The Recipient Perspective:

A Mixed Methods Inquiry of Knowledge Seeking Factors in Tacit Knowledge Contexts

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The Recipient Perspective:
A Mixed Methods Inquiry of Knowledge Seeking Factors in Tacit Knowledge Contexts

A Thesis submitted to Dublin City University Business School in Partial Fulfilment of the Requirements for the Degree of Doctor of Philosophy

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DECLARATION

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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DEDICATION

To papa, who taught me the value of curiosity and kindness and is very much missed.

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ABSTRACT

Tacit knowledge is an important source of competitive advantage to organisations. Sharing tacit knowledge among employees is vital to realising its benefits. Knowledge sharing requires the effective provision of knowledge and the useful acquisition of knowledge. More recently, knowledge seeking has been proposed as an additional recipient behaviour which encourages the provider to share their knowledge. Additionally, research has acknowledged the important role individual and social factors play in influencing the knowledge sharing. However, whether those factors equally effect recipient knowledge seeking and acquisition has been under-investigated. To address these gaps, this research investigates the individual and social factors which influence interpersonal knowledge seeking by knowledge workers engaged in highly tacit tasks within two separate contexts. In addition, knowledge seeking as a strategy for effective tacit knowledge acquisition is explored.

Study one uses interviews with 33 knowledge-workers to explore individual and social factors which influence their tacit knowledge seeking, acquisition and sharing. Study two surveyed 233 junior doctors to test direct and indirect relationships between individual and social factors and their tacit knowledge seeking and acquisition from consultant doctors. The key findings support the contention that the individual and social factors which effect knowledge seeking are not interchangeable with those that effect knowledge acquisition and sharing. Various individual and social factors effect knowledge seeking at different stages of this behaviour. Furthermore, findings indicate that knowledge seeking can enhance successful acquisition of tacit knowledge through the organisational learning process of interpreting. This is the first study to compare individual and social factors which influence behaviours of seeking, acquisition and sharing in one study. It is also the first to empirically examine the 4i framework, and specifically the mediating effect of interpreting to explain the relationship between knowledge seeking and acquisition. Both studies provide actionable insights to improve successful knowledge sharing practices for tacit tasks.

CHAPTER 1**: INTRODUCTION**

1.1 1.1 Introduction

Superior knowledge, used effectively, can provide competitive advantage and economic growth and is therefore a critical resource to the organisation (Little, Quintas & Ray, 2002, p. 124; Kreiner, 2002). This perspective is underpinned by the understanding that human knowledge and capabilities are the core of value creation in organisations (Kakabadse, Kouzmin, & Kakabadse, 2001). As knowledge is a unique resource it is difficult for competitors to imitate and is a primary concern for many organisations (von Krogh & Roos, 1996, p. 32–33).

Knowledge researchers have identified tacit knowledge as a particular form of knowledge that is difficult to imitate, substitute, and transfer (Ambrosini & Bowman, 2001), and therefore forms the basis of sustainable competitive advantage for the firm (Ambrosini & Bowman, 2001). As a result, tacit knowledge is a valuable resource that many organisations rely upon in the knowledge-based economy (Little, Quintas, & Ray, 2002; Gertler, 2003). This knowledge stored in the minds of the worker, is rooted in action and behaviour, and is difficult to communicate (Ambrosini & Bowman, 2001; Little, Quintas, & Ray, 2002, p. 43, Nonaka, 1994; Nonaka & von Krogh, 2009). Tacit knowledge is first acquired at the individual level (Polanyi, 1962; Kreiner, 2002; Wright & McMahan, 2011), and embodied in the organisation's individuals and groups. Despite this, most knowledge research is conducted at an organisational level (Chen & Edgington, 2005), and knowledge-based view (KBV) studies have been criticised for emphasising the collective level of analysis to the neglect of individual-level variables (Minbaeva et al., 2009), leaving an opportunity for individual level studies (Endres et al., 2007). A recent review of knowledge sharing highlighted the lack of research examining the microfoundations of knowledge processes, and the importance in examining behaviours at the level of individuals and their interactions (Foss & Pederesen, 2019). Even in studies in which individuals are emphasized (such as Minbaeva et al., 2003), the actual measurement of knowledge processes still takes place at the subsidiary and MNC levels (Foss & Pederesen, 2019).

While knowledge sharing can occur at the individual, team, organisational or intra-organisational level, Argote and Ingram (2000) suggest that all types of knowledge sharing ultimately originate from individual interactions. Knowledge sharing behaviours are important to knowledge researchers as they are widely viewed as key to enabling organisations to create and mobilise its knowledge resources for competitive advantage and success (Argote & Ingram, 2000; Alavi & Leidner, 2001). Individual knowledge sharing is "…*a relational act based on a sender-receiver relationship that incorporates communicating one's knowledge to others as well as receiving others' knowledge*." (Foss, Minbaeva, Pedersen, and Reinholt, 2009, p. 873). Therefore, the relationship between the provider and recipient is pertinent to successful knowledge sharing. This is especially

true of sharing tacit knowledge specifically which is learned through social interactions and practices (Nonaka & Von Krogh, 2009). In fact, the majority of tacit knowledge sharing takes place through social networking and informal interactions (Holste & Fields, 2010). Prior research suggests that in addition to the relationship between provider and recipient, the individual characteristics of the provider and of the recipient are pertinent to knowledge sharing (Minbaeva, 2007; Foss & Pedersen, 2019). Therefore, this thesis focuses on individual's tacit knowledge, and the individual and social factors between the sender and receiver which influence the tacit knowledge sharing interactions.

Research which has shown that knowