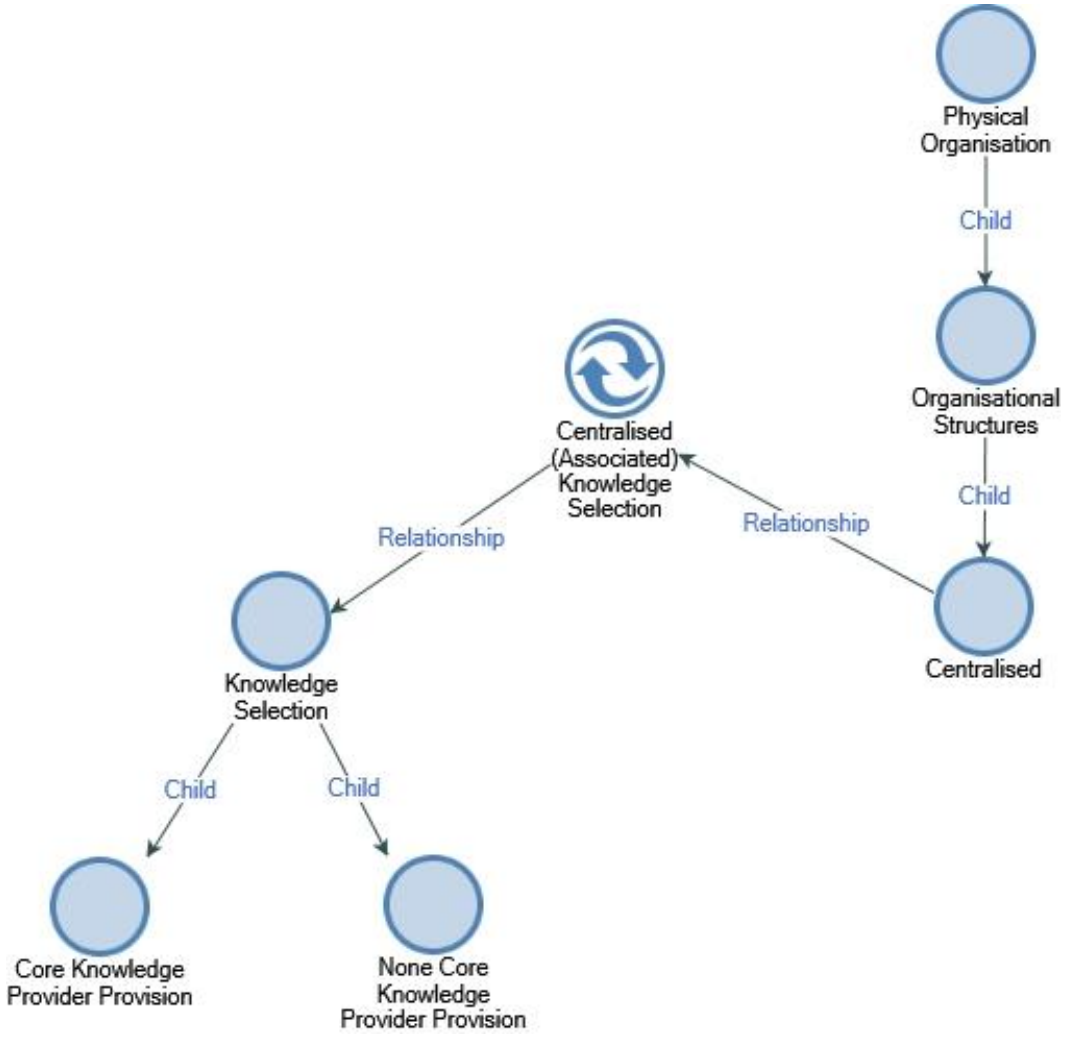

Figure 4.36 Relationship between knowledge provider and centralised resource structure

The physical placement of the correct resources continually emerges from several participants as a key factor on KM process. Participant 4 argues:

"I'm in favour of a centralised approach but I fully respect that in your company, where you have knowledge experts on the lines, they are the kind of people you need to speak to"

This comment refers to the placement of SME within the organisation and the need for them to be actively involved in organisational processes. Historically, knowledge experts within the organisation have been placed within key roles such as product managers or engineers. Recently however, as the value of knowledge and information continues to escalate, this knowledge and its value is being recognised as a vital key factor in the development of knowledge assets. Participant 15 re-enforces this finding:

"Having people who understand what the information is, again getting back to product knowledge experts. Having the correct people in the right places."

Although having expertise within the knowledge frameworks continues to emerge, so does the physical location of resources and which organisational structure would be most effective. Participant 11 discusses

"Compact and flexible and as shallow as you can. So, you feed in with hierarchies. Obviously, these days you can have them over a greater physical distance as you used to be able to. We would have all have had to be in the office, but now you can have people all over the country if you want or the world if you want"

Further re-enforcing the need for a centralised approach but without the need for physical interaction. This argument is based on having the technical capability to support a global KM framework within the organisation. Technical capabilities will be discussed further in Section 4.4 KM Technology.

Although resource structure and relationships emerge as requirements for effective knowledge management, participant 2 argues that structure alone is not sufficient. In addition, controls and guidelines should be applied to aid process:

"I think a team working together would be far more beneficial if they had good guidelines and knew what they were doing than having lots of individuals in different areas banging their heads. Different people will have a different view, a company view that we stick by, or individual views which can be very different"

This re-enforces the need to have controls in place to manage the physical activities of the knowledge workers, therefore removing some of the personal views relating to areas of knowledge processing. It could be argued however, that these controls could have a limiting effect upon the knowledge asset creation process. There is clear evidence emerging from the data that the application of a formalised process or structure could offer positive benefits. These benefits could be as simple or as clear as described by participant 13:

"I think we should have allocated people doing specific tasks, currently we are on rotation in the office and there is always the chance that something will be missed on the changeover. Each person possibly if the other person has completed the task so if we had an allocated person, there would be less chance of that happening"

This example simply identifies the key factors that need to be considered when considering the internal organisational structure capabilities.

4.4.9.10 De-centralised

A de-centralised approach can be defined as a disparate architecture with independent knowledge workers, working towards a single goal via individual objectives. De-centralisation can be seen to have both positive and negative effects depending upon the participant being interviewed. Depending upon the organisation type, de-centralisation can have different effect, Participant 6 discusses the implications of de-centralisation:

"With this type of company, we have 100's if not 1000's of separate entities that are consuming the same amount of central knowledge. To have it too decentralised is too risky for me because you don't know as a head office or as a marketing developmental team, you don't know where all of your branches are going, you don't know where all of your users are going. To me, having a good solid central system, a central pool of information that everyone can access, using standardised tools, and not restricting them from anything but allowing us to control the flow of information to them, making sure they get what they need, making sure we can react to their requirements if we need to increase of decrease the flow of data, we should be able to do all of that, so I think centralisation is quite important for this company"

Participant 6 discusses the risks involved within a complex environment being too centralised where there is a requirement for a centralised knowledge environment. This organisation consists of multiple businesses and in some cases the competing businesses with comparable businesses that do not necessarily complement each other. However, the organisation still has the requirement to have a centralised KM framework. Participant 6 is alluding to the fact that centralisation offers a more effective approach to knowledge process but also having the ability to control the flow of information throughout the separate organisational entities. Concerns about internal competition, but also concerns about who controls the data is still evident and emerges from the data in different ways. For example, participant 13 highlights:

"People were confused and got tired of going up to other departments and just started to work on their own and started to become detached from the team. Instead of relaying information"

Historically, autonomy at a branch level has re-enforced some of these fears within the organisation and to some extent appears to have bred a culture of mis-trust. Participant 6 discusses this feeling:

"we've been decentralised for a quite a long time, so every single branch has essentially been a little outpost and I think that has worked well in the past, due to our customer's inability to share information within themselves. But now with the way the world is and the way computing, the cloud and data access is going, we're running the risk of shooting ourselves in the foot by allowing our branches too much autonomy to take our company knowledge and then put a different cover on it. Our customers may be receiving another version of that data from another one of our branches. So, it's no longer an individual branch front, it's meant to be a company front and we as a company have the knowledge, so we should be sharing it and disseminating it across our users equally"

Autonomy at a branch level has historically been one reason for the success of the organisation. However, as participant 6 also discusses above, this approach is old fashioned and there are real concerns that the organisation needs to adapt to remain relevant, although there is still ambiguity on the correct approach. Participant 9 proposes:

"Yes, my natural yearning would be for a more de-centralised framework. Having the right people in the right places"

Therefore, there is a clear understand that change is required, and people are willing to apply these changes. With such a multi-facetted organisation, any approach would need to be applied correctly to avoid internal frictions. Participant 1 discusses the importance of communication in such matters at a local/branch level:

"at the local level, they want to feel like they have direct contact with the supplier, with a good flow of information and communication at a local level"

This comment highlights the concerns at a local level that centralisation would impact the branches ability to remain as effective if control was more centralised. Furthermore, they iterate the importance of internal communication within the organisation, particularly from the perspective of knowledge sharing. Where participants show a reluctance or concern from being centralised, they tend to suggest a hybrid of centralisation with control for certain elements remaining at a localised level. Participant 4 discusses this approach:

"I think it would need to be a combination of the two. You would have to have the specialised people with the knowledge of the product in the industry and then have the tech guys or the data guys to structure it and deliver it to a wider audience in more understandable terminology"

Generally, interview participants did prefer the option of centralised vs de-centralised albeit with a level of concern about how it could be applied to accommodate the needs of all areas of the organisation. The key values coming out of decentralisation vs centralisation were autonomy and provider relations at a local level.

4.4.9.11 Inter-Organisational Knowledge Communities

Inter-Organisation Knowledge Communities are defined as individuals or teams working together within the organisation and third-party organisations for the pursuit of a shared knowledge capability. The organisation is a wholesaler and therefore has a significant level of reliance upon third-party organisations and what could be learnt from them. There is a clear requirement emerging that such knowledge acquisition could offer real value if applied and managed effectively. Participant 6 discusses:

"as an idea, I think it's possibly the most powerful thing we can do without expending much effort. Just bouncing ideas of people that may not talk very often. You don't know what other people know, you don't know what you don't know. I find that something to be key in my role, until I am faced with problem, I don't know what I don't know. Being able to talk to people from other disciplines or backgrounds about the greater good, what we all do, I find new information, new knowledge comes out of the woodwork, just by having a blaze' cup of coffee with somebody. I think the power of having these little groups is almost immeasurable"

Clearly from the discussion above, there is potential knowledge to leverage from such communities. As participant 6 discusses, often it is not clear where solutions or ideas exist when working within a siloed environment. Participant 1 also re-enforces the opportunities available from a manufacturer perspective:

"Researcher – Do you think if we set up a community of practice with a supplier that this would in fact offer any real value?"

Participant 1 – "I think there are certain types of suppliers that would welcome that type of relationship and this could offer real benefits"

By, certain types of suppliers, participant 1 refers to what has previously been defined as a CKP. Therefore, a relationship between knowledge communities begins to emerge from the data. Figure 4.37 below shows this relationship:

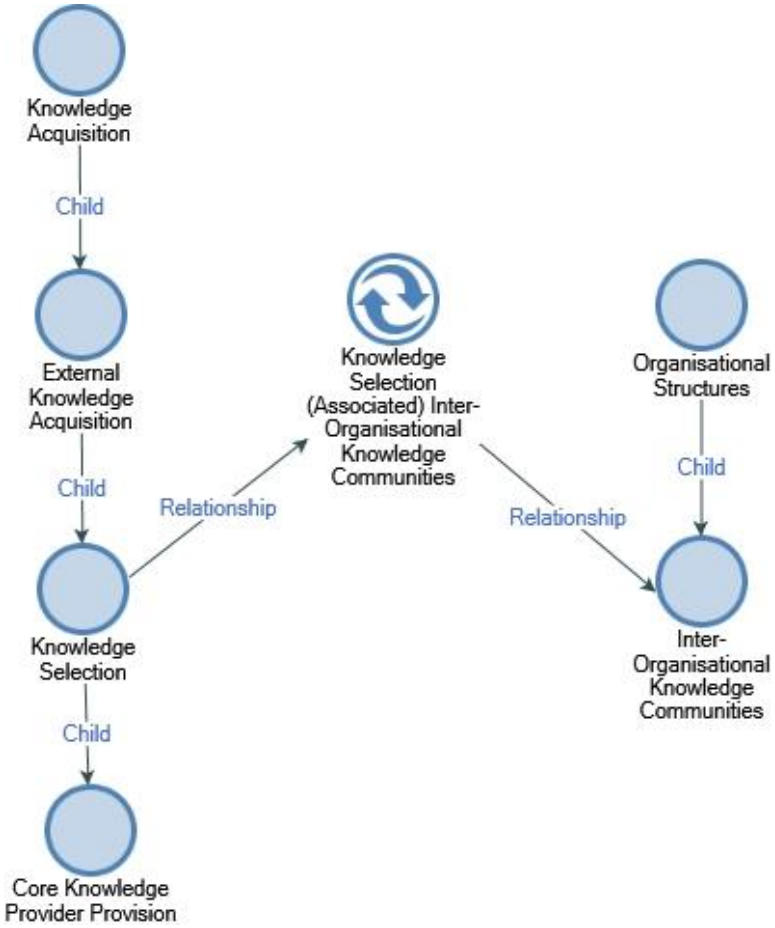

Figure 4.37 Relationship between CKP and inter-organisational knowledge communities

Although this relationship exists, each of these individual areas can co-exist independently and clear advantages for a collaborative approach continue to emerge. Participant 15 re-enforces the value of having knowledge communities:

"I have already said to my team that we should contact a member of a given supplier, a representative, technical guy or whatever, and even have them come in and help us with our data enrichment. This then helps us build our relationship and then we know we are getting the proper information and that it is being updated correctly. And that is one of our big issues, if something changes, how do we know? We have regular contact with suppliers and manufacturer's representative or technical guy then that would be informed. At the minute, we literally go through and check everything"

This discussion highlighted the practical issues relating to not having the correct knowledge at hand. Participant 15 goes further by identifying the potential value in

building that relationship with a provider. There are potential barriers to creating such communities however as discussed by participant 10:

"it's always good to broaden your knowledge and you know, suppliers, some suppliers, and a lot of the seminars that they do, a lot of people think, I can't be bothered, but sometimes it's good to attend, even if you don't actually learn anything, it's just talking in what they are saying ; it might be something happening in the future that might be relevant for everybody and that is what I think is very important, people should have an open mind"

This comment highlights a lack of enthusiasm within certain areas to participate within some communities, although participant 10 re-enforces that at a minimum, provider relationships could be maintained by a collaborative effort. From this, there are comparable key values to the KP selection process 1) mutual viability and 2) provider relationships. Although provider relationships are not the only ones with a possible value that emerge from the data. Participant 8 suggests:

"I think that discussing the factors with suppliers and customers always helps. Whether you accept the information you're getting is up to you. "And again, you're going to filter it through and put it back into your own environment to see whether it's going to be beneficial to you or useful to you"

Participant 8 suggests that consumer communities could also offer real value to the knowledge processes. Knowledge from consumers was also discussed in Section 4.3.4.3. Therefore, it emerges that the relationship in Figure 4.37 above could exist between all knowledge sources and knowledge communities. Relationships within relevant communities continue to emerge and offer value; this is expressed in different ways depending upon the participants role within the organisation. Participant 10 discusses:

"What I have experienced over the last 15 years is, if you have a good relationship with a supplier, it doesn't matter if you are spending millions or thousands with the supplier, if the relationship is between two, or even more, individuals is good, then you have a good working relationship"

Therefore, it emerges that knowledge communities are dependent upon good relationships with both consumers and providers. This again relates back to similar values that were identified as required for CKP, refer to Figure 4.12. Conversely, failings in such relationships also relate back to what was discussed for the knowledge provider selection process in Section 4.3.4. Poor relationships or ineffective knowledge

communities of practice would not be trusted and therefore require significant more effort to consume knowledge from. Participant 11 re-enforces this:

"It's as vital as the process of getting it anywhere. The people you are reaching out to have to want to give you the information, if they are reluctant to share it with you, you know are there any hurdles there. It's vital you have that kind of engagement with them, so they can sometimes go the extra mile and at least deliver and understand what you've asked for"

From this there could be a potential capability of defining CKP and NCKP, utilising communities of practice as a selection process tool as well as knowledge sharing community. The dependency of the SME continues to be highlighted, to ensure the correct selection processes are applied at the correct time. Participant 3 explains:

"You need to have good working relationships, you also need to have the correct knowledge within the team to ensure that you are asking the right questions. Also, there should be periodic visits to supplier sites to support these relationships and maintain communication. When you work with people face to face, you get more out of them. If you can have a relationship where you can tell them what you need and why you need it then they are also going to sell more products as well as the benefits, we get from it"

This requirement for the SME is identified as a key factor to ensure the success of such visits. As discussed in the previous comment, this would offer little value to the organisation if it could not be interpreted effectively. Participant 2 discusses this issue:

"obviously having the right professionals on both sides. There is no point in having somebody that doesn't know what they're taking about at our level speaking to a guy at their side who has got a clue what they are on about. They have got to be able to co-exist and work together, otherwise it just isn't going to work"

A relationship begins to emerge for a connection between the SME and their interaction with knowledge communities. This relationship is highlighted in Figure 4.38 below:

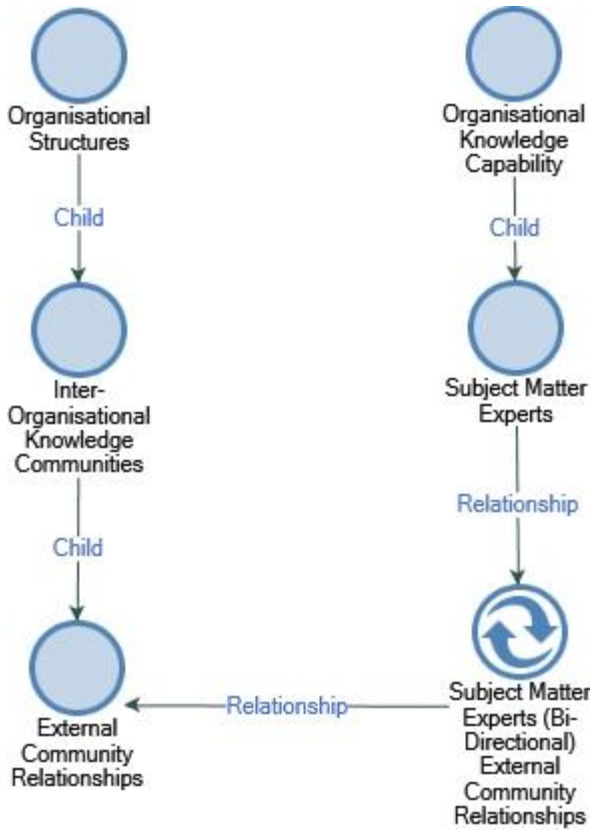

Figure 4.38 Relationship between organisational knowledge communities and SME

Also emerging from the data is a requirement to have controls in place to manage such knowledge communities to ensure they remain effective. Participant 4 explains:

"from a practical side, if three are too many people involved, you can't seem to make headway with anything or get to a final goal. There is always too many opinions and it can slow things down rather than help it progress I've found personally. But if there is a leader in each section then it could work"

The types of controls to apply have the potential to be subjective therefore they should be consistent with the needs of the community to ensure effectiveness. Participant 1 expresses this requirement:

"So, if we were going to build a community of practice, we would need a different set of rules if it was an internal manufacturer as opposed to an external manufacturer or supplier"

Although not explicitly defined from the data, it should be assumed that consumer communities of practice should also adopt control mechanisms that align with those discussed for provider communities later in Section 4.4.1.4. Within this section, the key

areas of interest for knowledge communities of practice reaching beyond the typical organisation are shown in Figure 4.39 below:

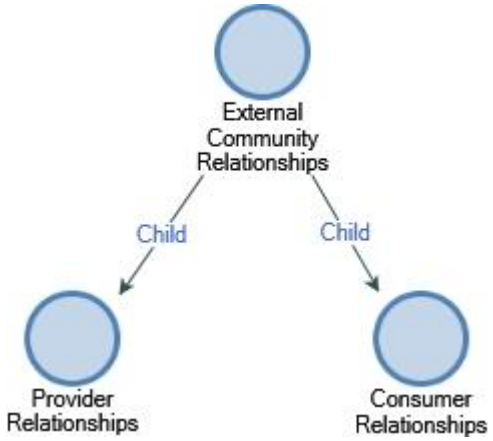

Figure 4.39 Inter-organisational communities

For each of these thematic nodes, the individual requirements of these two community types are discussed in Sections 4.3.9.12 and 4.3.9.13.

4.4.9.12 Provider Relationships

Provider relationships are defined as the physical relationship between a KP. The KP could be part of an inter-organisational community or there could be a direct relationship without the need for participation within a knowledge sharing community. As with knowledge provision discussed previously in Section 4.3.1 Knowledge Acquisition, provider relationships are a key element in the knowledge communities.

The initial key value of provider relationships to emerge from the data is that of communication. Communication means different things to different participants and this is evident from their responses. Participant 15 discusses the importance of re-enforcing communication channels from the top down:

"I think it has to come from the top really, communication has to work from the top right down to the bottom. IF you are asking a supplier to help enrich products and then their representative goes into a branch and is told to get lost, he is not going to be very happy. It has got to be a two-way street"

In addition to re-enforcing the importance of communication channels within the organisation, participant 15 also alludes to the importance of absorbing knowledge from providers as part of this relationship:

"I think we could pick up a lot from the suppliers and vice versa, I think some of the processes we have would them and I imagine they would have processes we could incorporate, it is about making these types of processes as streamlined as you can."

From this comment, the participant highlights the tangible benefits of such communication with the provider, potentially leading to enhanced processes in some cases. Communication can also be impacted by language barriers with respect to international providers. Participant 9 re-enforces the value in considering communication channels beyond English speaking providers.

"for years we traded with a nation who we couldn't communicate verbally with, I bet that's still the case with other distributors in the UK, you know the communication will be seriously marred. You can get this real broken dialogue and I have found is when you get a problem in the product, people's ability to speak English suddenly starts to diminish. So that is a massive factor for us, our guy can speak in the native tongue and enables us to form relationships with people. Surely the basis of any relationship has got to be communication."

Although typically, the common finding is that communication aids strengthening the relationship status between the organisation and the provider, it can also be determined that the communication channel is a direct channel of good information for the provider. Participant 9 discusses this approach from the perspective of initially building the relationship with a new provider:

"If you really want to dig into this, you have to consider the message that you communicate and are your suppliers consistent with your corporate message"

This approach is intended to re-enforce the expectations of the organisation with the provider during the initial communications process as part of the provider relationships building process.

Communication is not the only key value to emerge from the data, trust is one of the more common themes that impacts a provider relationship. Participant 4 discusses the importance of trust from both parties within the relationship:

"trust because they would be buying into what we're saying or offering. It would need to be a 2-way relationship. We'd provide them with the information they need and in return we'd get their business"

This example shows how trust can have not only an impact upon the physical relationship but also a potential commercial impact. Trust within the relationship often emerges as having a physical impact upon the ability to provide consumers with what they need. However, trust is seen to be combined with other key values to help build the relationship. For example, participant 9 discusses:

"Trust is massive! Credibility! You may not know it, but you strip me down I am a salesman through and through. Something I am big on is testimonials, if I go and see a supplier and they are already manufacturing for 6 or 7 people who have a credible name in the marketplace, that is assurance immediately, failing that testimonials for me are very strong, you know, this is where we have dealt with Customer A, B, C, these are the finished results so and so; So, that is mega important for me in terms of buying and equally selling"

Here, participant 9 discusses the importance of a credibility being aligned with trust. However, from this perspective credibility is more consistent for relationships where a viable commercial relationship is being considered. Furthermore, participant 9 goes on to introduce the concept of integrity also being a key value of the provider relationship process:

"Integrity is a massive one for me because you still have the human element surrounding all this information, maybe that's me, maybe I'm a bit traditional, I don't know but Integrity is massive. Is it coming from a trust worthy source?"

So far, a combination of values emerges for the provider relationship, communication, integrity, credibility and trust. These values are also consistent with what has been discussed in Section 4.3.4.1 for the CKP selection process. The relationship is shown below in Figure 4.40:

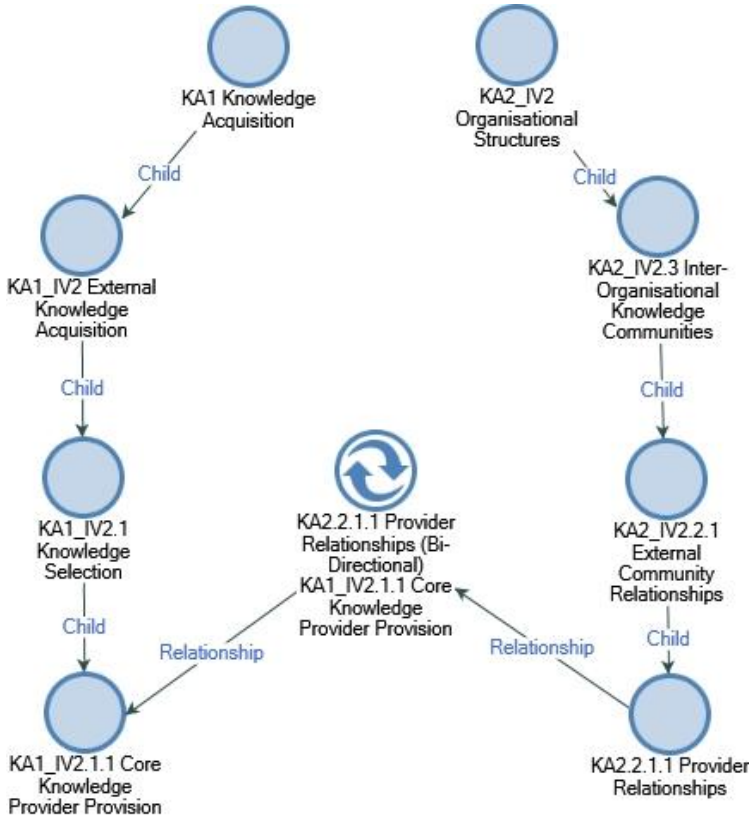

Figure 4.40 Relationship between CKP selection process and the provider

Although closely related from the perspective of knowledge acquisition, both paths shown above can be mutually exclusive, therefore, should be considered as separate processes. i.e. A KP can exist with or without a provider relationship or a relationship can exist with a provider without the need to acquire knowledge from them. In the relationship shown above the requirement for similar values for both the KP and the provider relationship can be seen to work in alignment with each other. The converse of this is that untrustworthy relationships would not lead to an effective partnership. Participant 10 explains:

"what I have experienced over the last 15 years is, if you have a good relationship with a supplier, it doesn't matter if you are spending millions or thousands with the supplier, as long as the relationship is between two, or even more, individuals is good, then you have a good working relationship"

Therefore, again the dependency upon this relationship being a good one should be considered carefully. This is of relevance when there is a potential commercial element to the relationship.

The relationship type is a factor to consider as part of the provider relationship. Also emerging from the data is the dependency upon flexibility of the relationship with the supplier. As discussed previously in Section 4.3.9.6, flexibility emerged as a crucial factor

of the processes ability to adapt to the needs of the organisation, this is also seen here as part of the provider relationship as discussed by participant 11:

"Yes, in every single case in life, and in business as well you need to be flexible. Always consider options that you would never probably contemplate doing because in life, especially in relationships with suppliers you must be open minded and flexible. It depends on the scenario, the situation. For me I would be open minded with a supplier that I trust but with a supplier I don't trust, I wouldn't"

Therefore, flexibility emerges as a key value of the provider relationship process. Participant 18 re-enforces this value but also relates it back to the previous comment by participant 9 and discusses the relationship between flexibility and communication:

"Our business is all about flexibility. I don't like black and white, I think it's restrictive, counterproductive. I've been in meetings with brand managers and explained it's about give and take. You could be talking any kind of activity and deal, but unless you've got the right attitude and mentality, and a good relationship with the supplier, then you're wasting your time"

In addition to the comment above identifying the relationship between flexibility and communication, for the first time, negative effects of a provider relationship begin to emerge from the data. Not having the appropriate key values could affect having a strong provider relationship and directly impact potential communities or the provider selection process. Participant 11 discusses the key issues affecting such relationships:

"So, anything less formal, a more informal relationship then there is different dynamics. In either one it's important that everybody understands what the expectations are from each other, why the information is needed and what we're going to do with it"

Therefore, the application of a formal approach for the generation of a provider relationship, applying key values, could be more beneficial than a lesser relationship. In addition to the application of formalised relationships, some relationships would never be achievable simply due to the third-party. Participant 7 re-enforces this point:

"a lot of companies, they are not willing to share, they are just not willing to hear that they don't know everything, they are not willing to hear that we could be better"

This is a key factor to consider as part of any relationship as the predominant focus is to build relationships with third parties for knowledge acquisition, irrespective of that knowledge being transformed into digital assets. As discussed previously, this

understanding would also require people with suitable knowledge to make these relationships effective. i.e. SME being directly involved with the provider relationship process to ensure the correct people are involved from both the organisation and the third-party organisation. Participant 3 discusses this requirement:

"You need to have good working relationships; you also need to have the correct knowledge within the team to ensure that you are asking the right questions. Also, there should be periodic visits to supplier sites to support these relationships and maintain communication. When you work with people face to face, you get more out of them. If you can have a relationship where you can tell them what you need and why you need it then they are also going to sell more products as well as the benefits, we get from it"

Although there are a lot of considerations for provider relations process, it is still highlighted as adding value. It is playing a crucial part of the overall need to provide enriched knowledge to the consumer. Participant 18 re-enforces this belief:

"No, because I think if you chop off one end of that you lose potential with the other end. So, if you chop off your relationship with a supplier and stop taking knowledge from them and applying it to your sales techniques and processes to enhance the sales to your customer, you lose a lot"

To conclude this section, Figure 4.41 below highlights the key values for the provider selection process which have emerged from the data:

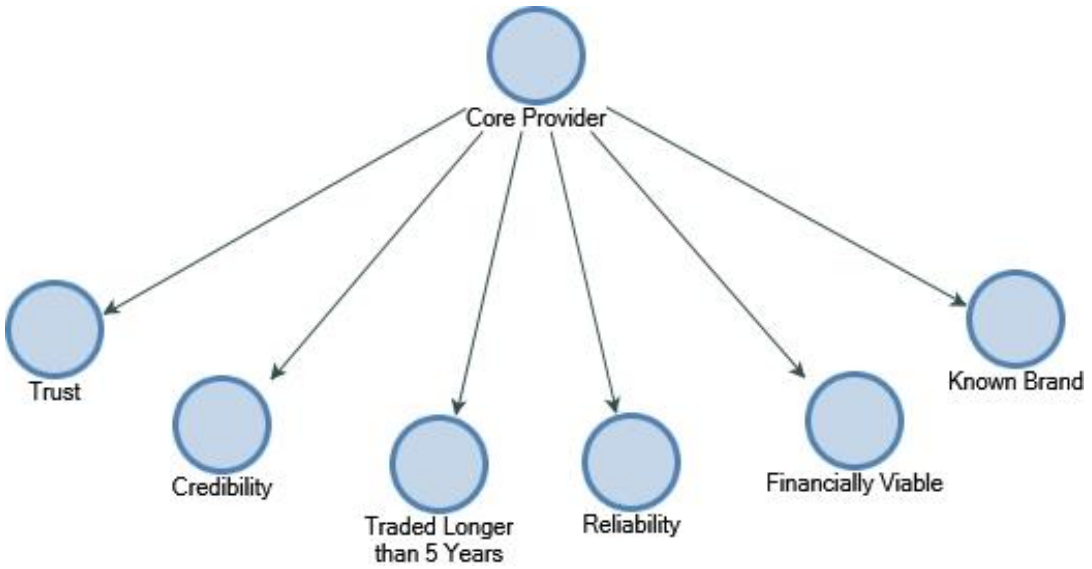

Figure 4.41 Key values of the provider relationship process

4.4.9.13 Consumer Relationships

Up until this point, relationships have only been discussed pertaining to the KP. This is by design, as predominantly, it is anticipated that most of knowledge feeds entering the organisation will be from CKP or NCKP, however, data analysis so far there has shown traces of the potential value of input from a consumer. This section will analyse this relationship in more detail. The consumer relationship can be defined as the physical interaction between the organisation and the end consumer.

So far, the data has shown the flow of knowledge from the acquisition process through to final consumption by the consumer. In addition to this, a relationship is emerging where the consumer can also be a provider, therefore transforming the single flow of knowledge from a starting point to a definitive endpoint to a cyclic process in certain circumstances. Participant 6 discusses the value of these relationships from a consumer perspective:

"your sales for that particular customer do grow so in terms of importance, it's right up there to be in front of your customers, talking to them as much as possible. Also, to your suppliers so you get the full value chain, so you know what your customers want, what the suppliers can provide, and you can tie the two bits of information together with your own sales with your in-house team to make sure you provide the best service but also the service that the customer wants, not what you assume the customer wants"

Participant 6 clearly identifies this requirement from the perspective of enhancing the consumer experience based on knowledge feedback from the consumer. This participant discusses the opportunity to enrich the knowledge further than what was originally provided. This in turn could offer value that has not previously been considered, from either the provider or the organisation. Participant 6 also discusses the full value chain which currently does not exist within the organisation due to the lack of an effective way of bringing everything together. The perceived value of consumer feedback is shared among many the participants. Participant 8 re-enforces the potential value:

"I think that discussing the factors with suppliers and customers always helps. Whether you accept the information you're getting, and again you're going to filter it through and put it back into your own environment to see whether it's going to be beneficial to you or useful to you"

The potential relationship between the consumer and provider was discussed earlier and is shown in Figure 4.41. The comments from participant 9 and 8 re-enforce the need for this relationship. Although participant reflects this requirement initially from the

perspective of commercial viability, they go on further to identify that the requirement goes beyond simply knowledge relating to a physical product:

"On the other end of that is, have we got a replacement product ready, when is that coming in, what is the balance between the product that is going out and the one that's coming in. Clearly, we need to achieve a balance there. So, if that is something that is legislatively driven, that gives us quite a strong communication angle when we are speaking to our customer and the marketplace who are the ultimate consumer, in terms of explaining all of the change"

This identifies the need to inform or educate consumers about changes beyond the product that may relate to legislative requirements. For these product types, this can have impact upon consumer safety and therefore is something the organisation takes very seriously. This requirement to think beyond the commercial impact is further re-enforced by participant 2:

"because it's all financial results driven, people can't build up that knowledge base with their clients. The information can't be passed on"

This is a short comment but reflects the need to be able to communicate with consumers on a regular basis. This is something the organisation recognises as an area for improvement to be applied in the future. The organisation value their position within the marketplace as recognised knowledge leaders, however they are also very aware that the rapid technological changes within this space has left the organisation needing to evolve. Participant 18 discusses this issue:

"We've been recognised by various people as the place to go to because we do things the right way, we try and evolve and learn, follow and utilise the information that your team bring to the table, which is constantly evolving, so we have to evolve with it"

From the data analysed in this section, there is a clear pattern emerging of the key values required for consumer relationships. These key requirements mirror to some respect what is required for provider relationships, however these are reversed. For example, where trust is a key requirement for the organisation to consume knowledge from core providers, trust is just as important for the consumer in having confidence that the knowledge being provided to them is accurate. Therefore, it could be assumed that the key values considered for both providers and consumers can be aligned.

4.4.10 Organisational Knowledge Capability

Organisational Knowledge Capability can be defined as an organisation's ability to learn and adapt to changes directly affecting the organisation and its processes. The ability to adapt and learn is a crucial requirement but often not so easy to apply within an organisation. Participant 19 discusses this point:

"In an ideal world, an organisation should know what this outside knowledge is telling them about themselves, about their processes, and it should have some use to somebody"

This comment clearly identifies that there is a need to understand what the outside knowledge is telling the organisation. As discussed previously however, understanding this knowledge is not completely straightforward and may require SME, at the early stages, to understand what is being consumed. Participant 10 gives a clear indication of this requirement:

"the good example I could give here. Your boiler is broken down and you need a plumber, but you've employed an electrician to resolve it. It's pointless"

Participant 9 re-enforces this requirement with another simple but explicit comment:

"you've got to have the knowledge to separate the truth from the fiction"

Therefore, the SME emerges as a key requirement for the organisation to be able to acquire the relevant knowledge, even before the enrichment process commences. It is generally acknowledged from the participants that this knowledge is crucial if used to fill knowledge gaps. Participant 12 discusses the need for the organisation to adapt to these requirements:

"I think we live in a digital age now and how must people interact. It would be nice if guys could go into a branch and ask a genuine technical question, for example: I have got this job, I need to do this have you got any ideas? A lot of the guys I would like to think, if they don't know then they would go and ask a senior member of staff or the manager. Then be able to say look we have Joe Blogs asking about something, can you help me? But unfortunately, I have also heard a load of guys just say, "no mate, I don't know what you are talking about"

There are differing levels of the requirements emerging, the comment above from participant 12, highlights the issues of having operational knowledge to provide to the end consumer. This does not consider the requirement for the organisation to be able to

adapt to its physical processes when the knowledge being acquired does not fit the current framework. This ability to adapt processes as well as knowledge is identified as a crucial element for the organisation by participant 9:

"On the front line, we can twist and turn, chop and change quickly. The downside of that is, you could have 300 plus different processes that are chopping and changing constantly, and it's very difficult to manage"

This was discussed previously in Section 4.3.9.6 Process Flexibility, however here the relationship between organisational knowledge capability and knowledge processing emerges from the data with a requirement for organisational flexibility. This relationship is shown in Figure 4.42 below

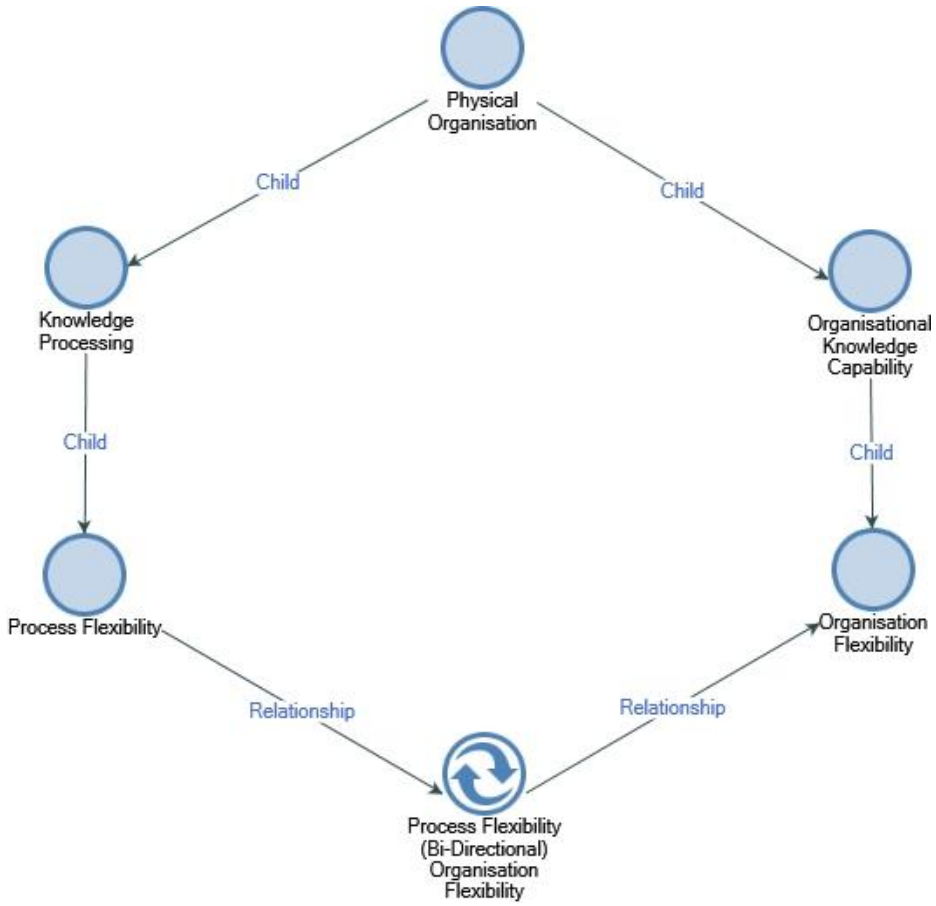

Figure 4.42 Relationship between organisational flexibility and process flexibility

From Figure 4.42, the relationship shows the organisation has a requirement to remain flexible to adapt or develop processes. The organisation's ability to be flexibility in this is identified as a crucial element. At this point, participant 19s comments earlier in this section should be re-visited to understand what knowledge defines changes to the organisation and the requirement for a SME to be involved. Participant 2 discusses:

"There is no point in moving into new areas and getting the information right if you go into the wrong area in the first place. If you go into the right area, and then you check to see if your products are correct for that area. Once you know you are in the right area, you can align the products correctly"

It would be inappropriate to determine from this that the SME alone was accountable for significant changes to both the organisation and its processes, which allow for acquisition of knowledge. The expectation would be that more senior members of the organisation are involved in such decision-making processes that would affect the broader organisation. Participant 2 highlights:

"I think if we were to change our process, the key thing would be to go back to a very senior level in the business, and ask is the business capable of rethinking its architecture and structure to accommodate changes that are essential for knowledge to be given the senior attention that the business needs"

Therefore, a strategic impact is clearly defined as having an impact upon the organisation's ability to learn and adapt. The keyword emerging is capable, but this needs to be aligned with the organisation's desire to adapt and remain effective.

Beyond the senior level decision-making processes, that allow the organisation to remain effective, there is the requirement for the SME to have access to external SME or knowledge experts to initiate relationships, communities and commence with internal knowledge processes. Participant 4 discusses:

"I think it's the people with the knowledge of the industry and the standards that would make us develop new ideas. I think it would be better if it came through a team of researchers and it would be a more efficient way to beat competitors to the market "

So far within this section, three key areas have been considered to allow the organisation to become one with knowledge learning capabilities; these are organisational flexibility, external knowledge experts and SME. This is shown in Figure 4.43 below:

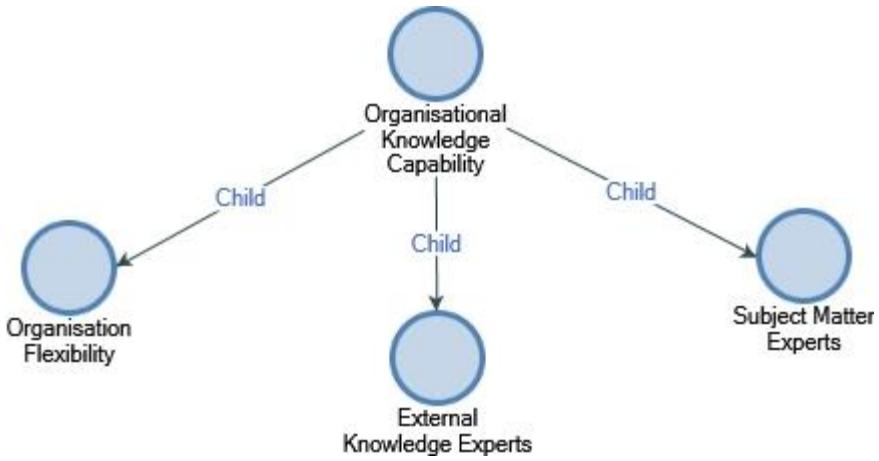

Figure 4.43 Organisational Knowledge Capability Key Areas

Figure 4.43 shows the three key areas; each will be analysed further in Sections 4.3.10.1, 4.3.10.2 and 4.3.10.3. At this point it is also worth re-iterating the relationship shown previously in Figure 4.42 between process flexibility and organisational flexibility and how the overall relationship continues to evolve.

4.4.10.1 Organisation Flexibility

Organisation flexibility is defined as the physical organisation's capability to adapt to change and remain effective within the marketplace. Organisational flexibility differs from process in that it relates to physical resources, location and effectiveness within the marketplace. An organisations ability to adapt has been identified as important as the ability to apply effective processes within the organisation. Participant 1 discusses:

Researcher:

"So to remain successful, we have to remain flexible?"

Participant 1:

"yes, correct. I think we have seen more change in the last 3-4 years than we have ever seen but this has not come as a surprise as the world is constantly changing and we need to change with it"

Although the participant alludes to the point that the world changes constantly, change within an organisation needs to be managed in the same way and at the same level of control as process changes. Change is not always welcome and often has to be introduced with some degree of caution. Participant 8 argues:

"if we streamline it to the point of it being absolutely rigid, at that point do you have a breakdown of traditional communication, dialogue, relationships? I don't think that's a good thing. It could be a bad thing. There must be a balance of the two. They have to be efficient with an element of flexibility, which is a difficult balance to achieve"

Here an argument is raised where it is acknowledged that changes can have a negative effect and need to be carefully considered to avoid any unforeseen issues that could, in fact, have the reverse effect. However, in general most participants acknowledge an organisation's ability to be flexible offers more benefits than issues. The converse to participant 8 cautious approach is participant 6 positive embrace of a flexible organisation:

"the biggest key requirement is flexibility and willingness to want to change! Understanding that you may not know everything, you probably do not know everything but willingness to say, yes, we're very good but we know there is a lot else out there and we know there are things we don't know, and we want to go out and find out what they are. We know our teams are great, but we know they are not the best they can be because there is no benchmark for that. There is no benchmark, no mark scheme for it. If you keep learning and keep growing as a company and as a person, we're only going to get better. So, flexibility, open mindedness and willingness to share knowledge and to grow are key"

This comment expresses the positive elements of the organisation's ability to remain flexible but also highlights other key elements of organisational flexibility. This comment does not suggest that commercial viability is a factor in the requirement to remain flexible, but knowledge sharing, organisational learning and growth are. From this, a relationship between knowledge sharing and organisational flexibility begins to emerge. From this perspective, knowledge sharing refers to how the knowledge would be consumed by the organisation. Figure 4.44 below shows the relationship between knowledge sharing and organisational flexibility:

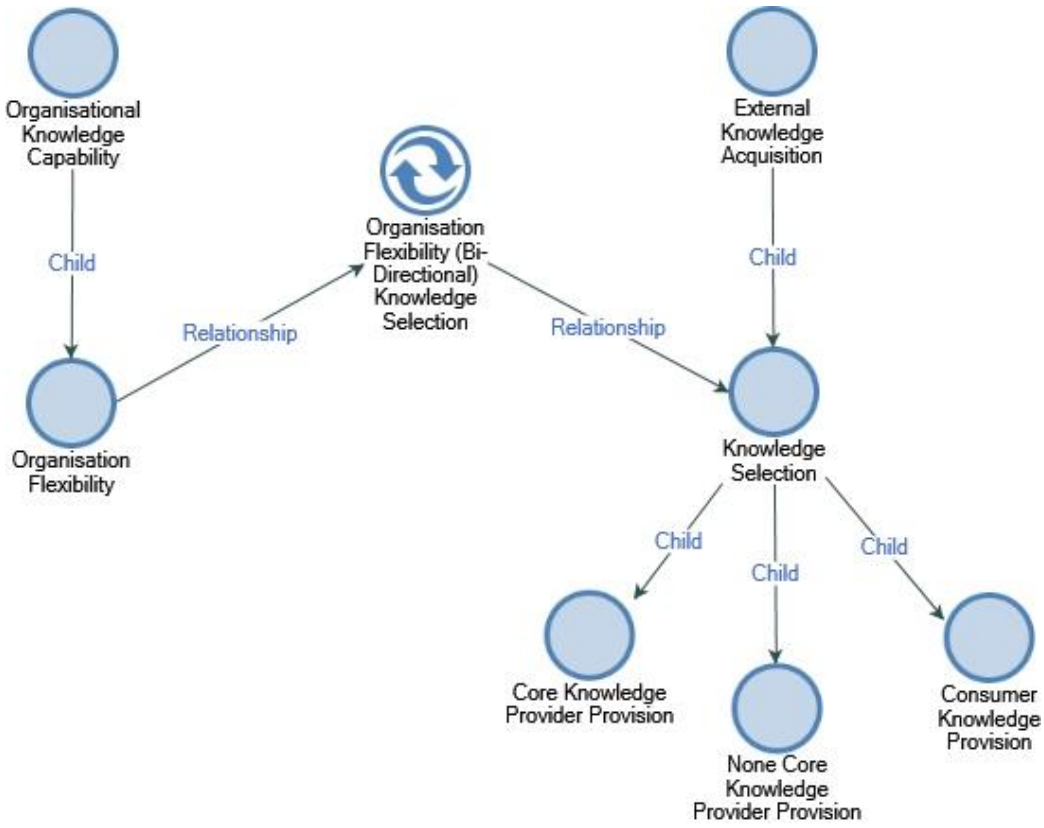

Figure 4.44 Organisational flexibility and the impact on knowledge sharing

Organisational flexibility does not only impact knowledge being consumed from outside of the organisation. It can also have an impact internally, with existing resources within the organisation. As discussed previously, having the correct knowledge or knowledge worker positioned within the organisation has an impact on what the organisation can absorb. Participant 6 discusses:

"Flexibility within our organisation, to allow someone like me who works in a support department to come and work for a period in a secondment to a completely different department. Conserving my knowledge while also making me feel like I can work elsewhere in the organisation and bring my version of my knowledge to them and allow them to teach me. Equally, have someone backfill my position from within the organisation and bringing their version of knowledge"

In addition to the relationship between an organisations flexibility and knowledge sharing, also emerging from the data is the relationship between the SME and organisation flexibility. Adapting the organisation based on the knowledge availability of its SME is a novel concept but, none the less, one that emerges from the data. Participant 9 discusses:

"The most important thing is to have people that are strong enough to take on that because the easy option is to stay as you are. Sometimes you think, OK well it's paid us well for the last 10 years, therefore I'm reticent to make that change, because it all might go wrong, but you've got to have, hopefully, the wisdom of saying – yes it has done us well for 10 years but if I don't do this change it's going to go horribly wrong. Sometimes, the risk is doing nothing and not embracing the change"

So far, from the comments in this section from interview participants, the importance of organisational flexibility is highlighted as an important factor from both senior managers and operational knowledge workers.

4.4.10.2 External Knowledge Experts

External Knowledge Experts are defined as key knowledge workers from outside the organisation with expertise in a given field. External knowledge experts can be of great value to the organisation, allowing it to grow and adapt. From the perspective of knowledge communities, they allow the transfer of knowledge between peers and potentially offer a mutually beneficial transfer of knowledge and best practice. Participant 6 discusses:

"as an idea, I think it's possibly the most powerful thing we can do without expending much effort. Just bouncing ideas off people that may not talk very often. You don't know what other people know, you don't know what you don't know. I find that something to be key in my role, until I am faced with problem, I don't know what I don't know. Being able to talk to people from other disciplines or backgrounds about the greater good, what we all do, I find new information, new knowledge comes out of the woodwork, just by having a blaze' cup of coffee with somebody. I think the power of having these little groups is almost immeasurable"

Here a relationship emerges between the concept of knowledge sharing communities and external knowledge experts. Participant 6 comments above highlight the impact upon imparting knowledge as part of a knowledge sharing activity and the value of maintaining effective relationships with a KP. In addition to the value of enhancing the organisation and SME knowledge base, there is also potential commercial benefits to be considered from such relationships. Participant 9 explains:

"The other thing with that is you've got a go to point to get that information. Even to the point, if there are associated products you are thinking of taking on board, you've got one person who knows this thing inside out and they then might attend a supplier meeting rather than just the manager who is 2 steps removed from the front line"

Here, the importance of knowledge experts sharing knowledge are highlighted with two examples: 1) currently only the SME holds the knowledge for the given product and this could have negative impact for a) the external manufacturer from the perspective of knowledge retention if that resource leaves the organisation and b) other members of the manufacturing organisation would have difficulty distributing the product effectively without the appropriate knowledge and 2) the wholesaler consuming the knowledge would not be effective from the perspective of sales to the customer if it could not impart effective knowledge about the given product. In this business environment this is always a concern and wherever possible, people try to share but with limited levels of success. Participant 10 discusses why the relationship to external KP is so important:

"I think it's the people with the knowledge of the industry and the standards that would make us develop new ideas. I think it would be better if it came through a team of researchers and it would be more efficient way to the market"

From this comment, the knowledge sharing element moves again from the external knowledge expert to the internal SME. This further re-enforcing the need for a relationship between external knowledge experts and internal SME. Figure 4.38, shown previously, shows the alignment of external and internal knowledge workers. The ability to learn from external knowledge experts is a key element of being able to move forward. Participant 9 explains:

"We are getting our eyes opened to different methods of communicating which have been highlighted to us from suppliers. That wasn't a conscious thing because until we witnessed it we hadn't witnessed it"

Therefore, concepts are beginning to emerge from external KP that had not been considered but ultimately enhance the experience for the end consumer.

4.4.10.3 Subject Matter Experts

The SME can be defined as the knowledge worker within the organisation with explicit knowledge relating to an area of expertise. The SME is not an exclusive role and can exist anywhere within the KM process from the decision-making processes of what to consume initially, how such knowledge is enriched, through to what should be fed to consumers. One thing which is inevitable and highlighted by participant 8 is:

"you've got to have the knowledge to separate the truth from the fiction"

Therefore, the initial key value is that the SME needs to be able to understand what is being consumed for it to be effective for the organisation. Participant 10 explains from a technical perspective the difficulties in consuming knowledge without the relevant expertise:

"I think the information that your team deals with, you definitely need to be able to understand it. We had that discussions earlier about the units of measure/pers data changing and having an impact across businesses. If I am buying something per 100, I have a price set for 100. Then if it changed to per 1 unit, if I purchase that product per 100, I might have 100 units showing on my system and my stock could be automatically reduced down to 1 whereas I actually have 100"

This example highlights a commercial impact on not understanding the knowledge correctly. Some of products and services provided by the organisation are very complex and only a SME would understand them. Therefore, positioning of resource within processes emerges as a crucial element to effective processes and the flow of knowledge. Participant 10 explains the reliance upon having knowledgeable people correctly positioned:

"I assume they are the right people that have been employed to try and understand the data, then obviously they can filter it through. It is pointless putting someone that doesn't understand the knowledge they are receiving to deal with that knowledge"

In addition to having expertise in specific areas, this is not enough to manage knowledge completely. SME also need to be problem solvers to some level. Often knowledge is incomplete and requires a level of problem solving abilities to complete knowledge activities. Participant 10 discusses:

"Trying to find solutions to problems we have identified, and we're quite good at identifying problems and obviously we then try to work towards rectifying them, which makes good business sense"

Problems can occur anywhere in the organisation but can also be consumed with knowledge acquired externally. Therefore, it becomes a requirement for the SME to work with external knowledge experts to try to work towards effective solutions. Participant 9 discusses:

"we encourage them (KP) to share best practice and embrace different ways of working. Each company has specialist knowledge but within each business we also have product champions. These people deal with queries, anything a bit odd gets channelled towards

them, day in day out and they become product experts. Secondly it gives people extra responsibility and they take some pride in that and get a sense of worth"

From this, a relationship emerges between the knowledge workers both internally and externally. This was discussed previously in Section 4.3.5 External Knowledge Acquisition, and highlights that this relationship is bi-directional and offers mutual viability.

One of the key factors emerging from the data is the importance of knowledge retention within the organisation. This can be considered from two perspectives 1) knowledge transfer between human resources and 2) effectively transferring knowledge to physical digital assets that can be consumed by the organisation. '2' is the intended outcome of this research, however this is not achievable without '1'. Knowledge retention is always seen as an issue for organisations. Participant 8 discusses this point:

"We're very lucky in the company that we have people with long service records, and I imagine there are certain companies where people drift in and out of the company, so the flow of knowledge is disrupted because of that. We are very lucky that we do have a number of people that have got that longevity and I'm not just saying that because I'm here, but I think that certainly helps the transfer of knowledge down to the rest of the company"

Participant 8 recognises the potential issues relating to the movement of people in and out of the organisation. Knowledge transfer and the value of staff retention in ensuring the knowledge is retained within the organisation. Participant 17 re-enforces this belief:

"I think we've got an obvious gap where you have people who have been in their job for a lot of years and then you have the new people. It's obvious how much of a gap there is in the middle. There's a huge gap between what different people know. That's nobody's fault, it's just because they have only been here a year and yet "anonymous staff member" has been here 30 years"

From this, the organisation accepts the reality of short term vs long term knowledge from its resources and this needs to be managed. One of the concerns emerging from this, is how does the knowledge manager know what to transfer? To re-iterate this point, participant 12 highlights:

"whether you are going to impart that onto someone else, and whether it is of relevance or not."

This statement could potentially be subjective; however, technology could help resolve this as part of the transfer of knowledge from SME to the physical digital asset. This would not replace the SME position within the organisation but rather strengthen the organisation's ability to retain knowledge as an asset. Participant 13 also highlights the subjective nature of the KE process:

"Everybody's idea of enrichment is completely different, and some people just put far too much information in and it is just not needed. People like participant 15, our Product Information Manager knows what it needed and what a Customer may need to see, and they just don't buy it off a description, let's say a soft handle"

This comment identifies the subjective ability of the SME to identify the correct knowledge for the knowledge asset. However, it also highlights the requirement that such knowledge should not be enriched by a single knowledge expert. Here a potential relationship could exist between the SME and knowledge sharing with external knowledge experts to ensure the validity of enriched knowledge assets. Moving beyond this potential relationship, empowerment is also highlighted by several the interview participants. Participant 8 alludes to this requirement:

"I think that the ability to learn from your mistakes and to solve problems enables, frees you, it's liberating so you can go and make new mistakes and have new problems. I always say, give me a new mistake rather than an old mistake. The ability for people to be empowered to be able to do that is fairly necessary I think in terms of creativity and moving forward"

Empowerment is something that is seen to ensure that knowledge workers have a level of control when working with knowledge assets. Since the knowledge being consumed can potentially be for an unknown element within the process, the ability of the SME to be able to action a knowledge asset, based on their own experience, emerges as key value. Experience alone is not the only dependency for the SME, the ability to learn on an ongoing basis frequently arises from the data. Participant 6 explains:

"You might be given a bit of knowledge that doesn't on the surface seem like it's particularly pertinent to your industry but maybe you haven't got the ability to understand it, if you don't have the experience; so, you can't then turn that knowledge into the useful information that it could be for a lot of our customers and suppliers"

The SME ability to make sense of newly acquired knowledge is fundamental to the effectiveness of the knowledge processes. This is not necessarily only relevant to

knowledge relating to new market sectors but is also very pertinent to existing knowledge and the potential impact upon those assets. Participant 6 discusses:

"There is always the risk that you muddy the waters; there is a risk you take on a lot of knowledge that is not pertinent to your industry at all. So again, it's a balancing act of knowing whether that knowledge your receiving is going to be useful to you. I think that's more for us as the consumer to understand"

From the comment above, the issue of knowledge dilution or error introduction is identified as a potential issue. Such issues could have a ripple effect on existing knowledge and therefore must be considered as part of any KM processes. In some cases, this difficult to manage, especially for certain complex product types. Therefore, in addition to experience and learning, the ability to be creative and solve problems emerges as a requirement for the SME. Participant 6 highlights this requirement:

"We have to be problem solvers to be able to find the right fit for the customer's needs. Customers know they can rely on us for that service. We had a sales manager who left, I went for a meeting with a customer; now the customer wasn't happy, he said we were a nightmare to deal with. I didn't comment on the guy who'd left, I just promised to deal with the issues. I went back 6 months later, and he said we were now the best company he deals with"

It is these requirements that separate the knowledge worker or SME from the data administrative level roles within the organisation. Currently within the organisation there is a degree of misplaced resources and this leads to many issues as discussed by participant 11:

"They have to understand what their role in the chain is. Are they expected to interpret that knowledge and re-distribute it or are they just processing that knowledge for somebody else to interpret it and use it in an indirect, almost abstract fashion? Or are they literally just converting that to this and let someone else crack on (use the knowledge)"

There is a definitive differentiation of role types in this statement, but also a definitive requirement that resources are placed within the most effective positions. Here participant 11 also expresses that there should be a chain or framework in place where knowledge workers are positioned to be most effective. This is a recurring theme across many areas (for example Sections 4.3.4.1, 4.3.5, 4.3.7) and highlights the requirement for a framework to begin to align all the required organisational frameworks and resources.

Beyond the knowledge requirements of the SME, the ability to effectively transfer this knowledge between SME and knowledge assets begins to emerge from the data. Participant 6 expresses:

"we need to make sure we conserve our company knowledge and SMEs and people who know the most about certain areas but also making sure they are not a bottleneck. They're not the only people that know about it, they might know the most but if they can disseminate their information to not just their team but to the company, so if they did happen to leave the company, then their knowledge wouldn't always go with them. So, making sure we can store it and retain it as a company, not just as users"

This comment describes the requirement to be able to harness knowledge in many scenarios relating to the physical resource. Participant 6 goes on to discuss the importance of transferring the knowledge to a data asset. As discussed earlier in Section 4.3.7, the ability to transform SME tacit knowledge to explicit knowledge assets is highlighted as a crucial element.

Within this section, the ability of the SME has been highlighted through a variety of key values which the SME should inhibit to be an effective part of any KM process. These key values are shown in Figure 4.45 below:

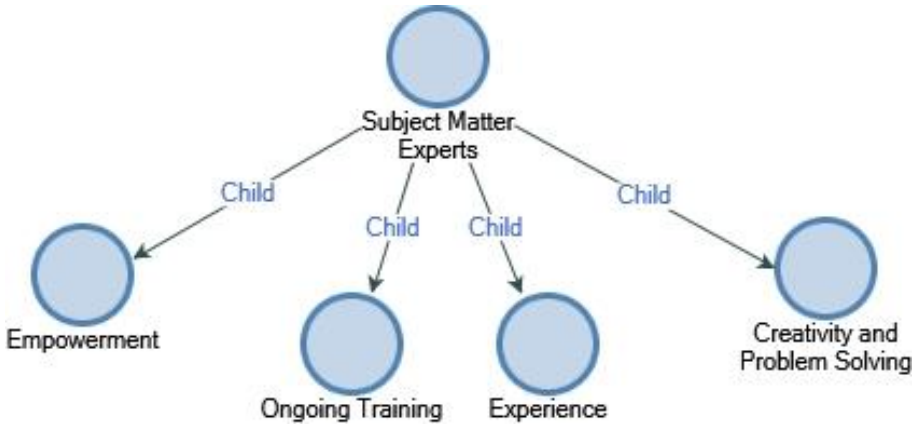

Figure 4.45 Subject Matter Expert Key Values

The SME plays a fundamental part in an organisations ability to learn, while also being a potential risk to the organisation if they were to leave and take that knowledge with them. Therefore, the ability of the organisation to retain this knowledge becomes more important than ever, particularly with reference to rapidly evolving technological workplaces. However, the primary focus should be on having the correct resources positioned correctly as highlighted by participant 19:

"If people are looking at that knowledge with a view to acting on it, then the organisation will learn from it. If you don't know what the information is telling you, someone else might, so sharing it could important. I said before about looking at financial results, it might not be any use to me to try to fix supplier information or a process related to supplier processes, but a sales guy could maybe use it and act on it. So, it's the same information but it's just in someone else's hands. So, getting the right information to the right people is really key to learning"

4.4.11 Physical Organisation Summary

The physical organisation has seen several key findings emerging from the data relating to how knowledge processes are affected by the physical organisation. The physical organisation was discussed in three key areas: 1) Section 4.3.9.1 Knowledge Processing, 2) Section 4.3.9.8 Organisational Structure, 3) 4.3.10 Organisational Knowledge Capability. Each of these sections were broken down and analysed based on the key findings emerging from the data. Figure 4.46 below shows a high-level node hierarchy of the grouped findings and how they are connected.

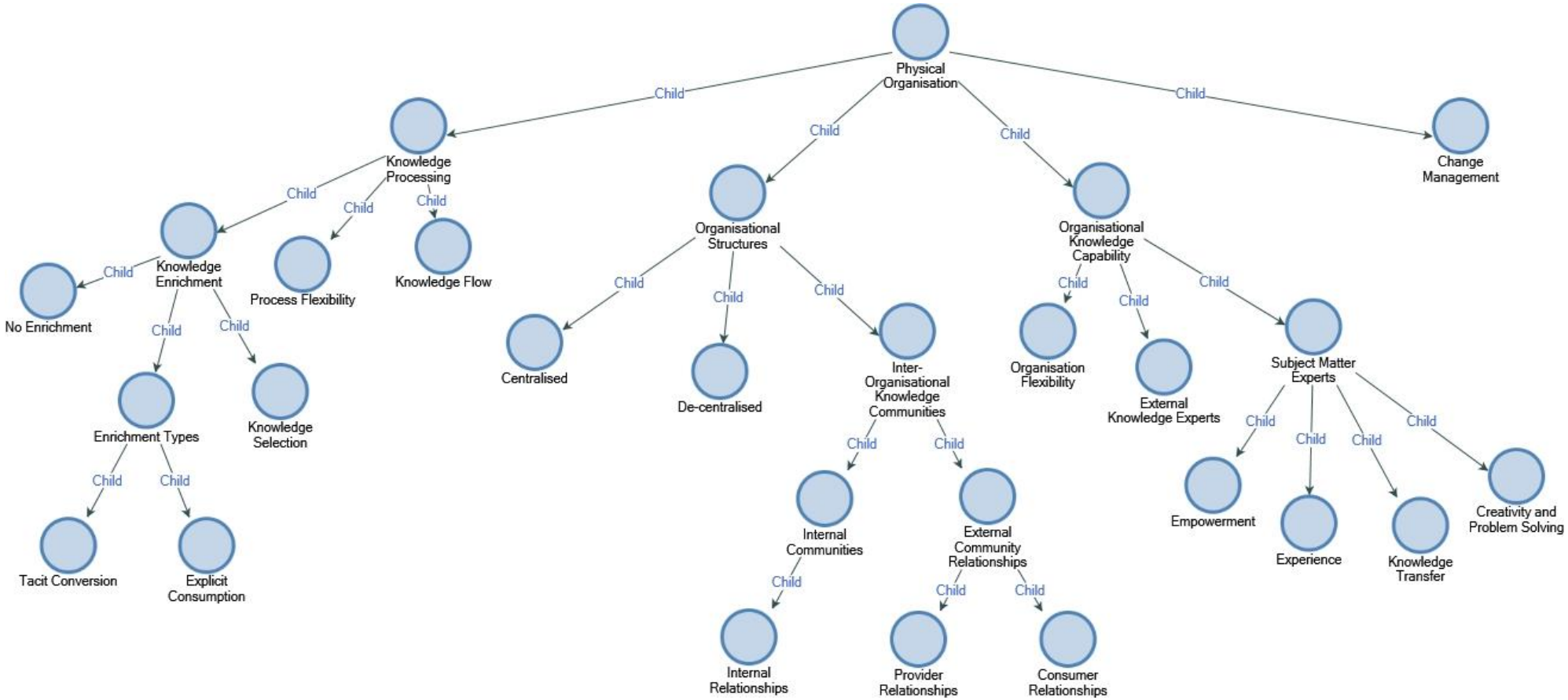

Figure 4.46 Physical Organisation Node Hierarchy

4.5 **Knowledge Management Technology**

KM Technology can be defined as the physical technology used to store, create and maintain physical knowledge assets. During the interview phase of the data collection process, the general responses were that the actual technology element of KM processes were not as significant as the processes themselves. This section will review the findings emerging from the data, from the perspective of the technological implications, and highlight any crucial areas that need deeper analysis.

There is no doubt that the interview participants see the value of the technology platforms that are currently utilised to help them work daily. Participant 13 discusses:

"we store everything on massive databases. We couldn't go backwards and move things into catalogues for example, what would happen if you had a fire! Databases are much better these days and it is much easier to keep customer information continuously up to date"

The immediate benefits highlighted from this comment are a) the ability to store large volumes of information compared to the past b) security, the ability to backup and restore information in the event of a significant disaster and c) the ease of maintaining information within a dedicated environment. Participant 1 also highlights the benefits of technology:

"I think to try and do it without technology and spread the knowledge any other way would be very difficult"

Here the participant discusses the value of using technology for transferring knowledge, but as already discussed, the technology is not being used effectively due to the impact of the lack of KM processes. However, participant 13 highlighted the issue of large amounts of stored data and this itself could be an issue, as discussed by participant 7:

"I think cost is prohibitive because of the sheer volume of information"

From this Prohibitive Costs emerge from the data and will be investigated later in Section 4.4.4. Furthermore, from the perspective of knowledge stores, currently there is no singular knowledge store to support such processes. Participant 15 discusses:

"I think they use SQL to feed their catalogues and web sites. There is obviously STEP and then there is MISOS and we have noticed things like with this organisation where there is a lumens output for a product it is different in each of the three areas"

Therefore, the first key issues being raised with a potential impact to knowledge processing is barriers to success. Technological silos of knowledge or multiple versions of the same knowledge could potentially dilute the knowledge trying to be inferred or transferred. Barriers to success will be addresses later in Section 4.4.2 to understand all potential barriers.

Another key factor coming from participant 15 comments is that because the information is being shared within different locations, potentially there could be differing levels of permissions to change this knowledge and even re-use this knowledge for different purposes that were perhaps not originally intended. Participant 6 discusses:

"It is just protecting what you've got because people can get very nervous about having what they have shared maybe in a forum or shared with other people"

Inevitably if knowledge is going to be shared, the ability to control how that knowledge is used becomes more challenging. This would be dependent upon how knowledge assets are being distributed and into which environments. Participant 4 explains:

"I suppose on the web it's difficult to control who goes on there but internally it's allowing the correct people the correct access of different levels"

'Knowledge Protection' emerges as an area for further analysis. This will be discussed later in Section 4.4.1.1. As discussed by participant 4, also beginning to emerge is the impact of sharing knowledge within social platforms. This was discussed previously in Section 4.3.9.11, to some extent, with reference to inter-organisational knowledge communities. A potential relationship exists between such communities and a) knowledge sharing and b) knowledge protection. Therefore, "Social Communities or Shared Platforms" will also be discussed later in Section 4.4.3.

So far, KM Technology has reviewed the key areas affecting it from a broad perspective. The areas to be analysed further are shown in Figure 4.47 below:

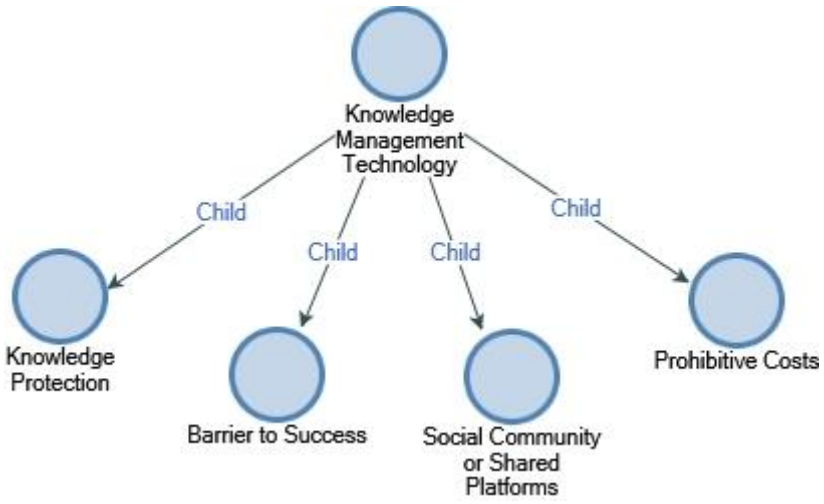

Figure 4.47 KM Technology Key Areas

These areas shown in Figure 4.47 will now be analysed further at a deeper level within the following Sections 4.4.1.1, 4.4.2, 4.4.3 and 4.4.4.

4.5.1 Knowledge Protection

Knowledge Protection can be defined as the ability to protect the knowledge asset against any unauthorised use. Knowledge by its very nature can be misunderstood depending upon the context it is applied to. The challenge, from the perspective of protecting knowledge, is to identify what it is being protected from. Participant 9 discusses:

"If there is an issue coming from data, the logical thing to do is work back through the chain and see where it originated from. This isn't trying to escape any liability or whatever, but if people copy some data they could use it out of context. For example, they could take parts of that data and change it but it could still look the same and it would still be attributed to that product and attributed to that brand. From my stance, those brands are attributed exclusively to me and to my only customer so it's vitally important that our data of that ilk remains ours"

Here the importance of ensuring the knowledge associated at the point of creating the knowledge asset remains intact. Internally, this could be managed at a permissions level and this will be discussed in Section 4.4.1.2. However, the potential issue arises here when knowledge is shared across channels i.e. inter-organisational knowledge sharing communities. Once knowledge leaves the safety of the organisation, it is then deemed to be in the public domain and therefore with limited protection from further enrichment. Figure 4.48 below shows this relationship:

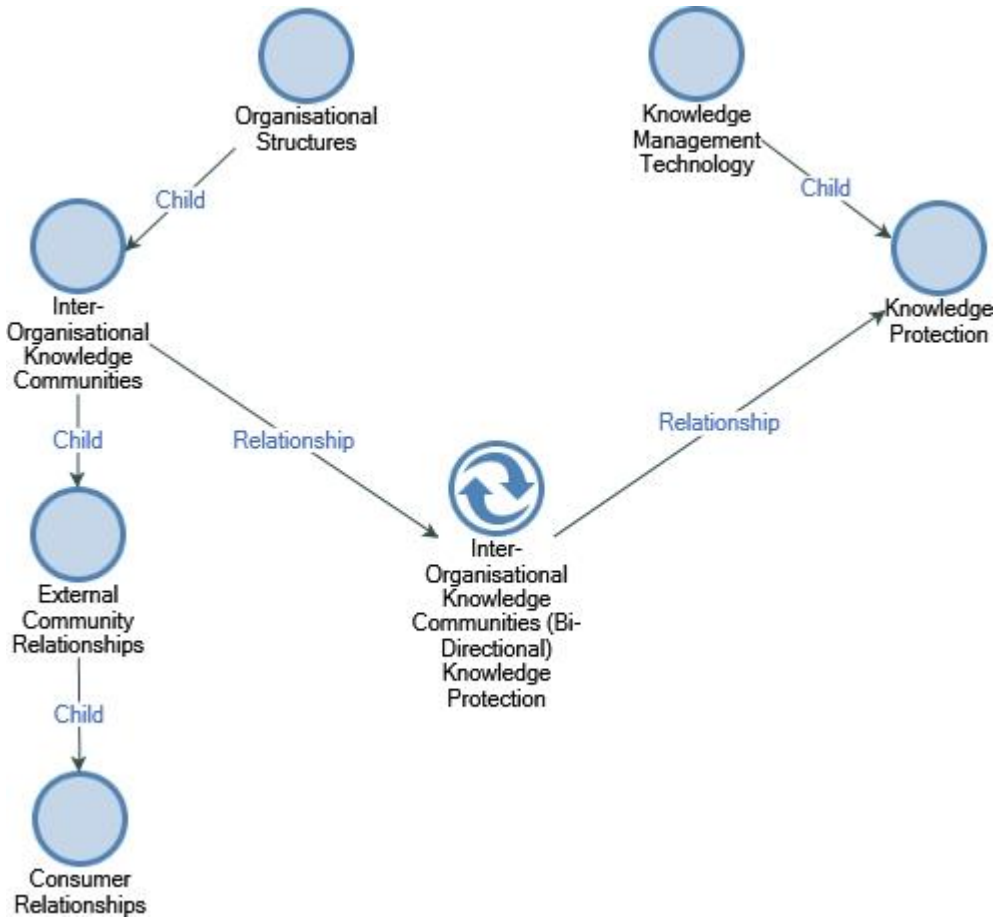

Figure 4.48 Limitations of cross boundary knowledge sharing

Participant 9, who raises this concern, oversees internal manufacturing and therefore, there is less of an impact as the knowledge assets are generated internally and see less interference before reaching a consumer. However, it could be argued that this same risk exists between KPs and this organisation. Whereby this organisation consumes knowledge from external providers and enriches further for its own purposes. What is defined as knowledge to be protected however, emerges from the data as very subjective in nature. Typically, this would require the intervention of an SME to determine what should be allowed to be distributed to consumers. Participant 1 discusses:

"I think we need that human intervention to decide what information we want to part with and when we want to part with, but I think this is very human specific"

Therefore, what emerges from the data is that knowledge protection is more of a human interaction as opposed to a technological requirement. What is distributed is in the hands of the expert who is sharing that knowledge beyond the organisational boundary. This is not to be taken lightly as some knowledge related to products could potentially hold sensitive or proprietary information that should only be visible internally within the organisation. For example, participant 1 discusses:

"there will be some information such as rebates for example that is always available to branch staff but quite difficult because it is not available to all members of the team because it is sensitive information. And it is information that we do not accidentally share from one supplier to another, and we certainly wouldn't want customers to know about them. So, we do use technology a little bit to control that goal"

The issues raised here are two-fold, firstly the impact is as previously discussed, directly related to what should not be distributed to a consumer as it could have a negative commercial impact. But also, internally there should only be partial sharing of knowledge through the organisation dependent upon the role and seniority of the consumer. Typically, these issues would be managed through internal knowledge security mechanisms.

4.5.1.1 Knowledge Security

Knowledge Security can be defined as the ability to ensure knowledge is only available to the appropriate resources with the relevant permissions to utilise that knowledge in the intended way. Security is important for ensuring knowledge is used as intended but also is not misused maliciously. Participant 8 explains:

"I think knowledge is power, unfortunately it can be used in a negative way like any other power. It can be used positively or negatively. Back to the old integrity thing, you've got to be sure where it's going and have control. I am a bit of a control freak, so I would naturally say that, I'd be risk averse in that respect, so I'd be very cagey where that knowledge is imparted so I'd feel sure that it was safe"

Therefore, to ensure that only the relevant knowledge is shared, a level of security should be applied to ensure the organisation protects itself from unscrupulous activities. From an ethical perspective, the organisation could also adopt mechanisms to protect their providers from such activities too. For example, participant 10 explains:

"It's incredible, in my position, I get a lot of emails from suppliers which have sensitive information, I can't delete the emails, I have to keep them on file and it just builds and builds and if you print things off, then you're wasting paper, I like to be green, and if you print something off it could still get into the wrong hands. Storage capacity is crucial and just having a superior system which can deal with everyone"

In this example, the organisation is the consumer of knowledge acquired by accidental means. As an organisation looking to practice secure knowledge processes, there could

be an argument that informing providers of such errors would allow for stronger relationships with providers. Figure 4.49 below shows this potential relationship:

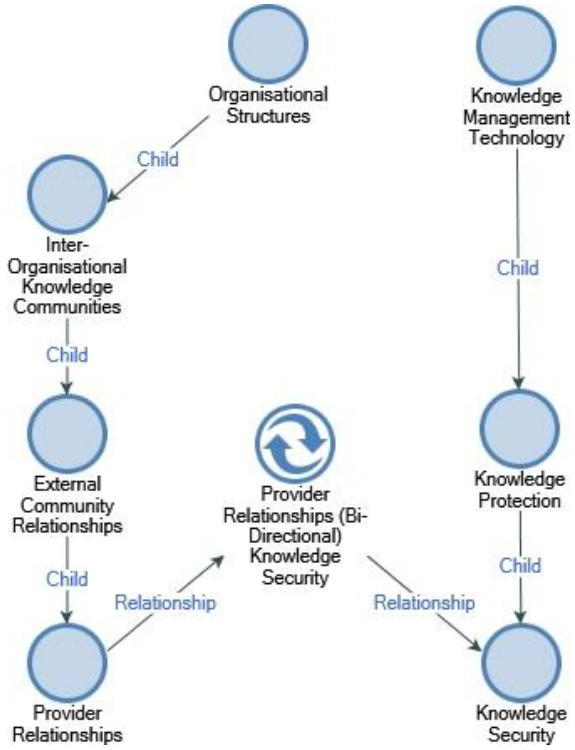

Figure 4.49 Potential relationship between the organisation and the knowledge provider

This relationship could have a potential impact upon many key values pertaining to supplier relationships such as trust and mutual viability as part of the relationship building process. The value of knowledge is clearly defined within the data; therefore, it should be determined that this would also apply to the consumer. Participant 9 further re-enforces both the cost and value of knowledge:

"It's very difficult to protect your intellectual property. It's very expensive and that's why the smaller companies are disadvantaged in this regard to the bigger ones who have the resource to not only employ the protections necessary on say patents and design rights, but they've got the ability to enforce them if they are breached"

Enforcement of breaches go beyond the scope of this research; however, this comment has been included to re-enforce the value of what is trying to be achieved. This example is more relevant to product related knowledge; however, knowledge value extends beyond the product as discussed by participant 11:

"Market research data, so non-product knowledge, you've paid good money getting that and a lot of resources and you've got to be careful about who gets it"

This is another clear example of a knowledge type with a requirement for knowledge protection but typically would never be shared beyond the organisational boundary. Whether the knowledge resides within the organisation or is intended be distributed back outside of the organisation, the person accessing that data at that time should be able to intuitively perform their tasks as required. Participant 6 discusses:

"making it so our users can access it without having to do anything different to their normal process. So, if it's additional data or additional enriched data then make sure they can get to it as normal. It's all around the same topic, it should be one place, make it universally available, assuming we want to make it universally available. We may not want to provide some information to some branches, or some users"

This example discusses the requirement to extend the level of protection beyond the typical organisational boundary by suggesting that users be able to access their knowledge securely from anywhere. The issue of global accessibility will be discussed in Section 4.4.1.4, as the world of cloud-based technologies have introduced a new area of technological security factors to consider. Nonetheless, the security remains a significant priority in the processing of knowledge and ensuring it is only processed by the relevant resources at the correct point in time as highlighted by participant 19:

"To protect the knowledge that might harm your business or your customers if it falls into the wrong hands, that's kind of general isn't it, it's not really my strong point this stuff. Stuff gets leaked all the time by mistake and on purpose, so you must do all you can to protect valuable knowledge that you don't want to be shared. If you don't want it to be shared, you use technology to protect it"

Therefore, it is acknowledged that security is required to protect knowledge, but this must be balanced internally within the organisation with the use of permissions.

4.5.1.2 Internal Permissions Access

Internal Permissions Access can be defined as permissions granted to a resource within a specific role or function to be able to complete their part in KM processes. Permissions are complex and beyond the scope of this research but are covered here to show the impact upon KM processes in general. Permissions are typically used to define which areas of knowledge should be accessible to which resources. Participant 19 explains:

"You can set permissions. You can have locked down areas with limited access for proprietary type information, like only 2 people can get in there or something like that. You can encrypt, you can encrypt emails and things."

From this, it can be inferred that permissions also relate to security of knowledge by ensuring that it cannot be inadvertently modified by the wrong people. As previously discussed, this is crucial because of the potential for a user to consider knowledge from an inappropriate context. This also considers at what point knowledge can be modified or indeed at what point an error may have occurred. Because of the complexity of knowledge being consumed then the ability to apply permissions correctly at the correct position of any process becomes more complex. For example, participant 9 explains:

"all this knowledge is crucial. Sometimes not everybody is being privileged to it. For arguments sake, there could be a scenario where myself and senior management are getting information from our supplier and then it's not filtered down to the branch network, who are going to be having to sell these types of products to the customer"

Therefore, applying permissions incorrectly could potentially impact the effective enrichment of knowledge assets. The approach could differ from organisation and be either role based, or solution based. Participant 1 suggests that role-based permissions could be a viable solution:

"I would make knowledge specific to position. So, you could get your hands on more knowledge at certain position with more information available to more senior positions within the organisation"

However, participant 1 goes on to highlight that this approach itself would not be without risk:

"the downside to that is the discipline within the network currently is not great. As an example, there will be examples within the branch network where everyone within the branch will know the managers pin number and login. So, this is where technology might have to come in and control that a bit better. So, whether this be with finger print readers or something"

Therefore, a clear acknowledgement of risk emerges for this approach and the need to be able to control this risk. Participant 1 is aware of appropriate technologies to circumvent such risks and thus is not considered a barrier.

4.5.1.3 Globally Accessible

Globally accessible can be defined as the ability to access knowledge assets anywhere and from any device. With the application of cloud-based services, the concept of globally accessible information has become more visible in everyday life. From the perspective of

the organisation, the premise is to consider whether this type of technology could offer benefits to the organisation. Cloud-based technologies are not the only way for an organisation to able to share globally as larger organisations already have global networks offering similar capabilities to those offered by cloud services; although the transfer to such technologies is typically defined by cost.

This organisation currently utilises a global network approach but have considered the option of cloud-based services for future activities. There is a clear thirst for such approaches within the organisation as discussed by participant 9:

"Being able to access information wherever I am being important to me. I need to be able to get onto the systems at home, anywhere, a mobile platform, a smart device, a phone or tablet. For me, it would be nice to access everything in one place, for example getting somethings on my phone"

Accessibility then becomes more of an issue because the platforms differ from device to device, unless users are restricted to using a single device. However, this approach is rapidly losing popularity with users wanting to access knowledge from wherever on whatever device and this introduces technological challenges. Participant 11 further re-enforces not only the requirement for global access but also the ability to access through multiple technologies:

"From a technology point of view something that is multi-platform, windows and mac compatible, flexibility in software and platforms, you have to have a good technology architecture as a business, so you can share nationally without any disruption, give the staff the correct technology tools to work internally, your IT team has got to be able to deliver this"

Beyond this ability to access knowledge across platforms and devices, the ability to recover from catastrophic events and having contingencies in place must be considered. Although this is beyond the scope of this research, it is expressed from many interview participants, the importance of recovering knowledge in the case of such events. For example, participant 19 discusses

"A shared global network. You'd want contingency if it fails, if your system goes down you'd want to have your, not just back-ups and data, but your contingency for how you get your branches back on line, selling or whatever. And of course, back-ups"

Although this example focusses upon business-critical systems, the same should be applied against all knowledge-based processes within the organisation.

Over the past 3 sub-sections, the key issues for knowledge protection have been reviewed. It is acknowledged that although most of these areas are beyond the scope of this research, they should be reviewed to understand the potential indirect impact of failures within these areas. This in turn could potentially directly impact knowledge-based processes which depend upon technology. The three key areas affecting knowledge protection as shown in Figure 4.50 below:

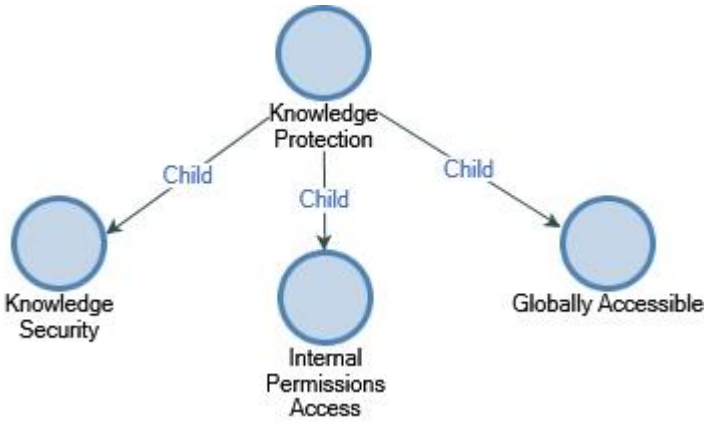

Figure 4.50 Potential relationship between the organisation and the knowledge provider

It is further acknowledged that each of these 3 areas complement each other and work together to offer knowledge protection.

4.5.2 Barriers to Success

Barriers to success can be defined as key issues that would impact the effective application of a KM process within the organisational environment. As part of the interview process, participants were asked which, if any barriers existed that would impact individual day to day processes. Although most participants did not highlight any significant barriers, there were some issues raised during the interviews.

Participant 11 discussed the potential implications of relying upon paid data services to consume knowledge as opposed to working with partner organisations:

"I could go online and for £40,000 find a market research company that would give me the information I need to know. And, to do that through a technology route and we can't do that, we can't bear those kinds of costs. There's software out there that manage data, would process data, that have a prohibitive cost"

The organisation has considered these types of services and historically they have proven less beneficial than internally driven projects to achieve the same results at a fraction of the cost.

Participant 11 also mentions the cost of technology and its potential prohibitive nature, although this was a very limited view from the participants and only participant 11 reflected this opinion. Furthermore, participant 11 went on to discuss the implications of software tools:

"Yes, and then you must train your staff as well, STEP for example, only 1 user can get on it and understand it and use it. You have to empower by having people at the sharp end having some input on the software that you're buying or building. Bespoke software should be developed with your team involved. So, they are comfortable and familiar with it. Keep you learning curves as shallow as you can. You've got to have that multi-platform flexibility in the technology. It has to have global reach"

Participant 11 alludes to the impact of lack of knowledge for the technology platforms and the impact this may have on end users being able to effectively manage such tools. Furthermore, they go on to discuss the empowerment of users in the generation of software tools and processes. This has been previously discussed from the perspective of process generation and the SME in Section 4.3.10, however not from the perspective of software tool selection. Participant 11 also re-enforces the previous discussion of multi-platform viability that was discussed during global accessibility in Section 4.4.1.4. Participant 6 also re-enforced the argument of global availability as discussed previously but from the perspective of security:

"make sure the knowledge is available, but we're got to protect it, not so far as so people can't use it, but to make sure unauthorised users can't get it. As soon as a reputation is shot it's very difficult to build that back up confidence when you have lost it"

However, although the issue of security and permissions were discussed, the impact upon the organisation from commercial viability was not. Participant 1 discusses the impact upon the provider relationship based on a negative impact from the mis-use of knowledge via a third-party from within a shared platform. Here a relationship emerges between Consumer and Provider relationships and knowledge availability. The potential risk to the reputation of the organisation could be a potential barrier. Therefore, the value of the knowledge itself needs to be considered as part of the knowledge asset creation process. Participant 1 comments below re-enforced the feelings of most of the participants:

"You might say that we don't always get to the right decision first time. Historically, we may have not spent as much as we should have on technology but as a company I think we have learnt the value of knowledge and invested accordingly"

This comment builds a relationship between the value of knowledge and the dependency upon the correct knowledge being consumed. This was discussed previously as part of the Section 4.3.10.3 Subject Matter Experts, with a reliance upon the organisation having the relevant resources in the relevant positions to apply such control of the knowledge consumption process. Cost will inevitably always play a key part in the decision-making processes as discussed by participant 6:

"Always the purse strings. I think a lot of it comes down to (not audible 45:57) so security is going to play a big part in the increase in cost. If it's within your own internal networks then the security costs are already offset because they are being applied to many of the systems, the ERP, the operating systems and so on, that security covers that entire whack. But, if you are opening this technology out to third parties, so customers, suppliers, assorted other industry elders then you are having to ramp up the security. You have to make sure that only the people who can access it can access it, the whole idea of security"

In addition to the concept of costs relating to security, participant 6 also discusses the many technological solutions available and the impact of cost. However, the number of tools within the organisation could also impact the knowledge flow within the organisation. Participant 15 discusses:

"This is normally because they don't have a central area or database for processing their data and it is in three different areas maybe, or maybe even more. Each of these areas having different information, so how do we know which information to consume"

This is possibly one of the most fundamental barriers to success. The storage and manipulation of knowledge within different knowledge sources would inevitably lead to variations in the structure or content of a knowledge asset. Therefore, there is a potential relationship emerging where knowledge flow and knowledge impact are directly affected by multiple internal unmanaged knowledge sources, and a potential barrier to success.

Therefore, from this section, multiple knowledge sources, complex technological solutions, consumption of knowledge from paid services, security and costs could all be potential barriers to success based on individual circumstance.

4.5.3 Social Community or Shared Platforms

Social Community or Shared Platforms can be defined as an area for the consumption or distribution of digital knowledge assets between the organisation and third-party organisations. Historically, the organisation has utilised such services to consume certain knowledge assets and bulk data sets. However, this has never been shared back to the consumer in this way, although tacit knowledge transfer has existed at a 1:1 branch level. Participant 11 discussed the typical relationship:

"We use a variety of social networks, both electronic, private and public and face to face meetings. There is a place for them, and ways to manage those, to get information in"

This comment identifies the value of social networks but also highlights the relationship to enrichment and knowledge types discussed previously in Section 4.2.2. This relationship can be seen below in Figure 4.51:

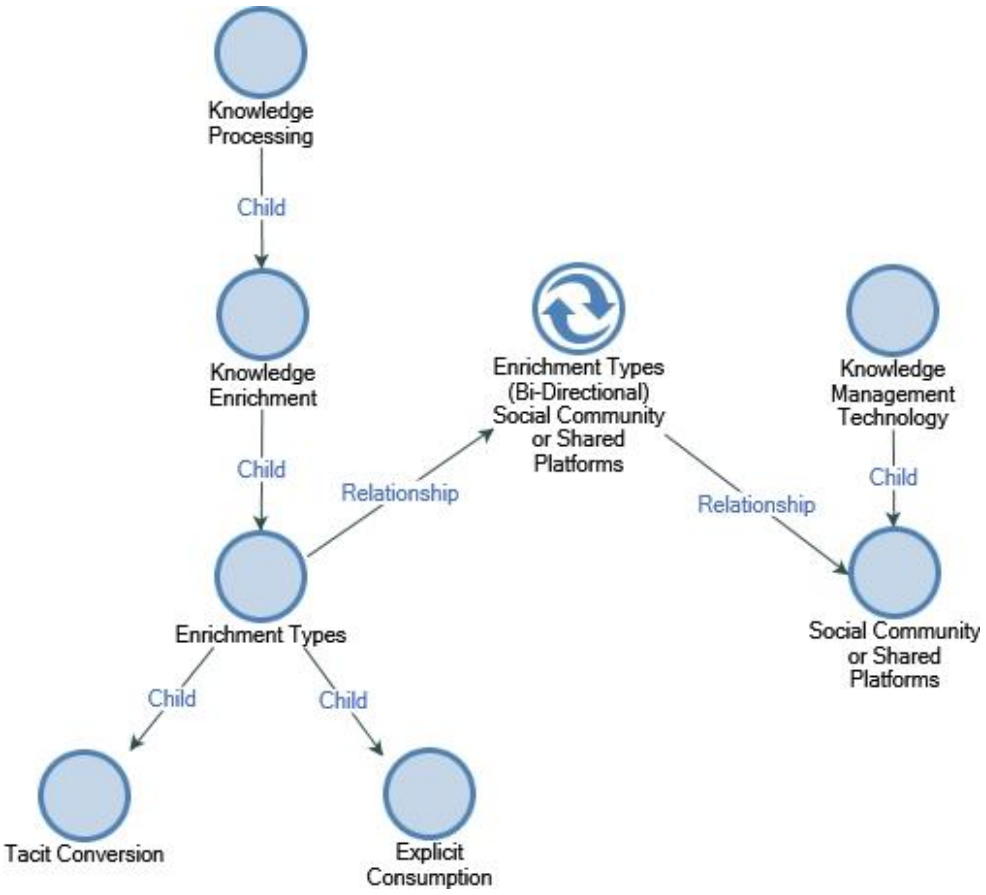

Figure 4.51 Relationship between enrichment type and social community platforms

The emergence of the requirement to be able to consume knowledge from different knowledge types as part of the enrichment process emerges. From the comments of participant 11, there could be a difference in the type of knowledge to be consumed from the perspective of social communities. However, for online communities this may not be

so fluid as knowledge already exists in an electronic format. The ability to consume knowledge may be easier than that provided in a tacit format but nonetheless, it may need further enrichment before it is stable.

As discussed previously within NCKP in Section 4.3.4.2, a similar issue emerges in what should be consumed from social platforms. The selection process should be subject to the same scrutiny as that of an explicit communication channel such as one with a CKP. Participant 12 discusses their concerns relating to shared knowledge communities:

"I once stumbled across a forum, I can't remember what I was looking for, but a guy was asking a pretty basic question. Which he shouldn't have been doing anyway because he was not a qualified electrician, you had four different guys giving him four different pieces of advice, whilst contradicting each other's advice, which then just turned into a shitstorm. So, to answer your question, I think social media has its role to play but it needs to be managed"

Here participant 12 discusses the potential issues of poor communication from an untrusted source from none SME. Therefore, potentially creating a dangerous situation. In this example, it re-enforces the need for a relationship between the SME and any social platforms when knowledge is to be a) consumed or b) distributed. In addition to this, participant 12 also highlights the need for a controlled environment to be considered when participating in such environments to avoid issues. Participant 6 also discusses the issues relating to having controls:

"I think if those tools are put together and constructed correctly, so you've got a good forum for sharing very discrete areas of knowledge and information. I think it can be great as long as they are structured properly and indexed in a way, so you can return, delve into, return some of the information that's been out in there previously, that might not be available at a glance, so you'll need to search it to be able to pull out as much or as little knowledge as you need to. I think it can be incredibly powerful, the most beneficial bits of software and bit of technology that you can give to users. It's very simple but you only get out of it what your users put into it"

Here participant 6 highlights the need for security and good structure to allow for it to be useable. Two other interesting points emerging from this comment is 1) the quality of the knowledge available and 2) the sharing of good knowledge from active participants; this indirectly relates to what was discussed earlier in this section relating to SME being actively involved and managing such environments. Participant 6 goes on further to discuss:

"it can be very powerful as a tool because it just connects absolutely everyone together. It's a choice as to whether you want to consume it or contribute to it or not. The problem you've got is regulation. Regulating it to make sure what is being placed on these networks, the knowledge that is being disseminated is actually useful"

Here, controls make way for regulation and align with the requirement to ensure relevant knowledge is managed within a shared environment and is mutually viable for all active participants. In addition to the environment, participant 6 also highlights potential commercial opportunities that could exist from such partnership initiatives. Participant 10 highlights the potential commercial impact of such environments.

"There are a lot of forums that people go into, especially the trade, our suppliers, they are always interacting with each other, making recommendations and it could make or break a business in some cases"

Although this comment discusses the commercial viability, it again emphasises the fact that the organisation is a participant as opposed to a driver of knowledge into such platforms. This is currently a gap within the organisation and no knowledge is pushed electronically back to the consumer. The ability to push knowledge back to the consumer is not well understood by the organisation but there is a perceived value for such a process. Participant 13 explains:

"I think from the perspective of how we push knowledge back out to the consumer it is important. I am not sure if it is as important from consuming information. Everybody uses some form of social media platform, so it helps the knowledge be seen"

Participant 14 re-enforces the value of such a process:

"I would say they play a big role. It's information about us getting out there"

There is also a perception within the organisation that there is growth within the marketplace for such technological advances. The concern being, the organisation falling behind the rest of the industry by being a follower as opposed to a leader. Participant 19 discusses:

"I think they're growing fast and we might get left behind, we could do better to prepare ourselves for what is coming. We should seek the best advice from industry experts on our strategy. The people you can reach on social networks is massive and that's now, we can only imagine how it will evolve. I can't imagine how it will evolve so you really must get industry experts consulting to get some guidance on where it's heading and what we

should be planning for. Maybe we can invest big and transfer our branch success, of having an expert to help, somehow onto social networks and keep providing the service that we're known for, that great service we're known for, there's an idea "

This discussion was focused on a future potential strategy of the organisation, to drive the adoption of mechanisms for social platform applications. This approach is considering the need to adapt existing services to a more technologically driven approach, upon a significant shift in the marketplace. Participant 19 however, still expresses the concerns of this being a controlled environment, further re-enforcing the general concerns of the other participants and the impact of knowledge available within such an environment.

"I do have some concerns, I suppose. Can you have full control over a network that your using, maybe if your using someone else's social network and they haven't set it up as you want the rules to be and your kind of at their mercy, in some respects. Maybe at the mercy of other users as well so things could go sour if the wrong information is shared either by mistake, or by malice. Not relating to commercial social networks, but look at social networks, Facebook, and twitter, the things the you see on there where you have trolls and people are actively looking to discredit people and say bad things. That could just as well happen on a commercial one"

From this, it can be inferred that closed social communities would offer a significantly more secure environment that open communities. The ability to ensure that none specific contributors or consumers have a mutually viable interest in the subject matter area could potentially ensure that participant interaction could remain consistent with the needs of the group.

4.5.4 Prohibitive Costs

Prohibitive costs can be defined as costs associated with the application of KM that would affective the ability of the organisation to be able to process knowledge. Technology costs historically could be high, however a dramatic recent reduction in costs has been visible, not only from the perspective of industry but also for personal computing. Participant 19 re-enforces this understanding:

"There shouldn't be any I don't think. I'm not on great money here and even I can afford good tech at home. I think you have to have a very meagre budget to be restricted by cost nowadays"

The question relating to costs as a prohibitive barrier was included to understand if there were any cost limitations on the application of technology platforms to support the

application of KM processes. Overall, the consensus from participants was that costs were no longer a significant issue. Participant 9 commented:

"we're clearly seeing a benefit from the investment in IT; there are no barriers there. But I reckon as you filter down, to a local level there are still barriers"

Here the participant discusses the corporate environment and in general investment is made at a broad level throughout the organisation. However, at a localised branch level, equipment is sub-standard and should ideally be brought in line with the rest of the organisation. This itself does not pose any barrier to the application of knowledge processes. Participant 9 re-enforces this understanding from a historical perspective:

"I would say from a technology cost point of view we are sufficiently funded and utilise so that we can send whatever information we need to. It wasn't always the case but of course the whole framework of assimilating knowledge into the market has changed dramatically in my time"

There would likely to be restrictions on spending on technology at some level. Participant 4 discusses:

"We've been able to invest but I'm not saying we can invest in whatever we want but we did PERSUADE the higher management to invest. From my side I haven't seen much prevention"

Inevitably, costs would need to be balanced with return on investment to allow it to be applied against the organisations knowledge processing needs. Ultimately however, prohibitive costs do not appear to act as any barrier.

Figure 4.52 below shows the overall node structure generated from the data and grouped accordingly:

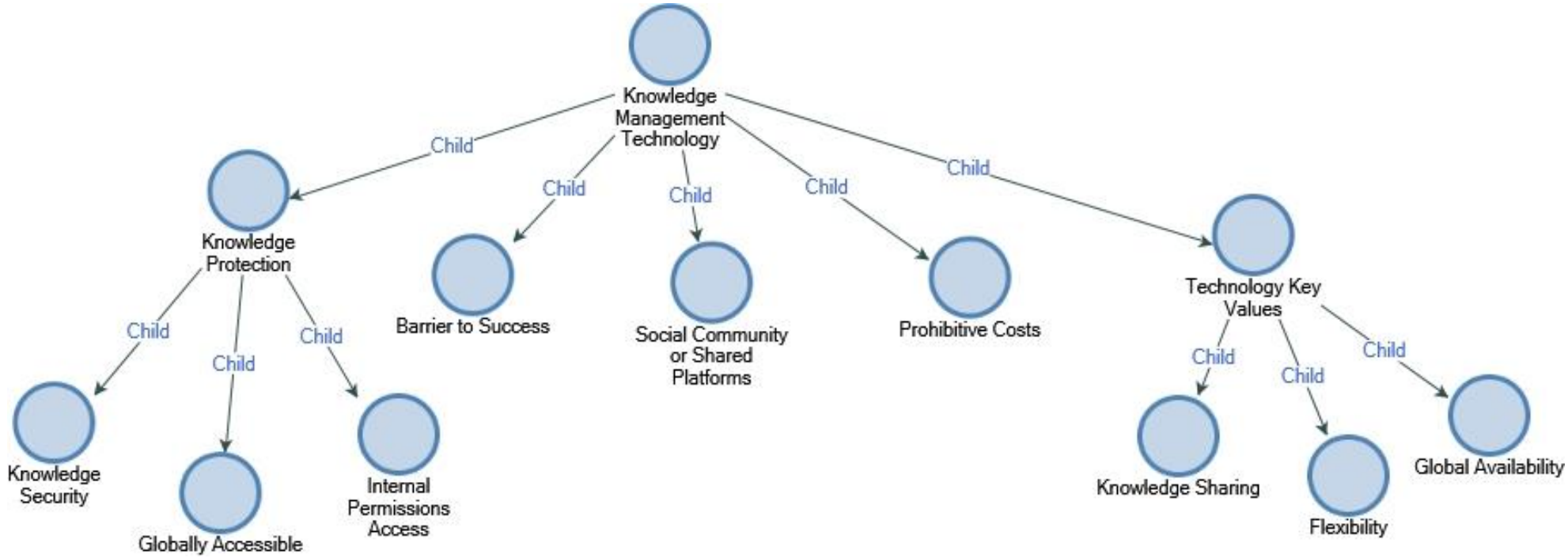

Figure 4.52 Overview of all Knowledge Management Technology nodes

4.6 Chapter 4 Summary

This Chapter has thoroughly reviewed and analysed all the data and findings emerging from the semi-structured interview process. The Chapter included focus on three important sub-sections as shown in Figure 4.53 below:

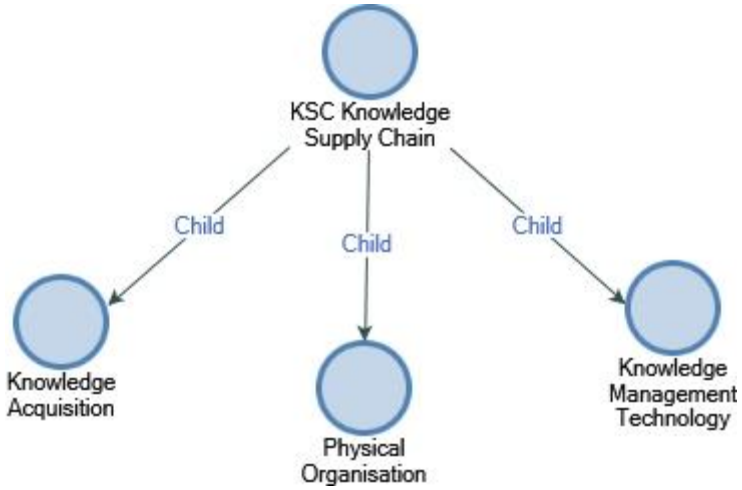

Figure 4.53 Structure generated from data and findings

From this, each section was explored further to understand the key issues relating to the overall issue; resulting in what the researcher defined as the Knowledge Supply Chain. This theoretical approach considers all issues and findings emerging from the data and is used to generate a proposed framework which adopts the name of Knowledge Supply Chain. This framework aims to address the needs of this research and offer a potential outcome as a resolution. For the analysis of data. A template analysis process, originally developed by King (2004), examined themes within the qualitative data gathered from the semi-structured interviews. These were produced from the 19 interviews with knowledge workers within the organisation.

In addition to the Node Structures and participant quotes, emerging inductively from the data, additional NVivo outputs are included in Appendices 6 and 7 in the form of a Tree Map and Word Cloud, respectively. These have been included to further demonstrate the richness of the data collection process.

The next Chapter discusses the findings emerging from the data. Furthermore, Chapter 4 will re-enforce the holistic framework developed from the findings, which is shown in Figure 4.54 below:

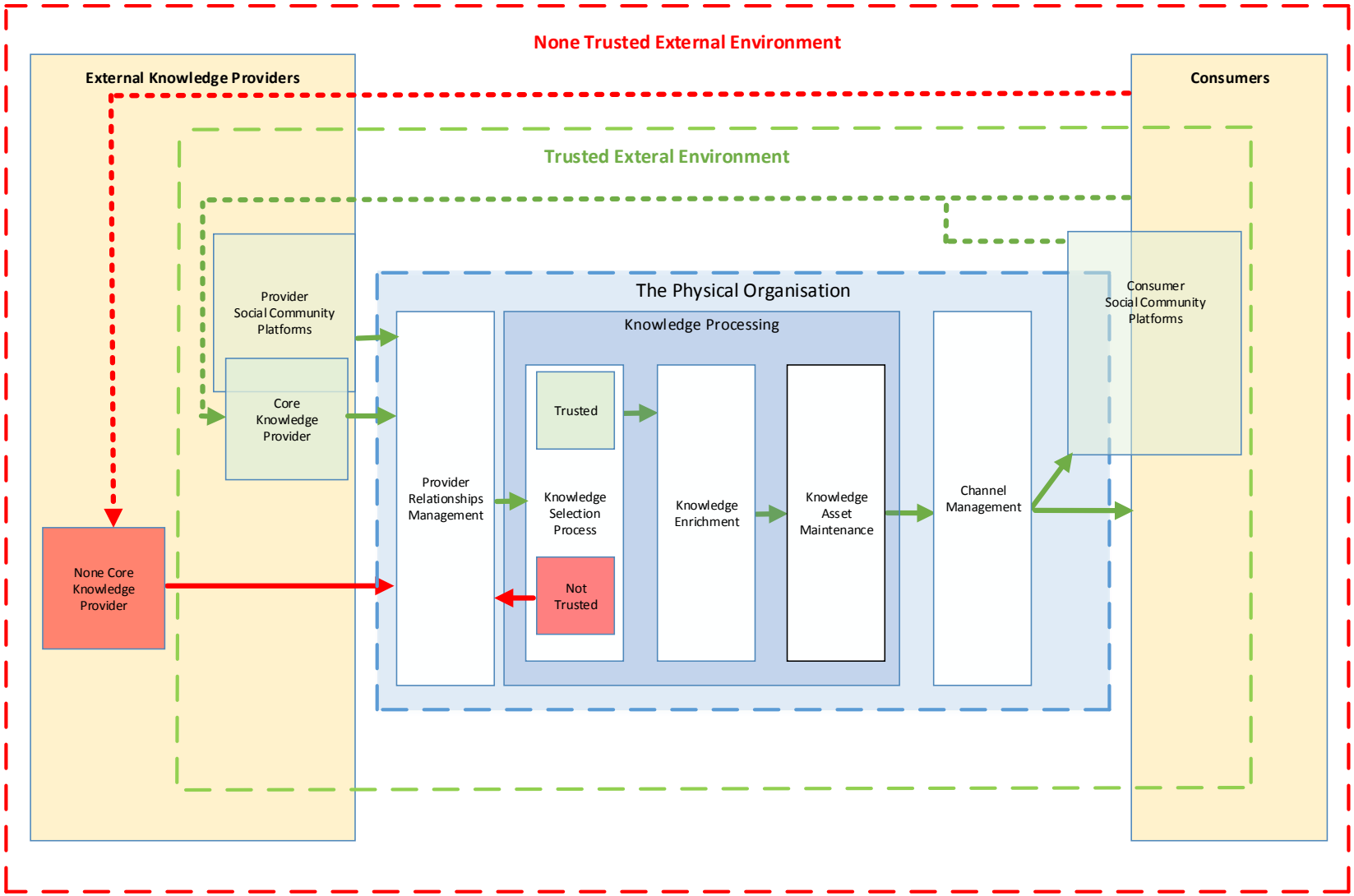

Figure 4.54 Holistic Framework: Knowledge Supply Chain

CHAPTER 5: DISCUSSION

5.1 Introduction

The previous Chapter focused on the qualitative data that emerged from the semi-structured interview process and highlighted the findings also emerging from that data. This Chapter discusses the findings from the study by assessing these findings against the theoretical framework which has emerged at the end of the previous Chapter.

At the end of Chapter 4, the emergence of the Knowledge Supply Chain is identified as a potential holistic framework to address the needs of this study. This theoretical framework aims to define an end to end lifecycle approach for the acquisition, consumption and re-distribution of knowledge from the perspective of a professional organisation. For the purposes of this study, the newly proposed framework is defined as the Knowledge Supply Chain (KSC). It is envisaged that the KSC can function as an independent framework and is not driven by nor impacted by other traditional processes such as the supply chain or value chain for example. It is envisaged that this framework is used explicitly for the purposes of generating a rich knowledge supply chain that is used to enhance an organisation's knowledge capabilities. Within this complex environment, the ability to consume and re-distribute knowledge across organisational boundaries are key factors in the success of the knowledge supply chain framework. To date from the literature reviewed, no previous attempt to approach this has been identified. The emergence of the importance for an overall framework to address the needs of the organisation has emerged from the data in Chapter 4. The KSC is offered as a solution and potential theoretical framework to address the needs of this study.

5.2 Introduction to the Theoretical Framework – (KSC)

The Knowledge Supply Chain or KSC is offered as a theoretical framework for moving and managing knowledge throughout the physical knowledge life cycle. It is intended that the findings from the data collection in Chapter 4 have evolved inductively based on the outcomes of the analysis of the data to produce the final theoretical framework being proposed.

During the data collection phase highlighted in Chapter 4, four participants (Participant 11, Participant 6, Participant 1 and Participant 18) emphasised the need for a framework or process to manage such a complex environment effectively while trying to maintain a certain level of autonomy throughout this process. The same participants acknowledged that although knowledge within the organisation does aid other organisational processes such as the supply chain and value chain which both have a requirement for knowledge to co-exist, it is broadly recognised that much more could be done. Hence, the consensus

on the need to value knowledge as a separate independent entity, but there is currently no knowledge framework available that addresses these needs. From the literature, several frameworks were reviewed (Al Saifi, 2015; Liao and Marsillac, 2015; Teese, 2009; Snowden, 1999; Nonaka and Takeuchi, 1995) but none would meet the needs of the organisation. Certain frameworks did cover certain elements of the requirements such as Bukowitz and Williams (1999) that focus upon the knowledge-based asset, but this was from the perspective of internal driven processes as opposed to externally acquired knowledge. This element of the theoretical framework, relating to knowledge as an asset advances this concept by combining the knowledge as an asset as part of the proposed holistic framework and is being addressed during the enrichment section, later in this Chapter.

The Cynefin framework Snowden (1999) considered knowledge from the perspective of relationships. Relationships play a key part of the framework proposed in this study, and as such this framework was of interest. The Cynefin framework however was more focused upon the psychological elements as opposed to the physical relationship. Relationship types play a crucial part in the KSC. Certain elements of the Cynefin (1999) framework can be extended and used against the knowledge providers and this will be discussed later in this section. This research focussed upon the soft systems approach due to the vast number of potential knowledge sources which are available to an organisation, each of which could potentially require a unique approach. Predominantly, this framework is driven by the interpretations of people involved within the framework and help to develop CKP relationship types through a continuous learning process as discussed by Checkland (1999). Furthermore, many of these can be none-definable and the level complexity will not be considered until the point of consumption. The hard systems approach focusses on serving explicit interests (i.e. goal based approach, measurable results) and not the value of knowledge in its own right as discussed by Jackson (2003). As there is no definite solution with potentially definable parameters, the hard systems approach was not deemed appropriate to this study.

As this research has already discussed, there are three key areas that affect the ability to consider a framework for the purposes of KM within the organisation, EKA, TPO and KMT. The interview participants alluded to the need for something to bridge this gap but were unable to articulate it; this appears to be due to the multi-disciplinary requirements needed to apply such a framework. Unlike other frameworks reviewed, the KSC framework proposed within this study is the only one that considers knowledge from an end to end life-cycle management process within this context. Furthermore, because this study considers the output of the consumer as an alternative knowledge source, the whole process becomes more cyclic in nature as shown in Figure 4.54.

Chapter 4 brought together the key areas required to be able to develop the theoretical framework in a thematic way applying King's (2004) template analysis, grouping the core areas where required, identifying the key issues in each area. The following sections within this Chapter will review this framework in detail and the pathways that make up the processes which transport knowledge through the framework as part of the knowledge life cycle. Figure 4.54 above shows the framework that was an outcome of the data and findings section with the application of pathways. These pathways will show the journey knowledge takes through the framework and are discussed in more detail in the following sections.

5.3 KSC Pathways

This study has the aim to provide a framework that utilises knowledge from beyond the typical organisational boundary, then enriches, utilises and re-distributes this knowledge for the benefit of the consumer. Each of the individual pathways within the framework depicts the requirements at each stage of the journey. Figure 4.54 highlights the holistic framework that has emerged from the data including the pathways. These pathways are the transportation mechanisms or processes used to move between each stage of the life cycle process to make the framework effective. This section refers to the findings that have emerged and how they are applied, discussing each of the processes required to aid knowledge through this journey.

5.3.1 Knowledge Acquisition (KA)

The starting point of the process is the acquisition of knowledge from outside of the organisational boundary. Previous literature revealed that an organisation may obtain knowledge from external partners through setting standards, collaborative efforts and joint issue resolution (He, Ghobadian, and Gallear 2013; Gold, Malhotra, and Segars 2001). This is reflected within the framework pathways as 1a), 1b) and 1c) and make up the three initial sources that knowledge is derived from that has come from the findings. Unlike previous research, this study explicitly defined the knowledge types based in key relationship types, these are; 1a) is the primary (or preferred) knowledge provision source as this is defined as a CKP. 1b) also a CKP, is the secondary preferred source of knowledge as this can start life as either Tacit or Explicit and requires more processing than 1a). 1c) an NCKP is the least preferred source as it is untrusted and as such requires significantly more processing and may not be of use. However, from the literature, previous approaches only offered a limited focus when considering how to build up a collaborative relationship between a knowledge supplier (He, Ghobadian, and Gallear 2013). This research advances this approach and considers knowledge from

multiple explicit and disparate knowledge sources based on pathways and KP management processes by applying the relevant key values against the relationship types. These key values are discussed further in sections 5.2.1.1 and 5.2.1.2 respectively against their defined relationship types.

5.3.1.1 Pathway 1a – Core Knowledge Provider

Pathway 1a) is the initial (preferred) source for explicitly provided knowledge and requires the least level of effort to process. Knowledge from these sources can only come from a) a CKP or b) a trusted consumer (also defined as a CKP). This is crucial because of the nature of knowledge and the fact that as knowledge is consumed and can added to existing knowledge assets, it may affect what is currently understood. Particularly within certain knowledge areas such as lighting where the knowledge is so tightly coupled and can often only be separated by a single code. From the literature, Snowden's (1999) framework or more specifically, the complicated domain of the Cynefin framework offered a similar approach that could be applied to a CKP at the provider selection stage. However, this framework extends this approach by applying the key values which have emerged to control what is defined as a CKP, thus making the process viable for the KSC. As shown in Figure 4.12 in Chapter 4, this knowledge is always acquired externally and therefore, controls need to be applied to define what a CKP is to define what the selection process would be for a valid CKP. As previously, discussed this is a trusted provider but also emerging from the data previously are the key values that define what is required for this type of KP as part of the KP selection process. Table 5.1 below highlights the key values which have emerged in Chapter 4:

Table 5.1 Core Knowledge Provider – Key Values

Key Value	Purpose	Mandatory
Trust	Trust is a key value in agreeing a provider to be a core provider due to the potential impact of poor knowledge	Yes
Credibility	Credibility aids trust in establishing an effective relationship with a KP	Yes
Traded >5 Years	Although not mandatory, only providers who could show a significant commercial viability offering could be considered	No
Reliability	Reliability of knowledge, services or products would need to be established prior to commitment to a provider relationship	Yes

Financially Viable	Financial viability only impacts certain services. It would not affect a KP from the perspective of regulatory knowledge provision for example, but would affect a new product manufacturer relationship who is entrusted or could not potentially be accountable for failures in products or services leading to financial backlash	No
Known Brand	A known brand is preferred as this can come with trust, credibility and reliability, however this is not always the case and would be established on the provider	No

The key values shown in Table 5.1 above could be applied whether the CKP is either a provider or a consumer (Consumer pathways 7a and 7b) as the values would ensure that a minimum level of control is applied against the source being consumed. Figure 4.20 in Chapter 4 highlighted the relationship between the CKP and the provider relationship process, highlighting that this relationship needs to exist before a CKP can be established. Upon establishment that a knowledge provider could satisfy at least the minimum key values, then the relationship could exist, and be initiated. Trust is a crucial factor in applying the key values because it can be measured based on previously acquired knowledge from a CKP. For example, previously acquired knowledge assets or portions of those assets, could be used to define expectations for levels of quality, completeness and validity. Based on the success of such assets, then this would increase trust levels for a CKP. Furthermore, this same approach would be used to determine the transition from an NCKP to a CKP relationship type based on this value.

5.3.1.2 Pathway 1b – Core Knowledge Providers: Social Community Platforms

As with pathway 1a discussed in Section 5.2.1.1, pathway 1b is also dependent upon a core provider relationship being in place for it to be utilised effectively. Unlike 1a, 1b initiates within a social platform with the provider but nonetheless, only a CKP could participate within a trusted social platform with the organisation. In addition to the complex domain however, Snowden's (1999) framework domain element of Complex could also be extended at this stage as potentially, the social platform offers a variation of potential interactions between the provider and the organisation. The advancement being that Snowden (1999) considers the probe-sense-respond approach to selection process only where it is safe to fail. However, this framework advances this approach by applying the key values shown in Table 5.1 above, therefor not relying upon a fail-safe approach to

knowledge selection but rather applying consistency which in turn, applies safety to the CKP.

This complexity would require that any community-based platform be managed by the organisation to ensure that the relevant controls were in place to confirm the credibility of active participants. Upon this requirement, the process becomes the same as required for 1a as discussed previously. Therefore, it is surmised that the key values for 1a and 1b are both the same because the same rules apply for a CKP to participate pro-actively for either 1a or 1b pathways. However, the exception is that the state of the provider could change as the relationship develops. Although the Cynefin (1999) framework defines the difference between the complicated and simple domains, in the organisation studied, the relationships identified can move continuously between the NCKP and CKP states. It was not sufficient to suggest that a provider would have longevity within either state but rather transition between states depending on specific products or services and depending on complexity. Therefore, considering a transitional or dynamic relationship based upon the key values discussed in Table 5.1 above will be applied against the KSC but using the basic underlying principles of the Cynefin (1999) complex and complicated elements.

5.3.1.3 Pathway 1c – None Core Knowledge Provider

1c is the initiating pathway for a NCKP. This source would always be defined as untrusted and require a significant level of processing and verification by an SME before being considered as a knowledge asset. Previous literature did express potential opportunities via informal networking (Almeida *et al.*, 2003; Lee *et al.*, 2011), again from an atomic perspective as opposed to multiple disparate sources, whereas this study addresses knowledge from potentially unknown or unverified sources. Unlike CKP a relationship does not need to exist between the source and the organisation as the knowledge may not necessarily have an owner, thus increasing the risk of such knowledge. Snowden's (1999) framework would define this relationship as chaotic and requires additional effort from the SME to allow knowledge from this source to enter the organisation. Where a knowledge source does have an owner however, this does limit the risk to a lesser extent, but still requires significant verification before consuming. The following key values emerged from the data before considering creating a relationship with a NCKP as shown in Table 5.2 below:

Table 5.2 None Core Knowledge Provider Key Values

Key Value	Purpose	Mandatory

Key Value	Purpose	Mandatory
Subject Matter Expert	A SME must exist at source and be able to communicate directly with an organisation-based SME.	Yes
Commercial Viability	The provider must be commercially viable and offer a level of mutual viability before being considered as a potential knowledge source	Yes
Time Sensitivity	Knowledge must be freely available and accessible in such a manner that it meets the needs of the organisation to achieve its commitments	Yes

Unlike CKP, NCKP will always be subject to scrutiny and enhanced levels of enrichment from an internal SME up until the point where their status could be upgraded to that of a CKP. It is proposed that NCKP are periodically verified to challenge their status. If they continue to be untrusted over a long period of time, then this could be a potential indicator that the source is not capable of adapting quick enough to the current market place and trends to be a suitable long-term KP. As with the CKP within the shared platform environment, the relationship status can also potentially change as the relationship develops. The primary focus would be to transition the relationship from chaotic to complex and ultimately complicated as per Snowden's (1999) framework but enhanced to consider the application of the key values which have emerged from the data.

There is a difference between commercial viability and financial viability. Within the CKP key values, Financial viability relates to an organisations ability to provide profitable goods, services or information but also the ability to be able to be sufficiently stable if one of those good or services fail. Potentially leading to lawsuits, claims or the ability to honour guarantees or recalls with a significant financial impact and the ability to withstand such an event. Therefore, financial viability is seen as the long-term commitment to such goods, services or information. Commercial viability relates to a lesser trusted organisation or an NCKP providing goods services or information that is of a sufficient level of quality or value that both organisations could benefit without risk of significant impact of failure. Thus, the risk is limited and would only have a minimal impact but is worth that risk due to potential gains. Therefore, commercial viability is seen as a short-term risk based approach that could potentially become a long-term offering, based on a successful outcome.

Each of the three initiating source pathways offers potential value as the starting point for the knowledge acquisition process. Figure 5.1 below shows the breakdown of access points into the organisation:

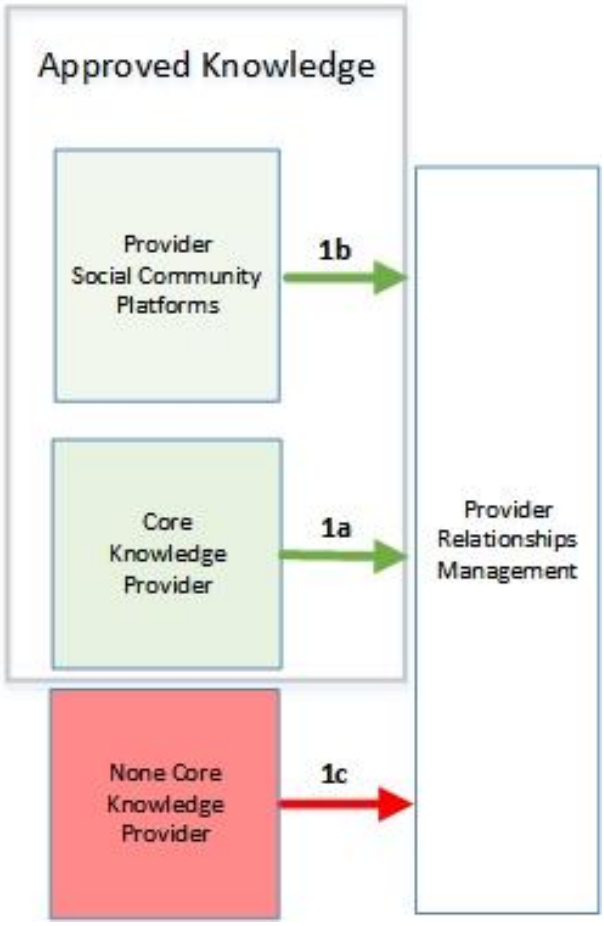

Figure 5.1 Knowledge Acquisition Access Points

Although Figure 5.1 above shows CKP's and social community platforms as separate entities, CKP's can be participants of social platforms therefore there is some overlap, and this is shown in the overall framework schematic. This method of defining the knowledge acquisition channels at the point of contact addresses issues highlighted in the literature where knowledge acquisition becomes more socially complex and interconnected (Liao and Marsillac, 2015). Therefore, this approach offers a solution for this issue and allows for the consumption of various complex sources. The impact of multiple sources of knowledge having the same meaning cannot be assumed. Therefore, the SME play a crucial role at this stage interrogating and dissecting knowledge, prior to applying against an existing physical knowledge asset or the generation of a new one.

The KP relationships are a crucial factor in the application of an effective framework. This approach of applying KP types confirm the importance of relationships as supported by Snowden (1999) but advancing this approach through the application of key values to

determine the most effective channelling of knowledge during the initial stages of the KSC. Furthermore, allowing the framework to consume knowledge based on these relationships by applying controls that have emerged from the findings as managing factors for such relationships.

5.3.2 The Physical Organisation

The first stage of the framework focusses upon the initial acquisition process and the requirement of the provider relationships to determine the relevant pathway for further processing. The following stage of the framework focusses upon the internal organisational processes or those analysed within the Physical Organisation and the findings emerging from Chapter 4, Section 4.3.9. Figure 5.2 below highlights this section of the framework:

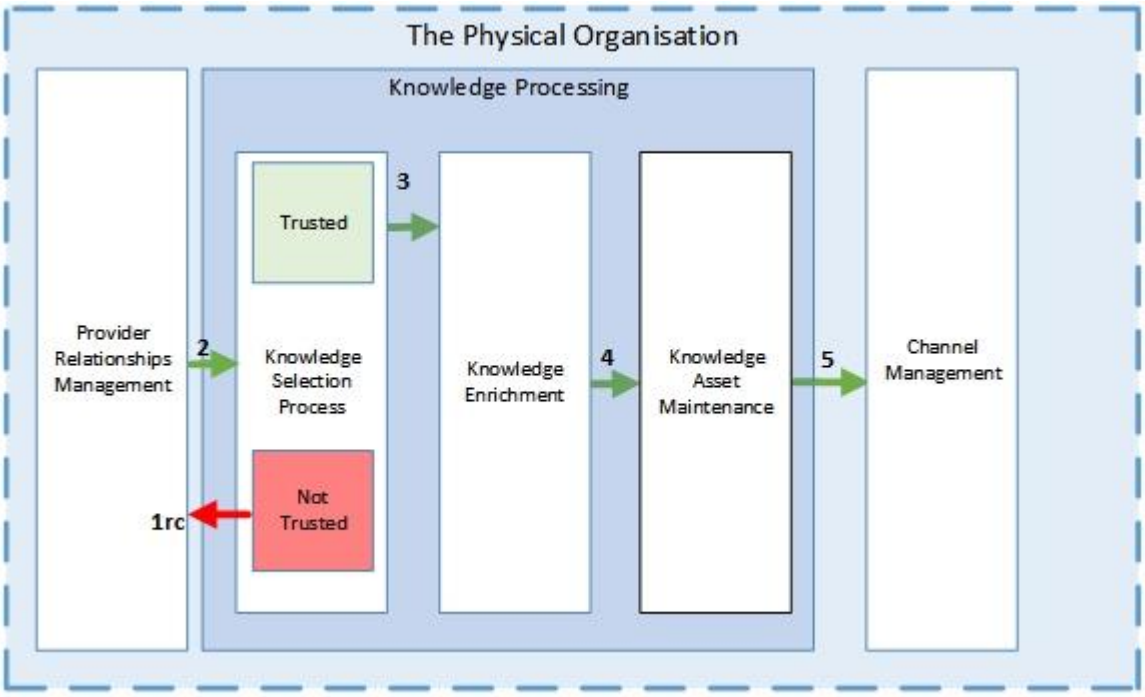

Figure 5.2 The Physical Organisation

McManus and Loughridge (2002) argued that embedding a culture of standardisation and knowledge maintenance is crucial to achieve organisational goals. Although this approach is appropriate for internal knowledge transactions or a small set of KP, and the term itself is valid. This is unsuitable for an organisation that has access to such a large volume of possible KP, as it would be unlikely that standardisation would be viable for all KP. The organisation used for the study has over 31000 potential sources of knowledge provision and this requires a significant level of dynamic behaviour to be able to absorb effectively as knowledge assets. Although standardisation can be applied from a framework perspective, the individual elements and processes need to be sufficiently

dynamic to allow for knowledge to be consumed in different forms. Furthermore, avoiding the potential to block the flow of knowledge into the organisation.

The culture affecting KM was discussed by Zheng (2009) and Al Saifi (2015) who both argued that each category within Zhengs (2009) framework impacts KM in divergent ways relating to the effectiveness, efficiency and sustainability of knowledge management. Zheng (2009) broke these categories down further into knowledge, people and work, however as Al Saifi (2015) discusses, there is little consistency in defining and conceptualising the term of culture and these three categories alone are too vague to capture knowledge within a complex acquisition environment. As with Al Saifi's (2015) argument, there needs to be a culture defined that allows for the consumption of knowledge based upon the values of the organisation being studied. The outcome of this framework is to not only share knowledge across boundaries but also to capture knowledge as a physical asset. Therefore, a failure in any one part of the framework could cause disruption while remedial processes are applied but it is unlikely that it would lead to a significant failure of the application of the overall framework. The application of key values which have emerged from the findings begins to help address what is required to instil a culture using effective relationships but are of more relevance to the organisation. Furthermore, as discussed within the literature review Al Saifi (2015), this allows for application of cultural antecedents as part of the organisational culture based on the findings from Chapter 4:

- Social Relationships (Social Community Platforms)
- External Knowledge consumption relationships (CKPs and NCKPs)
- Knowledge sharing (Independent external knowledge sharing capabilities)
- Organisational Boundaries (The application of controls to manage cross boundary knowledge transactions)

These applied antecedents could allow for the organisation to establish a basis for the application of the required relationships to implement effective KM. Unlike previous research (Liao and Marsillac, 2015; Zheng, 2009) where the focus was explicitly within the organisational boundary, these cultural antecedents extend consideration to the impact upon culture from people or processes located outside of the typical organisational boundaries. Therefore, the KSC framework extends current theory and understanding from social considerations within the organisational context as discussed by (De Long and Fahey, 2000; McManus and Loughridge ,2002; Alavi *et al.*, 2006; Al Saifi, 2015) to the inter-organisational context though the application of relationship types (CKP and NCKP). Considering external knowledge sources, the framework moves from outside of the organisational boundaries and into the physical organisation and offers significantly more

opportunity for knowledge acquisition. These antecedents allow knowledge to flow into the organisation and then be considered as part of the knowledge selection process, the first step in defining what will be consumed as a physical knowledge asset. Figure 5.3 below shows the transition stage of knowledge and how the provider relationships and their key values play a crucial factor in the initial stages of knowledge acquisition prior to the selection process:

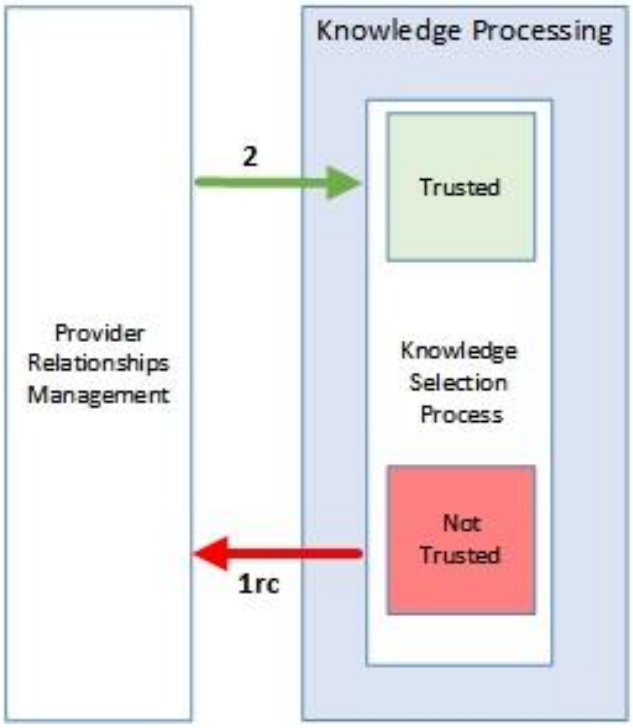

Figure 5.3 – Knowledge selection based upon relationship channel and key values

At this point, processes affecting the transfer of knowledge into physical knowledge assets commences. All activities relating to knowledge are now internally driven processes only and are not affected by the external environment. The need from this point forward to have relevant controls in place is now significantly greater as there will be a direct impact by any new knowledge asset against existing knowledge assets. As discussed in Chapter 4, it is easy to tip the balance of the purpose of knowledge assets if it is not correctly consumed. Milton (2007) discussed that problems relating the knowledge acquisition need to be addressed within a given KM project by the knowledge engineer. However, this study extends further the understanding that this should only be controlled within a given project but rather should be integrated as a culture for all KM requirements as part of the KSC framework.

One of the major factors to emerge from the findings was the dependency upon SME and their placement within the framework for maximum efficiency. In Figure 5.3 above, the framework would be supported at stage 2 pathway as this emerged in Chapter 4 as the

most optimum positioning of the SME. They would be in a key position to ensure that the most appropriate relationships were being defined within the provider relationship status but furthermore be a key factor in the initial knowledge selection process. This relationship was shown in the Chapter 4 of the findings in Figure 4.31.

To ensure this balance is consistent, pathways 2,3, and 4 as shown in Figure 5.2 previously highlight the key areas of the framework that focus on organisational processes. This balance must be carefully considered when applying new knowledge to existing assets or creating new assets. This balance is carefully balanced by the positioning of the SMEs within the framework as shown within Figure 5.4 below:

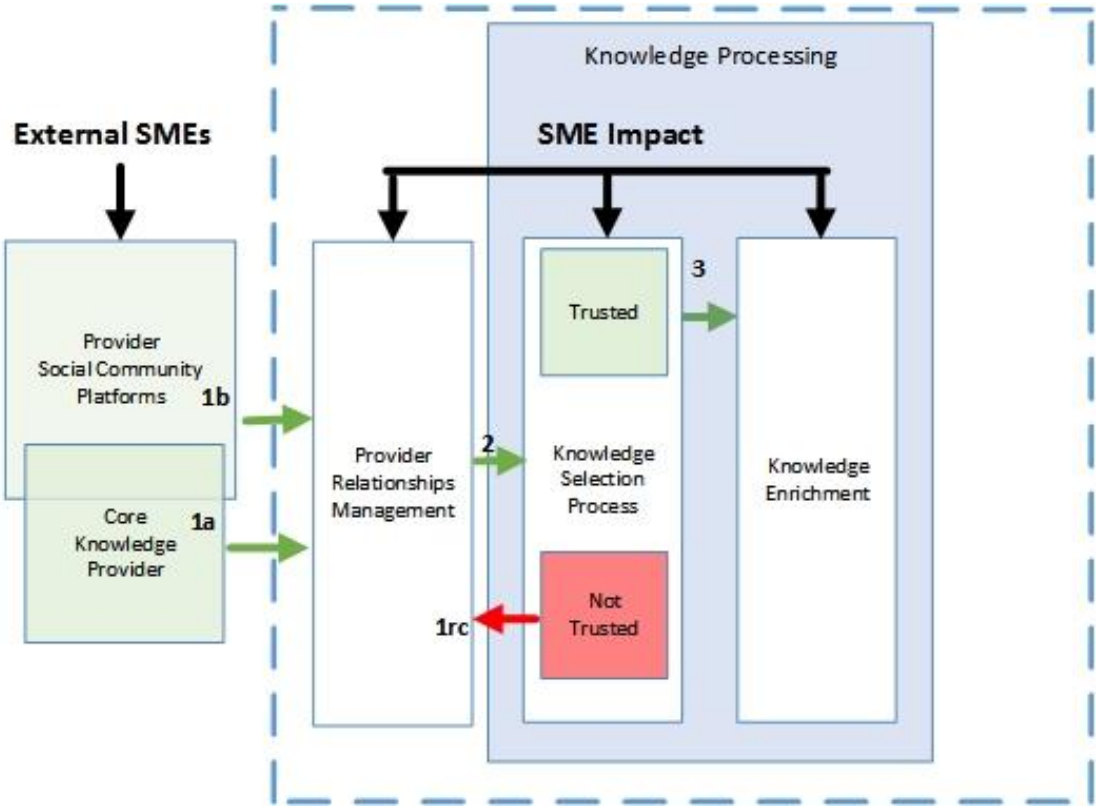

Figure 5.4 – Positioning of the SME within the KSC

The balance required at each stage and pathway will be discussed further in the following Sections 5.2.2.1, 5.2.2.2 and 5.2.2.3. However, Figure 5.4 depicts the impact of the SME and their position to influence the impact upon knowledge control across inter-organisational boundaries from an internally applied cultural approach as opposed to a project dependent approach.

Pathway 2 is the first fully internal process with the primary aim handing acquired knowledge to the knowledge selection process. Upon selection of the relevant knowledge, it is then handed to pathway 3. Pathway 3 passes the selected knowledge

through to the KE process. Pathway 4 is the final process directly affecting the physical management of the life cycle requirements of the knowledge asset.

5.3.2.1 Pathway 2 – Knowledge Selection

Knowledge selection is the process of determining which knowledge to use further for the generation of new knowledge assets or the creation of new assets. This part of the process is dependent upon a) the key values as defined by the outcomes of Chapter 4 as shown in Table 5.1 and 5.2, and b) the capabilities of the SME. Within the literature review, Davenport and Prusak (2000:5) discuss that "Knowledge can be defined as a fluid mix of framed experience, values, contextual information and expert insight that provide a framework for information". This study builds on this as a concept using the findings from Chapter 4 and determining that these framed experiences and values would be a crucial factor for SMEs and their position within both the KSC and the knowledge selection process. The approach for determining which knowledge to consume is the most difficult, particularly when applying the knowledge against a physical digital asset as it must be able to be transferrable. Durkin (2004) discussed this issue and how it can be the most problematic from a knowledge systems perspective. However, technology has moved on significantly since then and is significantly more flexible than it used to be, allowing for more dynamic approaches to knowledge consumption. This research has highlighted that both the value and importance of the SME plays a significantly more valuable role within the process of KM than that of technology. Liao and Marsillac (2015:5439) discussed "despite this need for a diverse knowledge base to support progressive innovation, if and how employees are provided the opportunity to access external knowledge is often determined by the overarching policies of the firm". As Figure 5.4 shows, the SME plays a critical role in the consumption of knowledge within the core areas of the knowledge acquisition process and this is deemed as critical to the selection process. Therefore, the SME plays a more crucial part within knowledge process innovation than the diversity of the knowledge base itself.

The literature highlighted that knowledge can be potentially obtained externally through collaboration or joint problem-solving activities (Gold, Malhotra, and Segars 2001; He, Ghobadian, and Gallear 2013). Using the knowledge provider types as defined in the KSC advances this understanding and offers a far more flexible approach than has been considered previously by applying knowledge provider types. Previous approaches also only considered trusted third parties or a known knowledge source as a key enabler to confirm the credibility of the relationship. The theoretical KSC advances this understanding in theory and applies more relevance upon the SME as opposed to trusted external knowledge partners on their own. Where such a relationship exists then the CKP

would be applied in alignment with the knowledge of the SME and as part of the CKP selection process. However, the use of the NCKP allows us to advance beyond this even further by consuming knowledge from a much broader number of knowledge sources. Furthermore, there is no longer a need for a physical relationship with a provider, where access to knowledge is available but without a clear owner. The clear outcome of this approach would be that the SME themselves would inevitably become a significant asset for the organisation, although only as part of the overall KSC. Furthermore, the knowledge of the SME themselves, would be captured as part of the knowledge asset creation process.

The primary key values of the outcomes of Chapter 4 and shown in Table 5.1 and 5.2 earlier, was based on the KP and their placement within one of the three defined providers: 1) CKP, 2) NCKP and 3) Consumer Provider. This relationship was identified in section 4 and is shown again below in Figure 5.5:

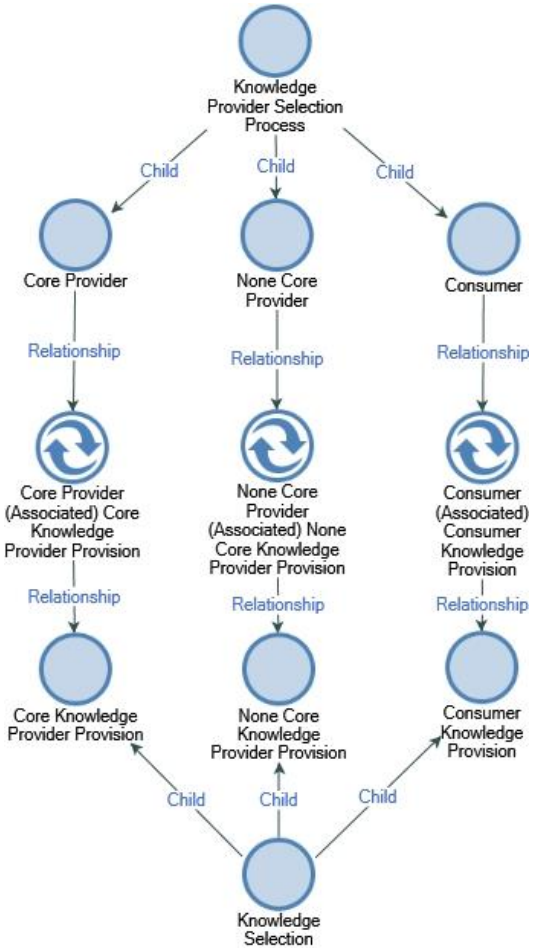

Figure 5.5 – Relationship to Core Knowledge Providers within Selection Process

Figure 5.5 above shows the correlation between the knowledge provider selection process and the knowledge selection process, it shows how this coupling defines that the key values are applicable to both the provider and the knowledge. This highlights that the

knowledge selection process and the knowledge provider selection process are not mutually exclusive.

The use of KP types also allows for the focus to be upon any knowledge as an asset as opposed to previous work by Liao and Marsillac (2015) where the focus was explicitly upon the advancement of product innovation via process innovation, therefore advancing this theory. This framework considers the knowledge asset as the primary focus and not the physical product. In Liao and Marsillac's (2015:5440) framework, the focus was upon the physical supply chain and its impact upon product innovation, the KSC advances this theory by a) extending the acquisition process to external knowledge providers and b) defining that knowledge creation does not have a dependency upon R&D. With the exclusion of the internal R&D capabilities, this study follows a similar path but detaches any need for other organisational capabilities to effectively create and maintain knowledge. However, the process is similar to that discussed by Liao and Marsillac's (2015) in that knowledge flows through the organisation, but this study advances this theory by detaching knowledge from other business capabilities and also considering the impact from unlimited external knowledge sources. The KSC is created as an independent separate framework which could be used alongside other organisational capabilities too (i.e. supply chain, value chain) but they are not a contributing factor. Also, because it has the specific capability of being an independent framework it could theoretically support other environments in addition to wholesale as is relevant for this organisation where product innovation is not the only contributing factor to the success of the organisation. In addition to product innovation, the organisation's predominant business is wholesale and although much of the knowledge can also be applied against internal manufacturing. It can also be directly applied against products or services consumed from external providers. (Liao *et al.*, 2010; Zhang *et al.,* 2010) identified that a broader research approach was required to assess the benefits of EKA and this study has advanced theory in this area by applying the knowledge provider types within the KSC framework to allow for unlimited sources of knowledge to be utilised. This aligns with the emergence from the findings to consider the acquisition of knowledge from over 31000 potential providers.

In addition to considering the impact upon product and process innovation knowledge, the findings also address the requirement for further research to understand the need for knowledge transfer through inter-organisational environments as suggested by (Liao *et al.,* 2010, Zhang *et al.,* 2010). By using a combination of the knowledge source types CKPs, NCKPs and Consumer KPs, combined with the application of SME's within the KSC, this allows for inter-organisational relationships to be a viable option. Applying this approach also aligns with the previous paragraph and the need to consider all knowledge

sources available to the organisation. This is shown in Figure 5.5 whereby a provider can exist in any state based on one of the knowledge source types but also from any external domain, whether this be as part of a developed provider relationship through to an untrusted source by utilising the skills of the SME and the application of the key values applied to the knowledge source types.

These providers were shown in Figure 4.10, Chapter 4 and the key values of each are shown earlier in this Chapter in Tables 5.1 and 5.2. However, another requirement discussed during the findings was the physical source of the knowledge selection pool which is used for the prioritisation of providers into one of these three categories more prevalent. A CKP would be selected from a smaller, proven pool of providers, whereas a NCKP would come from a potentially unlimited source with explicit values applied against them. However, a consumer provider would be dependent upon the successful relationship with a consumer and their willingness to feedback into the knowledge chain, this is discussed later in this section. From a DC perspective, an organisation's ability to develop and implement process innovations is rooted in the activities directed at generating, obtaining, integrating, and distributing knowledge (Teece, 2007; Zollo and Winter, 2002). Therefore, by extending flexibility to the source selection process, the organisation would allow itself maximum capability when selecting knowledge that impacts every stakeholder within the KSC.

5.3.2.2 Pathway 1rc – Knowledge Selection, Rejected

Pathway 1rc is an optional pathway that allows the SME to feedback to the provider, knowledge deemed as not relevant for the enhancement of existing assets or the generation of new assets. As discussed previously, none trusted knowledge sources do not necessarily have a KP and may be a disparate data source. However, where a provider does exist, then there is the potential to enhance the provider relationship to a trusted provider (or CKP) by feeding back to them issues or positive feedback directly. This could be a mutually viable activity, particularly where KPs are in their infancy and show growth potential. An example of this was discussed during the data analysis phase whereby the organisation worked directly with a new manufacturer to aid them in generating their first data sheets as this was beneficial for the end consumer. Figure 5.6 below shows this optional relationship:

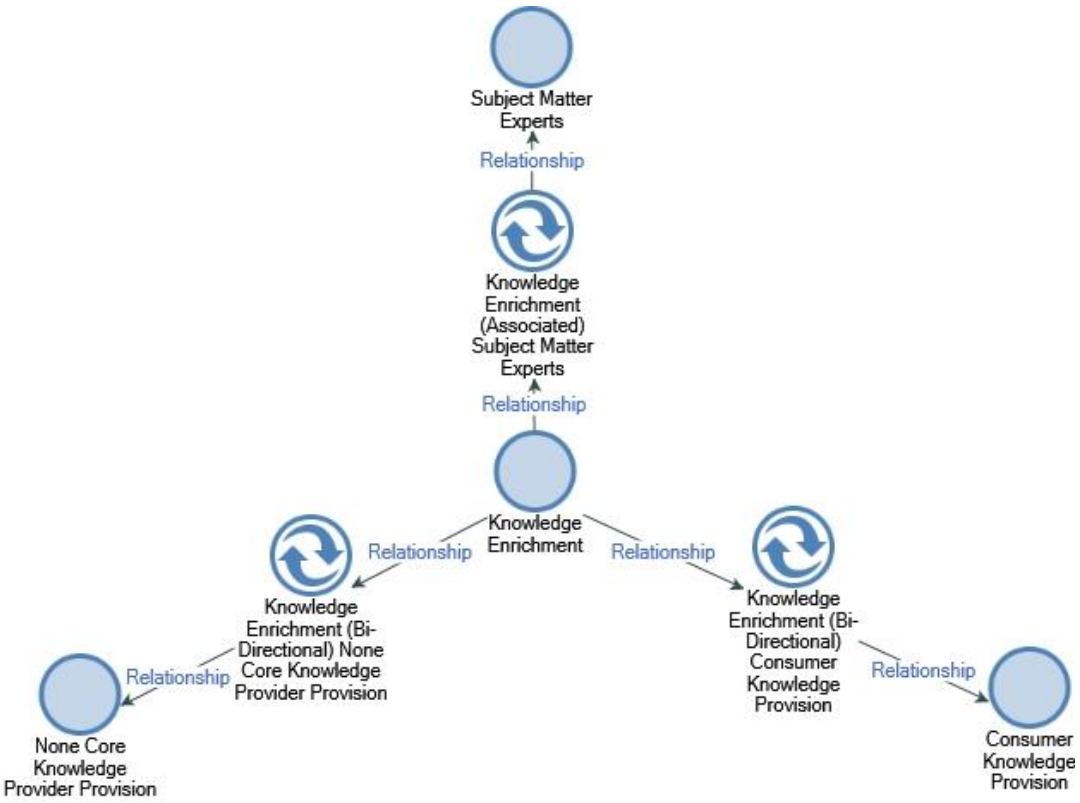

Figure 5.6 – Mutually viable relationship for feedback to none trusted knowledge providers

Although this relationship is defined as optional, the discussion focusses upon this being a pathway which potentially adds value to the KP selection process. Further research would be required to prove the value of such a relationship, but this is beyond the scope of this study as it would require a practical application of the KSC. However, all knowledge-sharing behaviours constitute to contributing or bringing knowledge together for collection and consumption (Al Saifi, 2015). Although, pathway 1rc goes a step further adding a new dimension by utilising negative or incomplete knowledge as a potential opportunity to develop a new CKP relationship.

5.3.2.3 Pathway 3 – Knowledge Enrichment

Section 5.2.1 discussed previously the benefits of knowledge acquisition and the advancement of using externally acquired knowledge to enhance the organisation's knowledge capabilities. Pathway 3, considers how these pathways are enhanced and furthermore, explicitly focusses on activities which transfer the selected knowledge into the enrichment process where either a) a new knowledge asset is created or b) an existing knowledge asset is generated.

At this point in the framework, only trusted knowledge that has been verified by an internal SME would be eligible to be processed and move through the pathway. The first

pathways 1a, 1b, 1rc and 2 focused upon refining and selecting knowledge to a state where it could not have an adverse effect on either the organisation or the consumer if or when it was transferred beyond the organisational boundary again after the enrichment process had been completed. Figure 5.7 below shows the framework pathway:

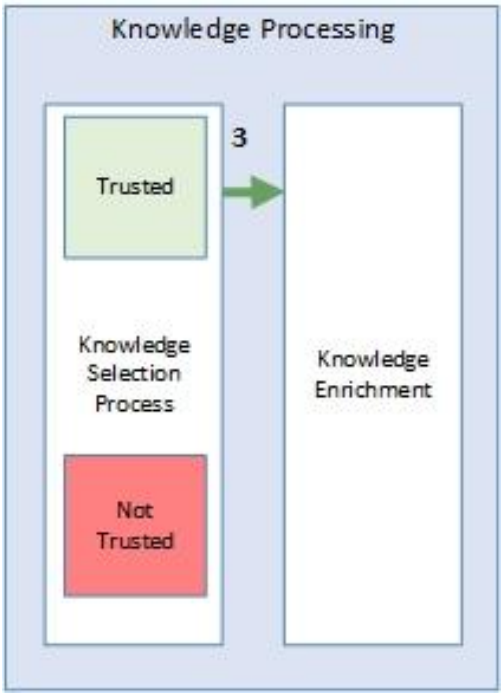

Figure 5.7 – The transition from selection to enrichment

This can help to overcome barriers to innovation originating from the path-dependent nature of an organisation's internal knowledge generation processes (Cassiman and Veugelers, 2006; Hagedoorn and Duysters, 2002). From Figure 5.7 above, there is no pathway back to the selection process as only validated knowledge would pass to enrichment as discussed previously in Section 5.2.2.2. The literature shows that the type of enrichment given to add value to knowledge appears to be subjective in nature Al Saifi (2015). Therefore, the ability to consume this knowledge is driven by the knowledge capability of the organisation as previously shown in the findings in Figure 4.43 in Chapter 4.

This combination of factors allows the organisation to have a DC approach to knowledge enrichment. Nonaka *et al.* (2006) discussed that multiple features of an organisation can be factors for enabling of the dynamic capability process of knowledge creation at all levels. For the KSC holistic framework, these characteristics are shown in Figure 4.43 in Chapter 4 and are key determinants for the knowledge selection process. However, external knowledge experts are not a mandatory determinant as they may not exist in all circumstances, therefore this extends this capability. As discussed for NCKP's they may not exist for certain untrusted knowledge sources, therefore it would be the responsibility

of the internal SME to secure the knowledge and also, its purpose in this scenario. However, it is highly likely that an external knowledge expert would be part of any relationship with a CKP for trusted relationships, thus adding value to the whole relationship.

Analysis in Chapter 4 showed that the key values for enrichment within the organisation are knowledge consistency, knowledge accuracy and timeliness. Although other values were discussed briefly such as quality, they were not deemed as important as the three mentioned here. These key values are also shown in Figure 4.31, Chapter 4.

Of these three values, two can be applied against the SME 1) knowledge consistency and 2) knowledge accuracy. Both elements should be defined prior to any internal enrichment and this can only be done by an SME with knowledge of the specific domain of application. Timeliness can be defined as a key attribute of the knowledge asset itself and its validity. Timeliness was covered in Chapter 4 and discussed the implications of the knowledge life cycle and update capability processes and therefore will not be covered again here.

An organisation which values its knowledge workers will allow them to be empowered and express their creativity and problem-solving abilities and furthermore promote a community of sharing and constructive feedback (Al Saifi, 2015). Therefore, the ability to adapt processes to the individual attributes or functions of a knowledge asset as a DC, is a crucial element of the enrichment process. This would be driven by the guidance of the SME and their ability to interpret the knowledge effectively for the needs of the organisation. These values were highlighted in Figure 4.45 in Chapter 4.

The findings identified that the SME plays a fundamental part in an organisation's ability to learn. Cooper and Zmud (1990) highlighted that an employee's skills, motivation, and commitment were crucial to innovation and process development, however the findings from this research extend this understanding. The need for empowerment or the ability to make crucial decisions on being able to modify or generate new dynamic processes have emerged from the data as important, allowing the organisation to remain adaptable to incoming knowledge. The capability to rapidly adapt to a changing environment would become a potential barrier if the SME did not have a significant level of empowerment. This would be aligned with an organisations commitment to KM within all levels of the organisation. I.e. trust from senior members of the organisation within their human resources, down to trust in the knowledge provided by an SME to internal knowledge workers for support purposes.

In addition to the value of the internal SME, the external SME also plays a key role in the application of the KSC framework. As discussed earlier in this Chapter for pathways 1a and 1b, the external SME is included within the framework as part of the relationship with the CKP only but irrespective of which path into the organisation that is taken. This trusted relationship allows for the SME and the External SME to work together across organisational boundaries to a) rapidly accelerate the knowledge to asset process and b) potentially identify knowledge opportunities that may not exist without such a relationship. Liao and Marsillac (2015) discussed that these type cross-firm activities would only be effective if they highlight the importance of external relationship networks. However, although it considers the importance of the external relationship and collaborative efforts as discussed earlier within this section within KA. Liao and Marsillac's (2015) model only focused upon organisational awareness and the impact of knowledge within the organisation. The KSC framework extends this to Inter-Organisational awareness considering the needs of both the organisation but also the third-party organisation from the perspective of mutual viability of the CKP relationship. This approach could offer a more effective relationship for both parties as the outcome of the quality of any enriched knowledge asset could be beneficial for both parties. Furthermore, as the KSC is defined as in independent framework it has no direct dependency upon the physical supply chain or the need to remain flexible. Figure 5.8 below shows how Liao and Marsillac's (2015) concept of organisational effectiveness is extended and modified to fit the KSC framework approach:

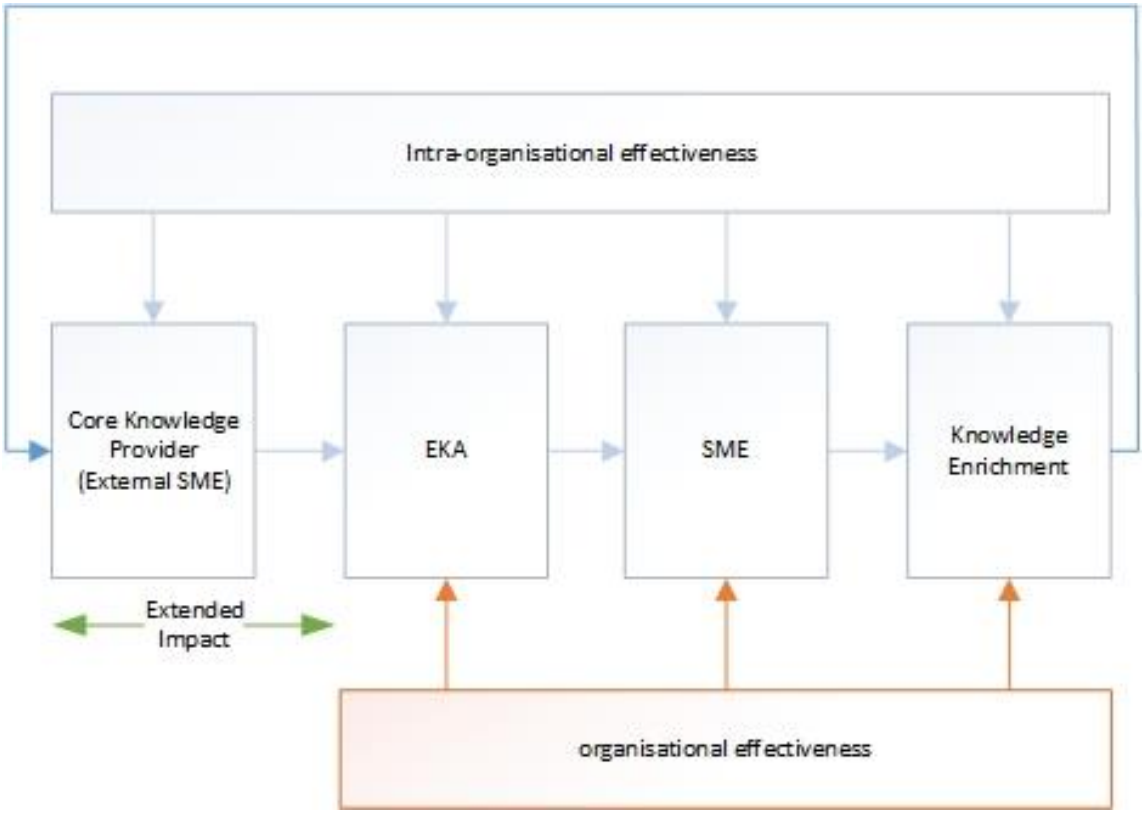

Figure 5.8 Adaptation of Organisational Effectiveness to Inter-Organisational effectiveness (Liao and Marsillac, 2015)

Furthermore, in addition to considering the impact upon EKA, the KCS also considers the flexibility of process innovation as a more effective approach than product innovation as the ability to take a dynamic approach to process flexibility could allow the organisation to be far more flexible if it can adapt to the needs of the knowledge asset.

Moving on from the SME, timeliness was re-enforced as a key value in Chapter 4, section 4.2.3 and highlighted that this key value was crucial for the CKP. However, there is a direct correlation between the time sensitive nature of the CKP but also the time sensitivity of the knowledge asset. One may exist without the other, however there would be a significant potential for a knowledge asset to become outdated if it were not maintained effectively. Figure 5.9 highlights this relationship on the following page and highlights a theoretical potential approach to the enrichment process of the KSC framework:

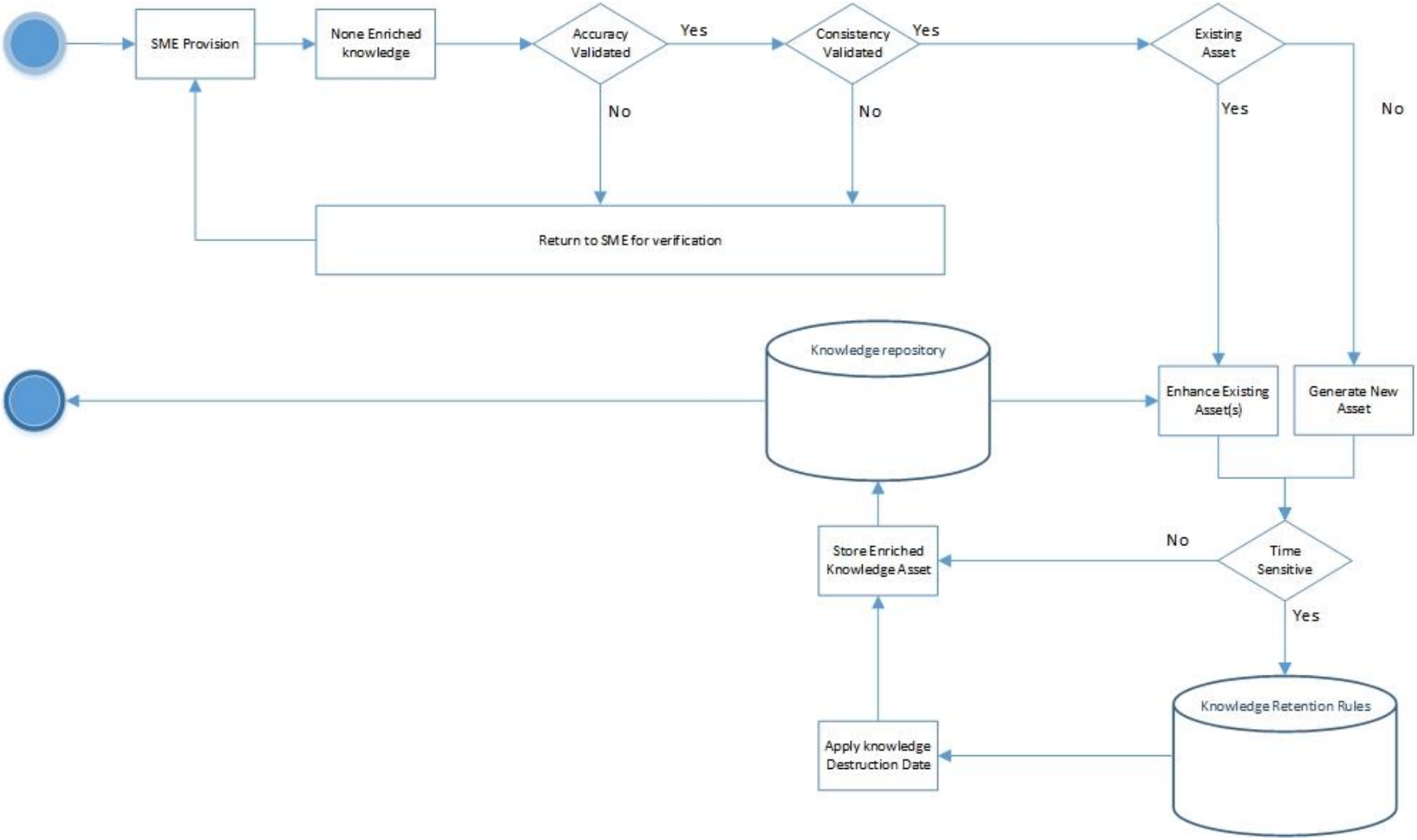

Figure 5.9 – Key values applied to the theoretical enrichment process

The application of the key values for all enablers of the KSC for the enrichment process enable the controls required to ensure that the enrichment process could be managed but allows for the flexibility of the internal attributes which make up the knowledge asset. Therefore, ensuring the enrichment capability remains dynamic in its approach for knowledge processing but formal enough to ensure the controls applied through key values are effective.

Figure 5.9 shows each stage of the key value decision process, ensuring the knowledge is passed back to the SME if it does not adhere to any of the key values. At this point, it would be the responsibility of the SME to re-validate the knowledge and pass it back through the process. Timeliness is the last stage in the process prior to saving the asset to the knowledge repository. This is because the varying impacts on time relating to the knowledge asset should be considered against a knowledge retention policy across the organisation. These rules could vary greatly depending upon the knowledge asset and the purpose of the knowledge. There were three key areas emerged from the data that required a way of controlling the time implications, they are:

1) Timeliness

   The ability for the organisation to use the knowledge in a commercially effective way to remain competitive

2) Regulatory Changes – Date Sensitive

   Ensuring that any regulatory related knowledge against products or services are controlled in such a way that the organisation adheres to legal and local policies. This controlled via the use of timing flags against the knowledge asset.

3) Obsolete Products or Services

   Application of time flags against the knowledge asset to:

   i. Automatically flag the knowledge asset for re-verification at a pre-determined time.
   ii. Destruction of a knowledge asset at a pre-determined date
   iii. Pre-determined date to flag the knowledge asset for enhancement of details via provider and SME.

For the purposes of the organisation being analysed, these scenarios cover all aspects of time sensitive issues but research into other domains could offer additional time sensitive elements beyond the scope of this study.

Upon completion of this process, it is expected that a digital asset would be produced and stored for further use and stored within the knowledge repository.

5.3.2.4 Pathway 4 – Knowledge Maintenance

Knowledge maintenance is closely aligned with KE and focusses upon key elements required to ensure the validity of the knowledge asset. From the findings in Chapter 4, this is broken down into two key factors:

1) Enhancement: The ability to enhance an existing knowledge asset based on further enrichment, not available at the point of creation
2) Timeliness: Ensuring the knowledge asset remains viable based on the timeliness issues covered previously.

Discussed in the finding was the impact in certain areas of the marketplace such as LED Lighting where the products move so rapidly, the knowledge relating to those products or the use of those products can be outdated before the product even gets to the marketplace. To ensure that knowledge maintenance is most effective, key elements emerge as crucial to knowledge maintenance processes:

1) Timeliness

2) Organisational Hierarchy

3) Process Flexibility

1) Timeliness

Timeliness has been covered significantly already within this section, but the importance of time upon knowledge being current and available when required continues to be an important contributing factor to the overall process.

2) Organisational Hierarchy

The findings show that Organisational Hierarchy plays a key role in the effectiveness of knowledge maintenance. As already discussed in section 5.2.2.3 above, the positioning and interaction of knowledge workers, specifically SMEs emerged as crucial for the effective consumption of knowledge. This study identifies the importance of a centralised approach to maintaining knowledge within the organisation from the perspective of the physical resource, allowing for the most effective use of SME resource. Teese (2009) proposed that de-centralisation or a de-coupling of resources is the most flexible approach to KM processes. This however was from the perspective of a technological or systems-based approach to KM and the alignment of resources to optimise technology processes. However, this study determines that the most effective approach is to centralise physical

resources internally but with Inter-organisational relationships to manage flexible relationships between the organisation and external NCKPs and CKPs. Teese's (2009) approach works well if focusing within the organisation, utilising technologies and with the outcome being more predominantly upon organisational performance. The knowledge type relationships within this study allow for knowledge itself to be the core focus and the technology, simply a mediating factor within the framework as well as organisational performance.

Also emerging many times from the findings Chapter was the key issue of large volumes of knowledge sources being managed by different areas of the organisation. This was identified as a negative approach within the context of this study and could be improved significantly by centralising knowledge workers within the physical organisation. This again differs from the decoupling approach offered by Teese (2009) and focusses upon the effective positioning of the SMEs. Furthermore, allowing these knowledge workers to apply a dynamic approach to knowledge acquisition through flexible process capabilities and within an inter-organisational setting. Achieving this by allowing them to use their knowledge and that of external SMEs to define and adapt required processes as part of the physical asset creation process.

De-centralisation of knowledge workers has been identified previously by (Teese, 2009; Al Saifi, 2015) as having a negative effect upon knowledge processes within the literature. It is believed that this introduces contextualisation to the knowledge asset as opposed to the knowledge being explicitly being relevant to its purest form. i.e. explicitly about a product or service, irrespective of its final objective. Furthermore, in an environment with such a diverse knowledge source pool such as the organisation in this study, there is a risk of knowledge contextualisation diluting the quality of the knowledge asset. Figure 5.10 below shows the centralised relationship approach between the physical organisation and the knowledge workers:

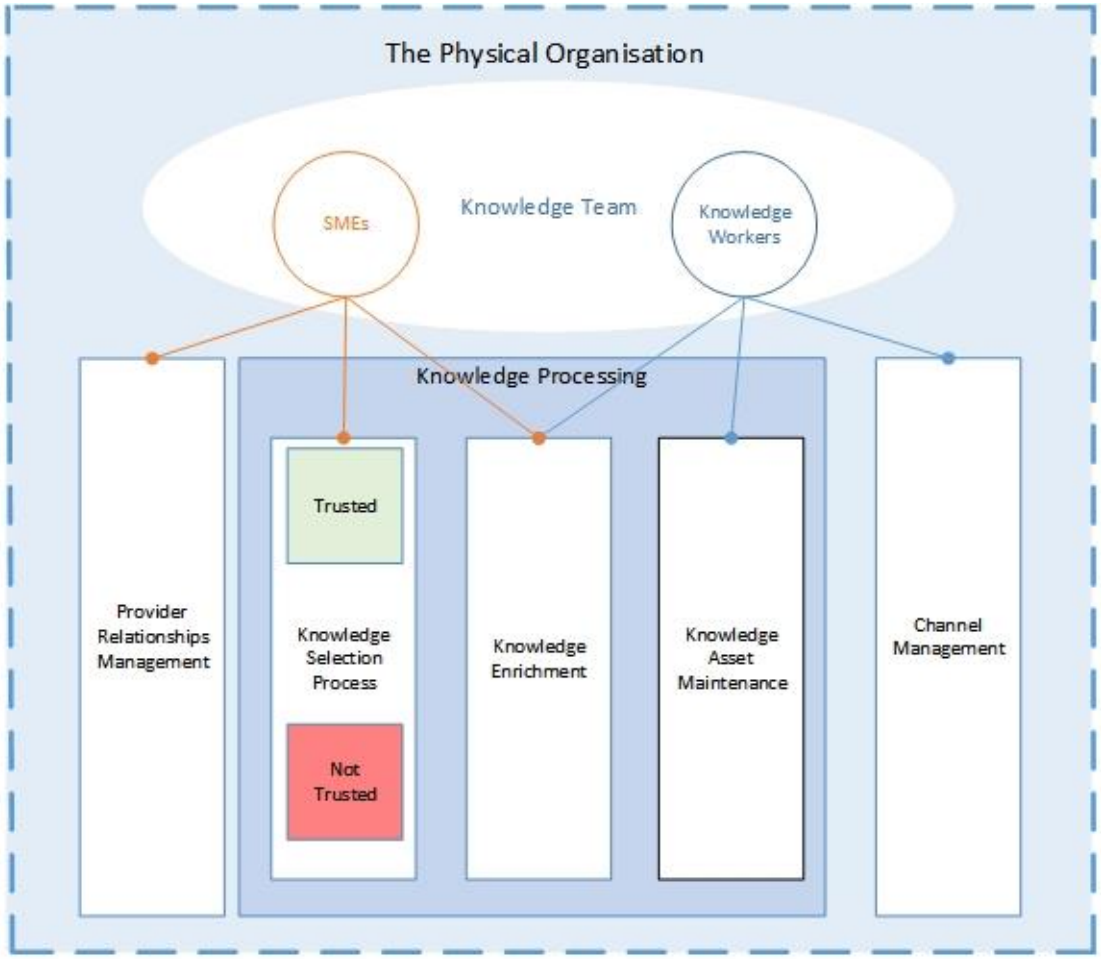

Figure 5.10 The positioning of roles within the physical organisation

Previously Al Saifi (2015) suggested that within a centralised organisation, knowledge workers would have less freedom. The KSC however, distributes the SME throughout the key areas of the KM process, therefore avoiding this issue. Furthermore, this aligns more closely with Pertusa-Ortega *et al.* (2010) who discussed that freedom of action encourages the use of new knowledge. If this is taken into consideration, then aligned with the findings from Chapter 4, where centralisation was seen as positive in the correct circumstance, then the KSC allows for both freedom of action and centralisation. This relationship was shown in Figure 4.11 in Chapter 4.

Nevertheless, this outcome can also be achieved by sustaining the formal organisational hierarchical structure while adding flexibility (Nonaka and Takeuchi, 1995). This is achieved by ensuring the SMEs are part of the centralised knowledge workers team and are a key element of the acquisition and process innovation capabilities of the organisation. The findings highlighted that having such many possible knowledge sources has a negative effect when managed across the organisation within silos. By introducing the approach shown above in Figure 5.10 within the KSC allows a proposed theoretical

solution to achieve these needs whilst retaining control of trusted and none trusted sources.

Furthermore, this would ensure the maintenance needs of the knowledge asset would be continuously transparent for the SME. This has the added advantage of knowledge assets remaining valid and relevant for the life cycle term of the asset. O'Dell and Grayson (1998) argued that organisational structure should to be designed for flexibility rather than rigidity to enable sharing and collaboration within that organisation. The KSC builds on this belief by introducing the sharing and collaboration into the KM environment.

3) Process Flexibility

Process flexibility or process innovation was considered by (Keupp *et al.*, 2012; Reichstein and Salter, 2006; Hatch and Mowery, 1998) as an important source of organisational renewal. For this to be effective within a professional environment, this same understanding applies here as it does for the physical organisation. The effective positioning of the SMEs to directly impact process flexibility to allow for process capabilities to create or adapt as required by the organisation. The findings in Chapter 4 identified that the SME plays a crucial part in defining the needs of the physical knowledge asset and what is required to achieve these assets. By considering the CKP and NCKP relationships as dynamic processes, the KSC offers significantly more flexibility than previous frameworks discussed during the literature review as it looks outside of the physical organisation and is not explicitly focused on internal processes. Furthermore, the SME can use these relationships as key processes for the definition of knowledge being consumed by the organisation. Therefore, this can be re-enforced by considering the relationship between the KPs and the enrichment processes as shown in Figure 4.23 in Chapter 4, which demonstrates process flexibility. This complex relationship could allow for such flexibility but would need to be re-enforced with the appropriate flexible technological processes to allow for the adoption of flexible knowledge processes. Although beyond the scope of this study, a flexible taxonomical framework with a dynamic application of asset values could be considered as a possible approach for technological implementation. This could be an opportunity for further research.

Teese (2009) defines DC as a key factor in the application of knowledge processes. However, Teese (2009) considers an approach of using selected micro-foundations from a different direction of this study. Whereby Teese (2009) predominantly focusses upon the internal R&D function as the primary contributor to process innovation, this study focusses directly upon EKA a more important factor to process innovation. Teese (2009) does consider the external knowledge channels for consumption but not as the dominant

source of knowledge as an enabler, but rather a contributor. Furthermore, Teese (2009) also predominantly focusses upon technology delivery mechanisms for the maintenance of knowledge, whereas this study focusses more predominantly upon the relationship between internal and external SMEs and the technology is merely an enabler of the creation of the knowledge asset at the point of consumption. Although Teese's (2009) framework emerges as effective from the perspective of the organisation, it also appears less effective for the knowledge asset as an independent entity. Although this study extends upon Teese (2009) and the importance of DC for the maintenance of knowledge, by advancing these principles against an inter-organisational environment using KP types as opposed to organisational performance and other determinants as an outcome for success. Therefore, the knowledge asset is an independent entity within the KSC and should not be dependent upon organisational determinants, except for the dependency upon SMEs. This move from the impact of organisational determinants to a more organisational approach was discussed by (Keupp *et al.*, 2012; Woiceshyn and Daellenbach, 2005) who identified that a particularly critical gap in the literature pertained to the lack of insight into the organisational and managerial activities through which firms introduce process innovations. It is believed this study addresses these requirements by the application of the KSC. By considering the CKP and NCKP relationships as dynamic processes, it offers significantly more flexibility.

In addition to the requirements of the physical process and its ability to adapt, the application of the SME within the KSC also addresses other gaps in the literature. (Keupp *et al.*, 2012; Woiceshyn and Daellenbach, 2005) discussed that research had yet to examine how performance is impacted by intra-firm variances in managing process innovation activities. From the findings, knowledge workers identified that a none-centralised environment had a negative effect on quality, consistency, timeliness and mis-understanding based on contextual variations and potentially a commercial impact by one or more of these variables. By centralising the knowledge environment and having shared experience across the environment, transparency is introduced, and these can be implemented in a significantly more effective way. Piening and Salge (2014) re-enforced the importance of this by focusing on process innovation outcomes, for example quality improvements or cost saving, as dependent variables rather than mediators. Therefore, offering a significantly more flexible approach to knowledge processes. Crossan and Apaydin (2010) suggested that existing studies missed the opportunity

to provide a more precise understanding of the mechanisms underlying this relationship. The KSC addresses this requirement by focusing explicitly upon the knowledge processes and their flexibility as part of process innovation, the mediators no longer limiting the

flexibility of process innovation and this being driven by the values of knowledge being transferred into physical knowledge assets.

5.3.3 KM Technology

Until this point within the KSC, KMT is seen to have a limited impact upon the ability to consume and maintain knowledge assets. Current technology platforms have significant capabilities in being able to adapt to business process needs and this can be seen in many of the leading ERP platforms such as SAP, InforM3 etc. Therefore, the focus has been predominantly upon gathering the knowledge and ensuring this is created into a suitable physical asset using the expertise of SMEs and knowledge workers and ensuring that technological processes are adapted to accommodate the knowledge asset as opposed to the converse.

At this point, knowledge distribution becomes a key factor within the knowledge life cycle. The findings in Chapter 4 suggest that many the participants suggest that technology should be used to a) distribute knowledge assets and b) secure knowledge wherever feasible to protect the organisation.

5.3.3.1 Pathway 5 – Knowledge Security

It is acknowledged within the organisation that once it has agreed to share knowledge back beyond the organisational boundary, there is very little chance that knowledge can be protected from further enrichment or mis-interpretation. However, some elements can be controlled such as knowledge spillovers or distribution of sensitive information such as trade price lists, commercial actions etc.

Introducing channel management as a controlling factor for knowledge sharing would allow the organisation to control which knowledge should be distributed to which consumers. Channel distribution can vary from organisation to organisation but from the perspective of this study, it focusses greatly upon the knowledge consumption for products and services consumed by paying customers. The main access points for these consumers are a) directly through one of the organisational branches or b) through the ecommerce platform.

Although the existing framework allows for a branch or the online platform to distribute physical products, the KSC allows the organisation to also distribute knowledge assets along with them. These could include, MSDS, user guides, application notes, media, regulatory information, safety notifications, training etc. All of which could be considered as part of the offering to an end consumer.

Knowledge security would be controlled through the availability of specific knowledge assets against physical products or services but maintained by the SME within the administrative processes of the KLC.

5.3.3.2 Pathway 6a – Consumer Distribution

Consumer distribution pathway 6a allows for the end consumer to absorb enriched knowledge assets which have been authorised by the SME to be shared openly. This pathway is an explicit transfer of knowledge between the organisation and the consumer. The distribution mechanism would typically be expected to be an electronic transfer of knowledge assets by electronic communication. This could be by either a) transmitting to a consumer email, b) re-directing a consumer to an online location to collect digital asset resources at their own discretion.

Option a) within the professional environment is always deemed to be the simple option however, has limitations and can lead to consumer frustrations. Some digital assets can be significant in size and will not pass through email systems as often size restrictions are placed upon the file transfer processes.

Option b) offers an open solution but has a dependency upon the consumer having sufficient knowledge with online processes, the knowledge required to navigate to the required asset and finally the ability to absorb assets using technical mechanisms such as shared web platforms. It also has a potential impact of any consumer being able to access assets and incorrectly consuming knowledge assets. Some products are dangerous in nature and the organisation should consider the approach of due diligence in its knowledge sharing to avoid amateur consumers putting themselves at risk by mis-understanding the application or use of knowledge, products or services who are not capable of absorbing such knowledge safely.

This could be avoided by only sharing knowledge assets by sharing with trusted consumers or alternatively apply a knowledge hub or learning centre as part of its online offering.

5.3.3.3 Pathway 6b – Consumer Distribution: Social Platform

Leading on from Pathway 6a, Pathway 6b offers an alternative approach for distributing knowledge assets by building a secure consumer social platform. By introducing a secure social platform and building trust relationships with consumers as well as providers, the loop is beginning to become complete in the knowledge management process and the KSC.

Social platforms emerged from the findings as a positive and potentially lucrative approach to communicate with consumers. However, it also emerged as a disconcerting opportunity and as such should be carefully managed. The findings suggested that the application of controls to manage such environments would be a pre-requisite for the application of any social environment. These controls align within existing common technological security approaches such as secure logins, user permissions control, and secure access areas based on consumer capabilities. Therefore, additional processes or considerations from the perspective of KM would not be required within the KSC.

Because of the historic nature of the business and the limited approach to online transactional mechanisms, there was limited feedback in this area but a significant thirst to apply such mechanisms in the future existed.

5.3.4 Consumer Feedback

Consumer feedback closes the loop of the knowledge process by feeding back knowledge based on knowledge asset provision to enhance existing knowledge as assets or in the words of participant 9:

"it is potentially one of the most valuable tools in our arsenal".

This ability to adapt to consumer requirements is very much seen as a key factor in the organisation's ability to remain at the forefront of its industry. Historically however, this has been very difficult, if not impossible in some cases to absorb and grow from. The consumer feedback cycles are shown in Figure 5.11 below:

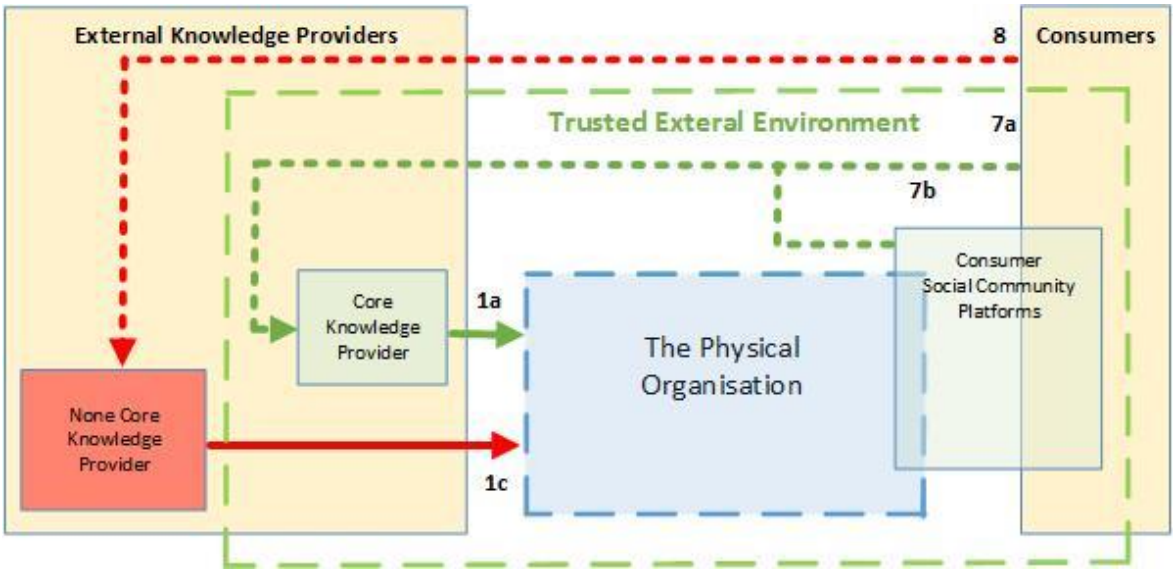

Figure 5.11 Consumer Feedback Cycle

The following pathways below in Sections 5.2.4.1 and 5.2.4.2 respectively consider the requirements of the findings and offer potential approaches to consuming this feedback into the KSC.

5.3.4.1 Pathway 7a – Trusted Consumer Feedback

Pathway 7a explicitly focusses upon a trusted relationship with a consumer and in such cases, the consumer becomes a CKP. By building this type of relationship with a consumer, it could be possible to strengthen relationships further with CKP manufacturers or CKP service providers. This being made possible by direct feedback from a consumer where a relationship exists, and they are defined as a CKP.

The theoretical notion being that by allowing the consumer to feedback knowledge, this can be then used by internal SME to further enrich existing knowledge assets. The SME can then use their relationship the CKPs to feedback enriched knowledge assets back to knowledge originator, to allow them to enhance their products or services further. This can offer significant benefits throughout the whole KSC and all key stakeholders within the process.

Of course, this approach can only be used for consumers who could be defined as a CKP. It would be expected that there would be insufficient trust from a consumer who could only be defined as a NCKP and thereby knowledge would not be consumed from such sources.

5.3.4.2 Pathway 7b – Trusted Consumer Feedback: Social Platform

Pathway 7b extends the capabilities of 7a by allowing consumers to participate and build relationships directly with the organisation. The application of social platforms would allow the organisation to share knowledge assets with preferred consumers more securely and also to offer a level of due diligence as discussed previously in Section 5.2.3.1.

Social platform generation may be applied from one of two perspectives a) a specialised platform for domain specialists allowing for the distribution of dedicated knowledge assets fit for that type of environment, or b) an open to all shared platform that allows complete coverage of all knowledge assets willing to be shared by the organisation. This being controlled by the relevant technical security mechanisms.

Furthermore, this could be controlled by only allowing access to the social platforms using the CKP and NCKP relationships as decision-making controls for the participant selection process.

This level of control would allow the organisation to manage who could feedback knowledge to the organisation based on access and permission levels within the social platform. For example, CKP level consumers could be allowed to feedback directly through a technical communication channel such as feedback forms or controlled email, whereas other less trusted consumers may only have access to consume and utilise knowledge assets as provided by the organisation.

5.3.4.3 Pathway 8 – None Trusted Consumer Feedback

For completeness, Pathway 8 is considered to allow for any consumers who do not fit into the CKP or trusted consumer group but may wish to offer feedback to the organisation. Although this approach offers the most risk to the organisation as it is essentially an open line of communication, it should not necessarily be dismissed. It may be that the consumer is new to the organisation or is in the processing of transitioning their own organisation to consume technological capabilities. Therefore, a lack of consideration could lead to missed opportunities or negative connotations of the perceived communication capabilities of the knowledge source.

Conversely, the organisation needs to be able to protect itself from negative feedback or damage limitation from potentially negative competitor practices. Consuming knowledge from an NCKP or untrusted sources inevitably takes significantly more effort for an SME to investigate, and then apply against a knowledge asset. Therefore, there are potential fiscal considerations to consider, and the amount of SME resource availability to apply against such activities.

Utilising the CKP and NCKP relationship types allows the SME to process knowledge far more rapidly and maximise the effectiveness of such knowledge for both the organisation and the send consumer.

5.3.5 Chapter 5 Summary

In this section, the proposed framework of Knowledge Supply Chain (KSC) has been discussed and the pathways that would be required to make the framework a success. Starting with provider relationships and EKA, the pathways reflected how the decision to accept incoming knowledge sources is handled and the different entry points to the organisation, based on these pathways.

After this, the position of the SME was discussed, particularly the importance of their ability to be positioned effectively across the acquisition and knowledge maintenance

processes within the KSC. Furthermore, ensuring that their position effectively impacts knowledge enrichment requirements.

From this point, the re-distribution of enriched knowledge assets was considered, ensuring that assets were distributed effectively based on the relationship with the organisation.

Finally, the topic of trusted consumer feedback was discussed and how this closed the loop for certain types of consumers, who were also providers of knowledge. This is a special case but exists in several different circumstances.

By considering these pathways and the KSC framework, it is offered as a theoretical framework to build upon extant theory. Furthermore, this is a framework with potential for a practical application based on the research domain.

CHAPTER 6: CONCLUSIONS

6.1 Introduction

This is the final Chapter and will focus on closing out the thesis with final thoughts and considerations for future research opportunities. Furthermore, it will highlight the contribution to the relevant academic body of knowledge, identifying theoretical contributions and the practical opportunities through the application of the KSC produced from the findings in Chapter 5.

This Chapter will then close out the thesis with reflections from the researcher's journey through the academic research process and the key factors impacting the underlying research and thesis preparation.

6.2 Implications

This doctoral research had the specific purpose of focusing upon the challenges faced within a professional organisation, pertaining to the lack of value being achieved from available knowledge within the UK market. Gaps identified within the professional environment were the initial catalyst for this thesis and used as the basis for further research used within this study.

The electrical wholesale market is essentially at saturation point from the perspective of the UK market. The environment has an annual turnover more than £4 Billion and approximately 225 wholesale organisations equating to approximately 80% of business carried out year on year. The organisation accounts for approximately 12.5% of the available market and thus makes the organisation in this study, one of the predominant wholesalers within the UK. The organisation employs approximately 4000 employees in the UK, equating to 18% of the overall environment.

There are few opportunities to expand with 400 branches spread throughout the UK and located in every major town and city, there is little opportunity for growth. Furthermore, the top five competitors within the same market can boast comparable figures.

The organisation has remained consistently profitable since the economic recession of 2008, due to its diverse operating environment and scale of products and services, but profit has not significantly increased in recent years. However, a pro-active approach has been undertaken to look for opportunities to move the organisation back into a state of growth as well as maintaining stability.

This study builds upon extant research and further extends research within the academic field of knowledge management by reviewing and building upon previous work, first considered by Nonaka (1994) impacts within internal manufacturing. Then further expanded more recently by Teese (2009) who considered knowledge management from the perspective of technological application and the impacts of organisational performance. Then even more recently by Al Saifi (2015), who considered the effects of EKA within the KM environment. This study contributes to the field of KM by looking at the individual components of previous extant research to understand what gaps have been identified and how these could relate to this study. Furthermore, understanding the previous approaches taken from extant research and how this applies to the original research question discussed in Chapter 1 to develop the theoretical KSC and further build on current theory.

This thesis began with Chapter 1 and an initial introduction to the environment and discussed the direction to be taken for the study. Firstly, by establishing the research question and then defining a set of research objectives as a premise to build on for the rest of this study.

Following on from Chapter 1, Chapter 2 followed with a comprehensive review of the extant literature and previous research pertaining to the knowledge environment overall then explicitly upon past KM frameworks. The first stage of the literature review in Chapter 2 was to cover the extant literature on knowledge acquisition. This was divided into two key areas 1) Knowledge Acquisition and 2) External Knowledge Acquisition. After considering the work of previous authors in this area (Al Saifi, 2015; Liao and Marsillac, 2015; Teece, 2009) a basis was established for generating questions for semi-structured interviews within these areas. Later in the literature review, the key areas for organisational culture and technical impacts were reviewed, again, establishing a basis from extant literature in this are (Al Saifi, 2015; Snowden, 2009; Zahra and George, 2002; Bukowitz and Williams ,1999). Therefore, this achieved Objective 1:

"1. Critically analyse the literature on the initial consumption of information into the organisation via external knowledge acquisition"

and also objective 2:

"2. Critically Analyse the literature on the organisational, cultural and technical impacts affecting KM within the organisational environment"

Both of which are set out in Chapter 1, Section 1.3.

One thing that emerged very quickly was that even today, there is ambiguity on the term knowledge management and what it means. From the perspective of this thesis, KM is defined as:

The ability to create, maintain and re-distribute knowledge effectively, not only within the boundaries of an institution or organisation but also beyond these boundaries and therefor beginning to more effectively utilise shared knowledge to greater effect.

With this definition in place, it aligns with the organisation's issues relating to how it could consume knowledge from many external sources, and the lack of ability to implement a suitable process to take advantage of these opportunities. Previous studies focused upon specific elements of the KM environment. However, within this context of this study, none offered a suitable end-to-end life cycle approach for KM from the perspective of knowledge acquisition through to knowledge distribution. Furthermore, with the capability to enrich and maintain this knowledge as a physical asset.

To address this gap in the current environment, the researcher started out on a journey of research and decided upon a qualitative approach, as discussed in Chapter 3 - Methodology. During the literature review, it became clear that a qualitative approach would be a far more effective method of analysing the environment and recording data. This being due to the potentially rich open-ended questions that emerged from the literature review in Chapter 2. Hence, allowing the researcher to have a significantly more in-depth insight into the environment and the current issues. Therefore, this achieved Objective 3 set out in Chapter 1, Section 1.3:

"3. To investigate and initiate an appropriate research methodology base to allow an effective result for the primary research aim"

The questions generated for the semi-structured interviews were open-ended in nature, with the premise of allowing the researcher to begin with an opening question and then delving deeper where applicable to understand issues at a greater depth. This resulted in a very rich data set as shown in Chapter 4, Data Analysis and Study Findings and then further built upon in Chapter 5, Discussion. Therefore, this achieved Objective 4 set out in Chapter 1, Section 1.3:

"4. To Analyse knowledge worker's experiences via the outcomes of the research methodology to understand the impact on an organisation's ability to consume, enrich and re-distribute knowledge"

All open-ended questions were directed towards the participants equally to ensure consistence of the approach, allowing the participant to be the governing factor in the direction of the responses. Upon completion of the interview process, the audio recordings were transcribed and analysed using Nvivo 11 as discussed in Chapter 4. The findings and analysis emerging from Chapter 4 were then discussed explicitly in Chapter 5, highlighting the outcomes of Chapter 4.

What emerged from the discussion in Chapter 5 was a theoretical framework defined by the researcher as the Knowledge Supply Chain or KSC as shown in Figure 4.54, p.227. This framework captures the key findings from the data analysis, but also identifies a theoretical approach for the transportation of knowledge through an organisation using knowledge pathways with the capability of crossing organisational boundaries. Therefore, this achieved Objective 5 set out in Chapter 1, Section 1.3:

"5. To introduce a new theoretical framework (KSC) to manage the knowledge life cycle as an independent concept"

This ability to transfer knowledge across organisational boundaries but within a cyclic process is believed to build on extant theory and offer new opportunities within the field of KM.

This study offers a theoretical framework (KSC) as a contribution to the practice of KM and the academic knowledge environment building on extant research. The KSC establishes the relevance of knowledge source types and relationships identifying CKPs, NCKPs and Consumers as crucial for an effective framework that could also potentially be applied within the professional environment. Furthermore, where previous research has considered the needs of the organisation for the advancement of knowledge management, this thesis focusses explicitly upon the importance of the knowledge itself and its existence as an independent knowledge asset as primary factor. The KSC clearly identifies the importance of linkages across inter-organisational boundaries, and the importance of relationship types (CKP, NCKP) to define the validity of knowledge an organisation would be willing to consume.

6.3 Contribution to knowledge

The first contribution to knowledge is:

> 1. The introduction of Knowledge Supply Chain (KSC), a new theoretical framework as shown in Figure 4.54, p.227.

This framework is offered as a solution which builds upon previous research approaches in the academic field of knowledge. Furthermore, it is offers a second contribution in that:

> 2. The KSC is a de-coupled framework that can exist independently from other organisational frameworks or dependencies.

As discussed in Chapter 2, previous frameworks such as Bukowitz and Williams (1999), Snowden (1999) and more recently, Liao and Marsillac's Conceptual Framework (2015) have been affected by organisational factors such as being tied to manufacturing processes, R&D processes, the supply chain, the value chain or being explicitly driven by other organisational determinants. Although typically, organisational applications are driven by commercial viability or the need to apply knowledge against one of these factors, this research has shown the KSC framework can theoretically exist entirely independently and be explicitly knowledge focussed. For example, establishments such as learning institution may be able to use such a framework to develop knowledge assets for enriched knowledge bases and not for commercial gain or simply a narrow contributor to other frameworks.

This study has considered lessons from previous research and moved away from the narrow focus offered within KM environments when applying knowledge against an existing organisational determinant, constructing a broader focus which encapsulates a knowledge environment that could gain significantly more value from knowledge than previously considered. This achieved by the ability to consume knowledge from a greater number of knowledge sources beyond the organisational boundary, then capturing this within physical knowledge assets via experienced SME involvement. Therefore, the third contribution is:

3. The ability to consume knowledge from many sources without being restricted based on tightly bound organisational capabilities.

As discussed earlier in Section 6.1, the saturated electrical wholesale market offers few opportunities to gain market share or competitive advantage currently. The KSC framework offers a novel solution whereby the extension of the term knowledge is power is extended to knowledge sharing is power. Furthermore, it considers enhanced or enriched knowledge value as a potential forward-thinking approach to allow an organisation to a) remain competitive in the current volatile market and b) offer opportunities for growth by becoming knowledge leaders within the marketplace.

This approach offers a more pro-active opportunity to working with providers and consumers, building mutually viable relationships and allowing potential growth for the organisation, and the growth of knowledge for both the organisation's providers and consumers. This approach not only offers potential benefits for the organisation but also its knowledge partners and as such offers a potential framework that enhances knowledge more than previous frameworks. Therefore, the fourth contribution to knowledge is:

4. The application of new knowledge relationship types 1) Core Knowledge Provider (CKP) as discussed in 4.3.4.1 and 2) None Core Knowledge Provider (NCKP) as discussed in 4.3.4.2.

This offering of variable controlled relationship types offers a way of managing knowledge sources entering the organisation. Furthermore, these relationships define the requirements for all sources of knowledge, and as such, knowledge provision must be applied against one of the relationship types. In addition to the typical sources of knowledge, this study also offers a fifth contribution of:

5. The introduction of the knowledge consumer as an alternative source of knowledge provision as discussed in 5.1.4.

The application of the consumer as a knowledge source, completing the overall cyclic process for the knowledge flow.

Although, the KSC is a stand-alone framework, it could theoretically be aligned with other organisational processes such as supply chain to offer potential financial gain, in addition to a rich knowledge base for all stakeholders. This could potentially incentivise an organisation to consider the application of the KSC as a financially viable framework as part of its organisational infrastructure. Therefore, this study concludes that knowledge consumption could easily be defined as just as crucial for organisational renewal as other essential frameworks or mechanisms i.e. the supply chain previously discussed (Keupp *et al.*, 2012; Reichstein and Salter, 2006; Hatch and Mowery, 1998).

6.4 Contribution to the Professional Environment

Section 6.2 above discussed the contribution to academic knowledge as the primary outcome of this doctoral study; by building upon the theoretical concepts in the field of knowledge management and its capabilities. However, this journey originally started within the researcher's organisation and as such, there are also contributions as outcomes of this thesis which could be considered within the professional environment. On many occasions during the data collection process discussed in Chapter 4, key knowledge workers within this environment alluded to the need of an applicable framework or at the very least an understanding of the key issues relating to their KM issues.

This topic was very important to the study environment and there was a significant interest shown when participants were initially approached to participate within the data collection element of the study. Further to the study, participants fed back to the researcher that simply by talking about the issues, gave them a clearer insight into their own issues faced daily from a different perspective. In general, the feedback from all interview participants was extremely positive and was deemed, in some cases, a mechanism for progression in their own approaches to, and thoughts about, knowledge management.

The data collection was spread across knowledge workers at each level of the organisational hierarchy to ensure that a sufficiently broad understanding of the problem domain was captured. This allowed the researcher to collect data to such a level whereby there was clear linkage between the expectations of key stakeholders of knowledge workers directly affected by knowledge management practices.

The study identified many related key factors emerging within the organisation but also within the marketplace itself which directly affected its ability to consume knowledge effectively. Therefore, the first contribution is:

1) The KSC framework as shown in Figure 4.54, p.227 that could be practically be applied against the organisational environment to meet the KM needs of the organisation.

The KSC could practically be applied by considering:

2) KM centralised knowledge processing

KM centralised knowledge processing: Emerging from the data in Chapter 4 was the difficulties of teams or departments relating to ownership and knowledge assets, and ownership of relationships with providers. Without having sufficient experience to fully understand and process this knowledge effectively, this is leading to inefficient processes and contextualised knowledge assets. This further led to teams or departments storing similar knowledge assets in disparate or silo'd knowledge stores, causing confusion about which knowledge asset was the correct one to use. What emerged from the data in Chapter 4 was the belief that centralised ownership of processes and assets would be more effective.

This has a direct impact, when a consumer works with more than one team or department within the organisation, they are receiving differing versions of knowledge from a single organisation. This has several potential impacts 1) a lack of confidence from the consumer about the knowledge being provided 2) a potential commercial impact whereby a product or service is not fit for purpose and 3) potential safety concerns where a none SME has defined the validity of the knowledge asset. Therefore, centralised ownership of knowledge processing with accountability from the relevant SME would alleviate such issues with consumers.

3) KM centralised knowledge team

In addition to ownership of the knowledge processes and assets, the positioning of the SME was a crucial factor from the organisational perspective emerging from Chapter 4. Historically, the SME is typically assigned against a team or department as a resource to an area of the business. However, emerging from the findings in Chapter 4 was that knowledge workers believed that the SME should be an organisational level asset and their knowledge be absorbed as part of a shared knowledge pool as part of a centralised KM team. At the very least an SME should span multiple areas of the organisation. Therefore, locating an SME within a single team or department of the organisation was seen a waste of SME resource that could be used more effectively across different areas of the organisation.

4) The application of knowledge source relationship types as part of the knowledge provision acceptance criteria.

KP Partnerships via CKP and NCKP relationship types: The organisation could take advantage of existing access to KPs and their willingness to share knowledge openly through the application of the provider relationships. Currently, this is only done on a commercial need basis, only allowing an SME to work directly with a provider when market trends require this. Furthermore, a sub-contribution could be:

4a) The introduction of knowledge working parties based upon the application of the CKP relationship type against trusted knowledge providers.

Consensus from the SME suggest that it would be more beneficial to conduct more knowledge working groups with providers, especially during quieter periods and be pro-active as opposed to re-active in their approach to knowledge acquisition. If this was aligned against the CKP relationship type, potentially working groups could be implement that offer mutual viability for all participants.

Opportunities 2-4a listed above could be applied independently without the need for a framework and potentially offer benefits for the organisation, however, applying these against the KSC is expected to offer a comprehensive solution to achieve the KM needs of the organisation.

6.5 Thesis Credibility

The resolve of this thesis was to understand the implications affecting the transfer and consumption of knowledge across inter-organisational boundaries. Initially starting within the study environment and a question on how to gain value from knowledge not being used effectively in Chapter 1. From there, investigating the issue, within the academic knowledge environment in Chapter 2 reviewing extant literature, to understand how the knowledge environment has evolved over time and how this could be considered within the context of this study.

As discussed earlier in the chapter in Section 6.3, the findings from Chapter 4 offer contributions to both the professional environment and the academic field of KM. Firstly, contributing a theoretical framework that builds upon previous research and the understanding of existing knowledge processes. Secondly, offering applicable findings to the professional environment by highlighting key issues relating to existing knowledge processes and issues emerging from Chapter 4.

The qualitative approach to this study added significant value to the findings due to the researcher's access to knowledge workers within the study environment and rich source of data available. With the average time working as a knowledge worker being 18.8 years and total combined years of experience of 357 years for the participant cohort, this offered a significant insight into the working environment of experienced knowledge workers. Furthermore, with knowledge workers consisting of front line, policy makers and business leaders, it gives a complete overview of the organisational environment and the impacts affecting KM at each level of the organisation.

The qualitative approach to the data collection process ensured that the researcher could deviate from the initial line of questioning during the interview process to gain as much detail and possible. This lead to the researcher gaining an extremely rich dataset from the semi-structured interview process with a wordcount of approximately 102,000. This made the findings section extremely valuable, offering crucial insights across the organisation knowledge processes spectrum and allowing for the effective building of relationships, thematic nodes and associations within the themes that inductively emerged within Chapter 4.

As discussed previously in Chapter 4, the data collected ensured that, in addition to the rich data sets, rich themes were built in accordance with qualitative research methodology and offered a way of consolidating findings effectively. Furthermore, the themes allowed for the grouping of key elements directly affecting nodes within the thematic structure. This coupled with the capability of NVivo V11 to build relationships between node based

thematic structures allowed for the outcome of comprehensive node based thematic clusters. These in turn were used to develop the KSC theoretical thematic framework as an outcome of the findings from Chapter 4 as shown previously in Figure 4.54 and then discussed in detail in Chapter 5.

6.6 Reflections

During this experience of producing a thesis as part of the PhD process, the researcher went through a lot of personal changes. Through discussions with other academics, study supervisors and work colleagues, many came as a surprise and will be discussed in more detail in this section.

This section is written in the first person.

I started this journey five years ago and I had a pre-conceived idea of what the journey was going to offer and how I was going to approach it. I have always had a passion for further education, both academic and professional and to promote this within my workplace as something which should always be part of continuous personal development. Sitting at work with my manager, she asked if I would be interested in a PhD course, especially as I had direct reports working for me who already held PhDs. This was something I had already considered and thought this was a great opportunity and the next logical step in my own personal development.

The first step in my PhD journey started with me having several meetings with Professor Teresa Waring to discuss my current environment, gaps in extant literature and opportunities available for research. Having worked for many organisations, who I felt suffered with the same issue relating to inter-organisational knowledge sharing, irrespective of the organisational domain, it was easy for me to close in on the topic covered within this thesis. With the backing of Professor Waring the part- time PhD began. The topic selected was one which was of interest to me, as one I have seen challenging several professional organisations during my years of experience. It was also interesting when I began to review the extant literature and see that the same challenges exist within academia too, all be them expressed in a different way and in different contexts and situations.

As a seasoned technical expert and chartered fellow of the British Computer Society (BCS) as well as other governing bodies, I approached this in a professional capacity but quickly realised that I had to separate my professional and academic careers if I was to be successful (James and Vinnicombe, 2002). As I had been out of academia for a while, my whole approach to the PhD process was based on business terminology and methods. I

had to learn to adapt and gain the ability to switch into academic mode for the PhD study and switch off completely from my professional persona. Being able to switch to research student was challenging, however, the feedback of my supervisors made this transition between two roles easier by guiding me in the early stages.

My early concern was, how would I approach a research project as a senior manager and how would my direct reports respond and particularly how they would respond to interview questions. Having a great relationship with my direct reports, I advised them in advance that they should think of me as a researcher and not their boss (Cunliffe, 2011). I need not have worried as the outcome of the interview process highlighted that the responses of my direct reports were comparable to knowledge workers whom I interviewed and had no professional relationship with, other than working for the same organisation. I believe this is partly because I operate a team where openness and creativity are encouraged to allow free thinking for our problem-solving activities. However, it is inevitable that my experience as a senior knowledge worker may have a minor impact (Cassell et al., 2005) from the perspective of deriving the questions from the literature review. To remove this bias, I confirmed the questions and the information that they were derived from in the literature review in Chapter 2, by asking knowledge workers from outside of the study to review them and verify that they were objective in nature and focussed purely on the emerging issues. Furthermore, by minimising the impact of my perspective and remaining objective (Day, 2012) on both the data collection process and analysing the findings that emerged from Chapter 4, the resulting data set was seen to be richer in nature. This self-reflective view, particularly from the perspective of interaction with the interview participants let me approach the data collection process with what I believe was with the minimum amount of personal bias. This approach allows me to offer a positionality to this study that reduces the impact of subjectivity from the participant and remove philosophical commitments (Gill and Johnson, 2010). Furthermore, learning how I remove subjectivity from research activities, as part of this process, has made me a better researcher.

As I began to evolve into the study over the first 24 months, I became more and more comfortable with the process and began to accelerate my learning processes as well as how to approach problems from an academic perspective. I also found the literature review a difficult concept initially as I was eager to get straight into the data gathering and analysis stages of the project. With the help of my new primary supervisor Dimitra, I understood the value of performing a thorough literature review to consider what the extant literature had to offer. Furthermore, this helped to develop the correct approach to the chosen methodology and to define suitable data collection tools and processes to ensure that this happened correctly.

As an experienced professional in the information systems domain, some of the findings which began to emerge from the data did not surprise me. However, some did take me by surprise, the difference in knowledge between younger and older knowledge workers. Senior knowledge workers had a complete and thorough understanding of products and services and were able to offer comprehensive guidance to our consumers. The younger knowledge workers could also offer this guidance; however, this knowledge was not understood but rather acquired using technology. Therefore, a clear issue was raised in that knowledge is being lost due to technology dependency. Technology allows professionals to essentially offer guidance based on technological findings rather than experience and knowledge gained over time. As a senior manager I did find this a little concerning and included this as a recommendation for further research later in Section 6.6 as a potential further research opportunity.

As I worked through the data collection and analysis stages, I had to begin to manage my time very carefully. As a busy full-time senior employee of a global organisation, I had to ensure that neither this nor my studies became compromised. Suddenly, the last two years of the study schedule became a very short period indeed! There is no doubt that my personal life suffered during this period and my guidance to anyone undergoing this path in the future is to prepare in advance for the impact the last 12 months will inevitably have on your life. I did prepare for this by discussing with my wife the challenges that were to come as well as dedicating holidays periods and other free time completely to this process. I thoroughly enjoyed the data collection and analysis stages too as this played very well into my key strengths.

As challenging as all this was, the last 3-4 months have felt incredibly rewarding when it all begins to come together as a final deliverable. Anyone pursing a PhD in the future should be prepared for a lot of commitment to the process and the challenges, but certainly for myself, I have found it a very rewarding experience.

6.7 Study Limitations

This study like others has limitations and these are highlighted here to help others on their research journey. Although these limitations are present, they could be considered as part of future studies in the same field.

1) This study was carried within the UK electrical wholesale environment and as such the scope was limited to this domain. International electrical wholesale environments and other business types were not considered. It is not appropriate

to accept that the framework emerging within other business areas without further investigation. The KSC could be a starting point for further research in other business areas.

2) The framework in this study is based on the responses from SME's within the electrical wholesale environment. These domain experts while, knowledgeable have experience within this domain only and it should not be expected that their responses are valid across a) other business areas or b) international organisational boundaries.
3) The knowledge provider types emerging from this study are based on the knowledge sources within the scope of this study. It should not be expected that the CKP and NCKP would be suitable for all business environments. However, these would make an excellent starting point to investigate knowledge provider types in other business areas.
4) Although this study had the backing of the organisation within this study, it should not be expected that all organisations would consider that knowledge has a value without financial return. This study is based on the value of knowledge for the knowledge asset and not commercial gain. This being said, the KSC framework emerging from this study could be considered for further research opportunities within academic or none profit environments.

6.8 Recommendations for further research

This study encountered several areas that could be considered as opportunities for further research that falls beyond the scope of this doctoral thesis.

1) Application of the theoretical framework within other organisational environments.

As discussed, the KSC is an independent framework and can theoretically be applied against other organisational types. As the KSC is predominantly focused upon the knowledge asset as opposed to the organisation, it is assumed that it could potentially offer value to none commercial organisations, learning institutions or organisations wishing to implement an inter-organisational knowledge sharing learning hub. The knowledge provider relationships discussed in the Chapter 5, and shown in Figure 5.3, could be applied against other organisations to confirm the relationship types with differing organisation types. When considering such organisations, variables for the relationship

types would need to be adapted to reflect the controlling factors of knowledge within that environment. This could be considered as an extension of this study.

2) Aligning the KSC framework with other frameworks

Although the KSC is defined as an independent framework, it shares similarities with some other frameworks i.e. supply chain. Further research could be undertaken to apply the KSC against a supply chain framework, integrating frameworks to align with knowledge transitions through the organisation. Typically, within professional environments products move through organisations to reach the customer; this could be aligned with knowledge assets to offer a richer customer experience.

3) The impact of technology upon the physical ability to understand and retain knowledge.

One key area that kept emerging from the findings was the lack of knowledge by younger SME within the organisation, due to how they learn about the products or services offered. More senior staff within the organisation are experienced in working with physical products or services. This has built a level of experience with senior SME who understand what the physical product or service is, but also understands the capabilities of these items. Younger SME appear not to be able to retain the same quality or level of knowledge as more senior SME due to the reliance upon technology. Access to knowledge search via technology by younger SME allows them to access to knowledge quicker than was possible in the past. Senior SME believe that this approach only offers partial knowledge based on the question asked and is not allowing them to fully understand the offerings. Therefore, the ability to gain access to knowledge is rapid but the ability to consume all the relevant knowledge or knowledge retention is seen to be affected negatively by technological advancements. Further research in this area could be an opportunity to understand the effects of knowledge consumption based on the delivery mechanism.

4) Quantitative study on the practical application of the KSC

The application of the KSC within the professional environment could offer the opportunity to measure the effects of the framework within the physical environment. There is an opportunity to extend this research further by conducting a quantitative study to establish if levels of certainty could be applied against the findings from this study by applying the framework within a professional environment and measuring the effects.

6.9 Chapter 6 Summary

Chapter 6 began with a brief introduction to the section before moving into a review of the implications posed for the research problem and the environment under investigation.

Contributions were then discussed, beginning with the contributions to knowledge and then contributions to the professional environment that are identified as an outcome of this thesis. Next to be discussed was thesis credibility and the implications for this work as part of the research problem and the approach to finding a resolution.

Reflections were then discussed in the first-person perspective allowing the author to discuss their journey and positionality within the overall process.

This section concludes with recommendations for further research that have emerged from the findings of this thesis.

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Appendices

Appendix 1

Background of the researcher

The researcher is a mature student who has over 25 years' experience within the technology and data management domains. During this time, the researcher has worked in both the public and private sectors and encountered many knowledge and information related issues. The researcher has played key roles in developing healthcare systems for the North-East UK area. These systems providing effective solutions for Paediatrics, Social Services, School Health, New Births and Immunisations and Vaccinations care. He also developed the management solution for the first walk-in Centre which opened in Peterlee, Co. Durham and dealt with the sporadic and none complete nature of the information captured within that environment due to the very nature of how they operate. The Centre was opened by the Chief Executive of the NHS Sir Nigel Crisp (who is now Lord Crisp).

The researcher has also spent many years working with the Emergency Services, again on mission critical, real-time information solutions to help ensure public safety. Working on complex analytical and graphical processes for assisting in enhancing such public services. Provision of the Analytics and Metrics were for submission to the Office of the Deputy Prime Minister.

The researcher has worked independently as a consultant to both private and public-sector organisations, including the NHS and many private multi-national organisations. Much of this time was spent developing novel information solutions to help gain market share, knowledge acquisition and learning environments as well as many other technology-related activities. At the time of writing, the researcher is employed as the Head of Data and KM for one of the largest electrical wholesalers and uses this environment to bridge the gap between the academic and professional environments and to try to achieve a level of equilibrium within his work.

The researcher is also a Chartered Fellow of the British Computer Society, since 2010, and actively participates in debates, meetings and conferences on topics that impact both professional organisations and the academic worlds. This allows him to share his own knowledge and experiences with others while trying to work to ensure sound practices and organisation standards at a national level.

The researcher started his journey towards achieving a PhD for two reasons, the first is to advance his academic education to a higher level, and secondly to investigate potential opportunities to further the understanding within the knowledge environment. Over the past few years, a successful career within the KM domain has driven the researcher down a very professional training path, with many professional accomplishments such as the BCS accreditation previously discussed but also other awards such as Microsoft certifications, Information governance and data management accreditations. During this time, the researcher has worked with, and employed PhD graduates, many of which have suggested that the

researcher should return at some point and achieve a PhD status. This is also something the researcher wanted to pursue, but career requirements often meant working within other geographic regions and on very large projects reducing the time and availability to give the full commitment required to achieve a PhD. Since returning to the UK and changing employment to a local organisation, it became possible to pursue this opportunity.

The nature of the researcher's professional work also leans very well towards carrying out a research project, being a technical problem solver and solutions expert.

Appendix 2

Data Collection Instrument: Semi-Structured Interview Questions

Research Instrument Development Table					
Questions Type Definition	Open Ended Questions	**Scale Type**	N/A	**Pilot Population Count**	5
Technology Mechanism	Interview	**Delivery Mechanism**	In-Person	**Target Population Count**	19

Objectives/ Research Questions	**Core Area**	**Primary Research Topics/Points (From Lit)**	**Interview Questions**
Knowledge Sharing: To understand the community perception of the core enablers for knowledge sharing beyond the organisational boundary.	Knowledge Sharing External Knowledge Acquisition	Q Ref: 1.1 External knowledge sharing can help overcome internal innovation barriers and have a positive effective on an organisations performance by increasing the knowledge base beyond the organisational boundaries. Q Ref: 1.2 Does Absorptive Capacity as a dependent variable of process innovation have a positive effect Q Ref: 1.3 Does Absorptive Capacity as an Independent variable become a pre-requisite for having a Dynamic Capability as a dependent variable Q Ref: 1.4 C1: Organisational determinants act as a barrier to process innovation, within the context of intra-organisational knowledge sharing Q Ref: 1.5 C2: Members of intra-organisational social groups should be engaged and knowledgeable to be able to have a positive effect on suitable knowledge transfer capabilities	How do you feel knowledge or information acquired from outside of the organisation helps to enhance existing processes and process development within the organisation? What do you think are the key issues relating to the flow of information moving through the organisation, from supplier to consumer? What value do you think there is in consuming knowledge relating to none-product related information? How do you think an organisation learns from the knowledge it consumes from external sources? What are the key values required for people selected to engage within intra-organisational knowledge sharing communities? What do you think are the important factors to consider for having a relationship with a knowledge supplier? Do you think that enriched knowledge needs to have a level of protection against further enrichment by external sources to avoid mis-interpretation?

Objectives/ Research Questions	Core Area	Primary Research Topics/Points (From Lit)	Interview Questions
Knowledge Consumption: To identify the core strategies and enablers to consume externally acquired knowledge as part of internal KM processes.	Knowledge Consumption Intra-Organisational relationships Knowledge Transfer	Q Ref: 2.1 C3: Organisational culture has a direct impact upon an organisations ability to consume external knowledge Q Ref: 2.2 External knowledge acquisition can strengthen an organisations process creation capability by enriching existing knowledge capabilities. Q Ref: 2.3 Does externally acquired knowledge have a positive impact on internal R&D Functions Q Ref: 2.4 supply chain effectiveness positively impacted by an organisations ability to consume external knowledge and the "Knowledge Supply Chain? Q Ref: 2.5 Intra-organisational relationships are crucial to effective external knowledge acquisition and knowledge sharing Q Ref: 2.6 Does the size of the Supplier pool have a positive effect on the knowledge acquisition strategy? Q Ref: 2.7 Can the deterministic attributes of AC be used in a holistic process innovation strategy?	How do you think information from outside of the organisation needs to me processed and managed? What benefits do you think are available from communities working together on the consumption and sharing of knowledge? i.e. internal and external to an organisation Which core values do you think play a key role in an organisation's KM processes? I.e. governing rules of how information/knowledge is consumed? What do you think are the key requirements are for an organisation to be able to change its capabilities to consume external knowledge? What value do you think there is in having a large or flexible source for knowledge coming into the organisation?
KM Culture: To understand the key issues affecting an organisations ability to consume and re-distribute	KM Culture Knowledge Processing Intra-Organisational Relationships	Q Ref: 3.1 C4: Centralised organisation's offer the best opportunity for the successful integration of externally acquired knowledge. Q Ref: 3.2 A de-centralised, low formalised organisational structure will have a positive impact on the ability to create effective knowledge sharing supply chain processes.	Within an organisation, how do you think teams or departments need to be structured to offer the most value for processing externally acquired knowledge? What do you think are the key issues relating to working practices and their need to be able to adapt for knowledge to be consumed into existing

Objectives/ Research Questions	Core Area	Primary Research Topics/Points (From Lit)	Interview Questions
knowledge both within the organisation and to external partner organisations.		Q Ref: 3.3 Does a dynamic supplier network offer more process innovation opportunities for the internal supply chain process? Q Ref: 3.4 The involvement of communities of practice would have a positive impact on knowledge consumption and knowledge sharing. Q Ref: 3.5 Artefacts and espoused beliefs as “independent variables” would have a positive effect on a process innovation strategy. Q Ref: 3.6 A flexible KM framework via the application of an effective “Knowledge Model” would have a positive effect on the competitive advantage of an organisation Q Ref: 3.7 Knowledge Sharing requires an organisational culture of commitment to KM for it to be effective Q Ref: 3.8 Intra-organisational relationships are crucial to effective external knowledge acquisition and knowledge sharing Q Ref: 3.9 Organisations which have the capability of adapting to cultural changes allow for a positive effect on knowledge as an Asset Q Ref: 3.10 Formalised core values with a capability for flexible changeable attributes can have a positive effect on the cultural impact of KM upon the organisation	systems and processes? How do you think a culture of problem solving and creativity could enhance KE processes? For KM to be successful within an organisation to aid Knowledge Sharing, why do you think commitment from all levels of an organisation would be important?

Objectives/ Research Questions	Core Area	Primary Research Topics/Points (From Lit)	Interview Questions
Organisational Factors: To understand the organisational impact on KM processes.	Supply Chain Process Innovation Organisational Alignment Leadership	Q Ref: 4.1 The application of a “Knowledge Supply Chain” against the process innovation perspective could have a positive effective for the organisation and supplier relationships Q Ref: 4.2 Supply chain effectiveness is positively impacted by an organisations ability to have flexible processes which can change to allow for the consumption of external knowledge Q Ref: 4.3 C5: Organisation performance defined as an dependant variable have a positive impact upon process innovation Q Ref: 4.4 C6: Organisational enhancements defined as dependant variables have a positive effect on process innovation Q Ref: 4.5 Intra-organisational relationships are crucial to effective external knowledge acquisition and knowledge sharing Q Ref: 4.6 How do we introduce a framework for inter-firm relationships that allow for the flexible adoption of antecedents and contingencies to support the development of innovative processes? Q Ref: 4.7 Knowledge Acquisition for the purposes of improving the quality of the supply chain process is not explicitly dependent upon internal Innovation Q Ref: 4.8 Process innovations via the use of External Knowledge Acquisition can contribute to the fiscal success of an organisation	How do you think streamlined processes affect relationships with suppliers and other external bodies who you share information with? i.e. information shared via the web, punch out catalogues, SDS, etc. How do you think an organisations performance could be used as a factor for impacting existing processes or creating new processes? How do you think a KM framework that includes participants from outside of the organisational boundaries could affect KM processing? Which areas do you think are most effective as part of an organisations process innovation capabilities?

Objectives/ Research Questions	Core Area	Primary Research Topics/Points (From Lit)	Interview Questions
		Q Ref: 4.9 Process Innovation can have a positive effect on the organisation without the need for Product Innovation on the supply chain process Q Ref: 4.10 C7: The alignment of organisational factors to define innovative processes has a positive effect on the supply chain Q Ref: 4.11 C8: The requirement for multi-dimensional factors as variables within the process innovation strategy has a positive effect Q Ref: 4.12 Broad organisational involvement in process creation requirements is more effective than independent innovation activities Q Ref: 4.13 Dynamic capability as a dependent variable of absorptive capacity would allow for flexibility within the process innovation strategy while minimising the need to completely re-invent a given process	
5. KM Technology:	Knowledge Application Integration Barriers Enablers Knowledge Protections	Q Ref: 5.1 Social networks have a positive effect on knowledge creation capabilities Q Ref: 5.2 Can a cost benefit analysis of an organisations investment in EKA (External Knowledge Acquisition) show a positive impact upon the supply chain process? Q Ref: 5.3 C9: The capability to consume effective knowledge is dependent upon the source on which it is drawn from and the quality of the relationships between provider and consumer	How much do you feel that social networks play a role in the consumption and distribution of knowledge and information? What barriers to knowledge sharing do you see from technology costs? How do you think that a) technology could be used to avoid valuable knowledge being accidentally shared with competitors or external partners? And b) what would be the reasons for managing this issue? Which areas of technology do you think are

Objectives/ Research Questions	Core Area	Primary Research Topics/Points (From Lit)	Interview Questions
		Q Ref: 5.4 Knowledge Acquisition for the purposes of improving the quality of the knowledge supply chain process is not explicitly dependent upon internal Innovation Q Ref: 5.5 Mechanisms implemented internally can have a positive effective upon the control of knowledge spill overs Q Ref: 5.6 Technology dependency is a single factor within the process innovation strategy Q Ref: 5.7 Technology dependency is a pre-requisite of the implementation of process innovation strategy Q Ref: 5.8 C10: Technology solutions act as an enabler to innovation effectiveness for employee creativity and cross-boundary learning	essential as a pre-requisite for efficient KM processes?

Appendix 2

Request for Information

Colin Richardson
University of Northumbria
Newcastle-upon-Tyne
NE1 8ST

Title of Research: "Towards a framework for the management of knowledge as an asset within a global electrical context: Pathways for navigating Inter-Organisational boundaries"

Dear participant,

I would like to invite you to participate in a research study as named in the title above. I am currently enrolled in a PhD research course at the University of Northumbria, and in the process of writing my Thesis. The purpose of the research is to determine:

"How can the knowledge management life cycle be detached from existing organisational processes as an "autonomous entity", taking into account the knowledge acquisition, physical organisation and technical factors required?"

I would like to interview you as part of this process to gain an understanding of the issues which affect you and are relevant to this study. Your involvement will be to participate in a semi-structured interview with open-ended questions. This should take approximately 45-60 minutes to complete

Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your individual answers to these questions.

I would be grateful if you could please respond by 01/06/2017 to colin.richardson@northumbria.ac.uk

If you have any questions about this project, feel free to contact DR Skoumpopoulou (lead supervisor) at the University of Northumbria on (number removed)

Thank you for your assistance in this important endeavour. I appreciate how valuable your time is.

Yours Sincerely

Researcher: Colin Richardson

Appendix 3 NVivo Outputs – Initial Thematic Nodes Structure prior to inductive coding

Name	Description
Initial Theme	This is the initial theme deriving from the literature review.
External Knowledge Acquisition	nodes relating to knowledge being consumed from outside of the organisational boundary
Inter-Organisational Relationships	Key elements of inter-organisational relationships
Knowledge Acquisition	Knowledge Acquisition
Knowledge Management Culture	Impacts of KM culture and relationships to organisational Culture
Knowledge Sharing	Key influences of knowledge sharing
Organisational Culture	Elements of organisational culture directly influencing knowledge acquisition, consumption and sharing.
Knowledge Management Technology	

Appendix 4 NVivo Outputs - Total Thematic Codes Node Structure post inductive coding

Name	Description	Sources	References
KSC Knowledge Supply Chain	A physical framework for the consumption, processing and distribution of knowledge within an intra-organisation environment.	14	59
Knowledge Acquisition	Top Level Factors affecting Knowledge Acquisition	13	43
External Knowledge Acquisition	The physical elements affecting the consumption of externally acquired knowledge.	8	14
Knowledge Selection	(placeholder)	17	63
Consumer Knowledge Provision	Knowledge provide back to the organisation via the end consumer.	3	3
Core Knowledge Provider Provision	Explicit sources of knowledge from trusted partners or external organisations. This could lead to trusted consumption of explicit knowledge or knowledge assets.	8	12
None Core Knowledge Provider Provision	None preferred knowledge suppliers with no direct relationship or capability of guaranteeing knowledge quality. Requires significantly more effort to add value or integrate into processes.	4	5
Knowledge Type Consumption	The types of knowledge to be consumed from the selected knowledge sources.	13	30
Explicit Knowledge Transfer	Explicitly consumed knowledge, typically in a pre-defined format or consistent format.	9	12
Knowledge Availability	The availability of knowledge from a knowledge provider.	6	8
Tacit Knowledge Transfer	Issues relating to the tacit transfer of knowledge to an effective explicit knowledge asset.	2	3
Unstructured Knowledge	Knowledge consumed from outside of an organisational boundary with no direct application or requires the need for enrichment or validation.	5	7
External Non-Product Related Knowledge	Any information not related to products explicitly but have a level of value to an organisation.	8	16
Domain Space Knowledge	Knowledge about the environment rather than physical products or services. i.e. legislative or environmental factors	5	13

Name	Description	Sources	References
Knowledge Application	Knowledge gathered for the purpose of the application of knowledge or specialist knowledge pertaining to the use of a) other knowledge, products or services.	4	6
Knowledge Source Availability	The different types of sources for knowledge acquisition and factors affecting the consumption of this knowledge.	4	5
Consumers	Knowledge providers typically recognised and end consumers.	5	7
Key Knowledge Providers	The physical key knowledge sources available to an organisation.	17	105
Knowledge Provider Selection Process	The key values that make up the knowledge supplier selection process	17	103
Consumer	Knowledge Consumer Specific Values	1	1
Espoused Beliefs	A belief in the knowledge area and what it takes to make it effective.	0	0
Subject Matter Expert	Expert in a specific knowledge area	1	1
Core Provider	Core knowledge providers. These providers have strong relationships with the organisation and a higher level of trust.	15	55
Credibility	The credibility of a knowledge supplier	1	2
Financially Viable	Whether the knowledge source is a financially viable relationship.	2	7
Known Brand	The positive affect of a known brand.	1	2
Reliability	Reliability as a key value of a knowledge supplier.	5	6
Traded Longer than 5 Years	Key value of a preferred knowledge supplier	2	6
Trust	Trust as a key value of a preferred knowledge supplier.	8	9
None Core Provider	Minimum values for selecting a none core knowledge supplier.	7	23
Commercial Viability	(placeholder)	2	2
Competitive	Key value for selecting a none-core knowledge provider.	0	0
Provision Justification	Justification of consumption from provider that is not a core provider	2	4
Subject Matter Experts	Subject matter experts having empowerment over the selection of none core knowledge providers prior to knowledge consumption.	0	0

Name	Description	Sources	References
Time Sensitivity	A Time limit set on the availability on the provider one products, knowledge or services	1	5
Risk Factors	Risk factors relating to knowledge supplier relationships	1	2
Knowledge Management Technology	The physical effects of KM processing within the technical environment.	3	3
Barrier to Success	Barriers to success due to the effects of technology.	7	16
Knowledge Protection	Factors affecting the importance of technological solutions to knowledge protection.	3	5
Globally Accessible	The importance of globally accessible knowledge and its accessibility	8	8
Internal Permissions Access	Factors affecting the need to use technology to control access to knowledge.	7	11
Knowledge Security	Issues relating to the physical security of knowledge and knowledge assets	13	27
Prohibitive Costs	Where technological costs have a direct impact on the effect of processes	7	8
Social Community or Shared Platforms	Factors affecting the use of social platforms or shared spaces within the technological environment.	17	42
Negative Effect	The negative impact of technological shared workspaces.	7	10
Positive Effect	The positive effect of shared workspaces.	16	28
Regulated	A regulated social platform can aid a positive effect	2	3
Technology Key Values	The key values required within the technology space relating to the effective management of knowledge.	17	47
Flexibility	The factors affecting the flexibility required within the technology space.	11	16
Negative Effect	When technology flexibility has a negative effect	3	5
Global Availability	The ability to access knowledge from any location on available devices	4	4
Knowledge Sharing	Factors affecting the knowledge sharing capabilities of the technology space.	12	22
Mobile Devices	Any electronic device used to connect to a global knowledge centre	3	3
Performance	This physical speed of electronic communications	2	2

Name	Description	Sources	References
Physical Organisation	Factors impacting the physical organisation or their effects on knowledge processing.	0	0
Change Management	Managing change within the organisation	4	15
Key Values	Key Values of the Physical Organisation	19	252
Autonomous Processing	The autonomous needs of the organisation.	4	11
None Autonomous Approach	Rigidly following processes to the extent of affecting the ability to consume rich knowledge from external sources.	1	1
Brand Confidence	Expectation that the quality of the brand directly relates to confidence in the quality of knowledge shared	4	11
Commercial Viability	Commercial viability having an influence on knowledge processes	18	61
Commitment to KM	Organisation levels showing commitment to knowledge management as a viable process.	17	40
Empowerment	Empowering people in the relevant positions to be able to make the required decisions for an effective process.	3	4
Other Levels	None senior members of the organisation's commitment to the knowledge management process.	4	4
Senior Level	Senior level managers commitment to knowledge management processes.	8	11
Governance	The key rules relating to knowledge processing	4	11
Innovation	Seen as a key value in reason for external knowledge acquisition	10	35
Negative Effect	Innovation, negatively affecting innovation benefits	3	3
Internal Communication	Internal communication factors influencing the physical organisation.	9	16
Knowledge Confidence	Confidence that the knowledge transferred is viable and is from a trusted source. The internal knowledge manager would have full confidence in using this information.	4	4
Knowledge Sharing	The key factors for sharing knowledge	9	24
Knowledge Spill-over	Influences of knowledge spillovers	4	9

Name	Description	Sources	References
Risk Factors	Risk factors affecting knowledge processing in the physical organisation.	10	18
Service Provision	The ability to provide a service to consumers based on knowledge, learning and relationship building beyond explicitly providing a physical product or object	6	10
Knowledge Processing	The physical element of processing knowledge, transformation of knowledge and controlling the flow of knowledge.	3	7
Issues Resolution	Factors relating to knowledge issues resolution	2	4
Knowledge Negative Impact	The negative effects of volumes of knowledge and technology growth	4	5
Knowledge Pools	Storage locations for storing knowledge as physical data assets	3	3
Knowledge Saturation	The impact of knowledge saturation during knowledge enrichment.	2	2
Key Values	The key values for processing knowledge Internally	19	188
Availability	Factors pertaining to the availability of knowledge.	14	50
Knowledge Retention Timescale	Factors affecting knowledge and how long to should be retained.	7	17
Viability	The viability of knowledge within the organisation and the need to retain it.	7	14
Demand	(placeholder)	3	4
Integrity	The integrity of the knowledge being consumed	2	2
Knowledge Accuracy	(placeholder)	13	29
Knowledge Consistency	The importance of consistency within knowledge processing.	14	24
Knowledge Protection	Impacts of additional enrichment from the consumer environment	12	16
Knowledge Quality	The importance of quality knowledge entering the organisation.	12	33
Timeliness	The ability to consume knowledge within a required timeframe.	8	22
Transparency	Internal transparency of the overall process and an understanding of what happens where	7	8
Knowledge Enrichment	Knowledge enrichment processes and how external knowledge is consumed.	15	48
Enrichment Types	(placeholder)	0	0

Name	Description	Sources	References
Enrichment Issues	Specific issues relating to managing the enrichment process.	6	14
Explicit Consumption	Consume explicit knowledge without the need for further enrichment such as product data	13	34
Assisted Enrichment	Enrichment of Provider Data with later sign off by provider	11	23
Tacit Conversion	Converting tacit knowledge as part of the enrichment process	8	11
Enrich None Explicit	Marketing or application knowledge not explicitly defining a product or service	5	6
Knowledge Selection	Factors affecting the knowledge selection process as part of consuming externally acquired knowledge.	17	68
Knowledge Capture - Tacit	Potential areas where tacit knowledge is assessed and considered for capture.	2	3
No Enrichment	Consume with no further enrichment	1	1
Knowledge Flow	The flow of knowledge through the life cycle process	18	71
Organisational Knowledge - Remove	Outcomes from existing internal knowledge	6	12
Compliance	Knowledge relating to compliancy issues	1	2
Regulatory	Knowledge relating to domain regulations	1	1
Process Flexibility	Factors affecting the flexibility requirements of knowledge processing processes.	14	45
Organisational Knowledge Capability	Factors affecting the physical organisation from the perspective of SME, existing knowledge and knowledge gaps.	4	6
Impacts	(placeholder)	15	51
Knowledge Gaps	Identified knowledge gaps within the physical organisation.	11	26
Resistance	Resistance to learning or change	5	11
Strategic Direction	Management level decisions impacting people and processes	6	14
External Knowledge Experts	Key technical experts from outside of the organisation	6	6
Knowledge Feedback Channels	(placeholder)	0	0
Branch Feedback	Feedback from branches on information flow and quality.	5	8

Name	Description	Sources	References
Consumer Feedback	Feedback from the end customer on flow of information	4	8
Organisation Flexibility	Important factors influencing an organisation's need to remain flexible for the perspective of organisational learning.	8	12
Subject Matter Experts	Experienced subject matter experts within the organisational boundary.	19	155
Creativity and Problem Solving	The ability to apply creativity and problem-solving methods against existing real-world issues.	14	18
Collaborative Working	Working together to come up with collaborative results from shared knowledge SME	1	1
Empowerment	The ability for key stakeholders to be able to make decisions that affect processes	2	3
Experience	Longevity and Experience gained over a number of years	5	6
Knowledge Transfer	Transferal of knowledge to other knowledge experts or knowledge systems	10	27
Technology Effect	The impact on Knowledge transfer via rapid availability of knowledge vs understanding of knowledge	2	6
Ongoing Training	Factors affecting the need for on-going training of internal SME.	13	24
Retention	Retention of subject matter experts and commitment to existing members.	2	2
Work Ethic	A Persons commitment to a specific role	2	5
Organisational Structures	The factors affecting the physical organisation and its structure to be able to effectively manage knowledge processes.	0	0
Centralised	Influences affecting a centralised approach to physical resources and their ability to manage knowledge processes.	16	45
Primary Contact	Factors affecting the need for a single point of contact via a centralised organisational structure.	8	12
De-centralised	Factors affecting a de-centralised approach to managing knowledge processes.	7	15
Key Stakeholders	Factors affecting key stakeholders within a disparate or de-centralised knowledge processing environment.	2	2

Name	Description	Sources	References
Negative Effect	The negative effects of being de-centralised.	2	2
Primary Contact	Factors affecting having a primary contact for a disparate on de-centralised approach towards knowledge management processes.	1	2
Inter-Organisational Knowledge Communities	Groups of knowledge workers across organisation boundaries, their key values and effects.	19	419
External Community Relationships	Consumers or providers of knowledge outside of the typical organisational boundary.	19	338
Key Values	Key values for Inter-organisational facilitation	12	56
Commitment	A willingness and commitment to participate in cross boundary knowledge sharing communities.	1	2
Communication	Particular Skills chosen for people who build relationships outside of the typical organisational boundary.	5	7
Inter-Personal Skills	Particular Skills chosen for people who build relationships outside of the typical organisational boundary.	3	3
Mutual Viability	Interactive groups must be mutually viable to retain interest in relationship retention	11	16
Strategic Alignment	Aligning knowledge sharing and application with the needs of the business or organisation	4	4
Subject Matter Experts	Essential to have subject matter experts to ensure effect communication	11	24
Consumer Communities	External consumers feeding back based on real world interactions, either through products, services or communication.	4	6
Consumer Relationships	Relationships between external consumers and internal stakeholders.	15	62
Negative Feedback	Potential negative feedback from an external consumer	5	8
Inter-organisational	The impact of inter-organisational relationships.	13	26
No Knowledge Provider Relationship	No relevant relationship exists between the knowledge provider and the organisation.	2	3
Provider Relationships	Relationship factors relating to external knowledge providers	19	178

Name	Description	Sources	References
Issues Resolution	Coming together to resolve issues, perhaps from a tacit perspective initially prior to extrapolating into an explicit asset.	5	5
Negative Effect	When negative feedback is given from a knowledge provider	9	15
Communication	Communication Channels between organisation and knowledge provider	9	38
Credibility	(placeholder)	0	0
Flexibility	(placeholder)	0	0
Integrity	A key value of retaining a relationship with a knowledge provider	6	7
Trust	Trust factors relating to external relationships.	8	17
Internal Communities	Relationships relating to internal stakeholders.	16	80
Group to Group Sharing	Internal group relationships	10	33
Internal Relationships	Relationship between knowledge workers and SME	16	44
Negative Effect	A Negative effect caused by internal communication or relationships	1	3

Appendix 5

Faculty of Business and Law
Informed Consent Form for research participants

Title of Study:	Towards the consumption of externally acquired knowledge within an organisational environment to enhance processes and process innovation across organisational boundaries: Managing the impact within an electrical wholesale environment
Person(s) conducting the research:	Colin Richardson
Programme of study:	PhD – Part Time
Address of the researcher for correspondence:	(hidden)
Telephone:	(hidden)
E-mail:	Colin.richardson@northumbria.ac.uk
Description of the broad nature of the research:	To investigate issues relating to the lack of an effective knowledge management process which crosses organisational boundaries.
Description of the involvement expected of participants including the broad nature of questions to be answered or events to be observed or activities to be undertaken, and the expected time commitment:	Semi-Structured Interview. Interviews will be recorded then transcribed. Upon completion of transcription process with participants agreement the audio recording will be destroyed. All participant details will be anonymised.
Description of how the data you provide will be securely stored and/or destroyed upon completion of the project.	Encrypted Database, identifiable data will be anonymised upon collection. Upon completion of transcription process with participants agreement the audio recording will be destroyed. All participant details will be anonymised.

Information obtained in this study, including this consent form, will be kept strictly confidential (i.e. will not be passed to others) and anonymous (i.e. individuals and organisations will not be identified *unless this is expressly excluded in the details given above*).

Data obtained through this research may be reproduced and published in a variety of forms and for a variety of audiences related to the broad nature of the research detailed above. It will not be used for purposes other than those outlined above without your permission.

Participation is entirely voluntary and participants may withdraw at any time.

By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study on the basis of the above information.

Participants signature : **Date:**

Student's signature : **Date:**

Please keep one copy of this form for your own records

Appendix 6

Student Research Ethical Issues Form

Faculty of Business and Law

Student Research Ethical Issues Form

Student Name:	Colin Richardson
Programme of Study	Business Analysis, Systems and Information Management
Title of Research Project:	Towards a framework for the management of the knowledge Asset within a global context
Start Date of Research Project:	March 2013
Supervisor	Dr Dimitra Skoumpopoulou

	Comments
Brief description of the proposed research methods including (if relevant) how human participants will be selected and involved.	The research will be conducted by using semi-structured interviews with approximately 20 participants with an initial pilot of 5 participants within a single multi-national organisation at a national level to investigate the gaps within the KM context of external knowledge acquisition. Organisation consent has already been granted and the signed approval form will be submitted. Data will be collected and collated for evaluation within the context of the research area. Agreement on participation will be acquired upon receipt of the consent form. All data from the interviews will be compiled and analysed using NVivo. Participants will have the right to withdraw at any time. The data analysis is currently expected to take approximately 4-8 weeks to complete prior to receipt.
How will informed consent of research participants be acquired? (If appropriate attach draft informed consent form)	Informed consent will comply with the relevant legal frameworks and regulation including the University's ethics policy, The Human Rights Act 1998 e.g. to respect a human's right to privacy and the Data Protection Act 1998 e.g. the need to ensure consent to participate in the research and the use to which data is put. In terms of how informed consent is operationalised the researcher has consulted ESRC research methods guidelines see: http://www.sociology.soton.ac.uk/Proj/Informed_Consent/Resources.htm.. A covering letter will also be included with the interview request that will act as consent if the participant agrees to completed the interview.

Will the research involve an organisation**(s)?** **(If appropriate attach draft organisational consent form)**	Yes, Agreement from senior levels of the organisation have already been agreed as the organisation will benefit from the research outcomes. Organisational consent form attached.
How will research data be collected, securely stored and anonymity protected (where this is required)	No personally identifiable data will be collected, and any identifiable data inadvertently collected will be anonymised immediately. Secure database within encryption will be used to store all information. Data will be stored within database tables that align with the question responses to allow for ease of analysis. An anonymizer algorithm will be applied against any columns that contain potentially identifiable information. All personal details will be removed completely Any information containing organisational terms or names shall be given fictitious aliases. Database will only be accessible via secure login (username and password) Database shall be destroyed upon completion of the research project. Database location shall be securely wiped to avoid recovery being possible.
How will data be destroyed after the end of the project? (Where data is not to be destroyed please give reasons)	All data will be purged from data store. A data cluster rebuild will then take place to destroy any fragments that could be recovered using recovery software.
Any other ethical issues anticipated?	None
Student Signature (indicating that the research will be conducted in conformity with the above and agreeing that any significant change in the research project will be notified and a further "Project Amendment' Form submitted). **Date:** ……27/09/2015……**Student Signature:**…… 	

Supervisor:

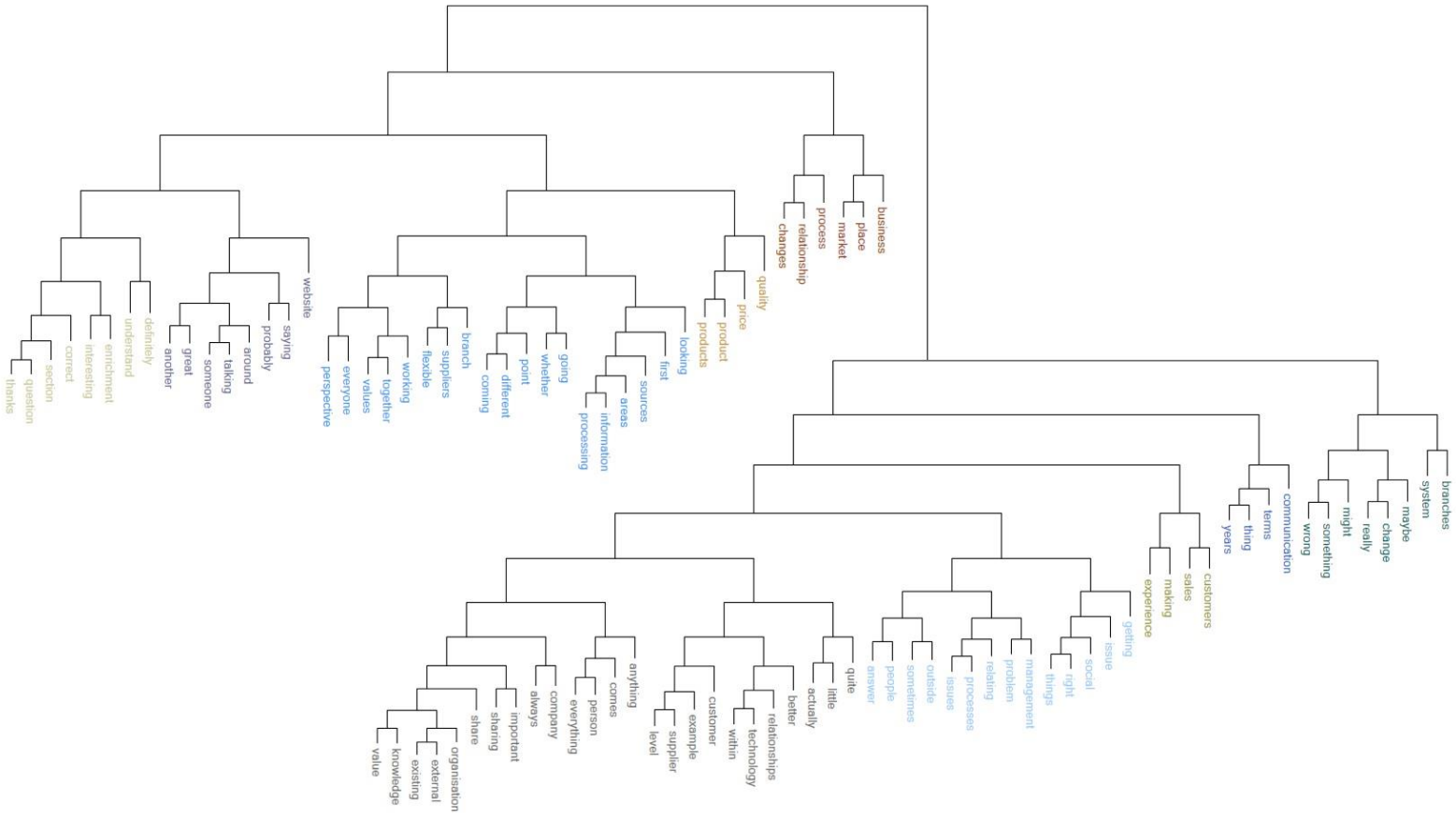
I confirm that I have read this form and I believe the proposed research will not breach University policies.

Date:……29/09/2015…… **Signature:** 

Please Note:
The appropriate completion of this form is a critical component of the University Policy on Ethical Issues in Research and Consultancy. If further advice is required, please contact the Faculty Research Ethics Committee through bl.ethics.administrator@northumbria.ac.uk in the first instance.

Appendix 7

NVivo Outputs - TreeMap



Appendix 8

NVivo Outputs - Word Cloud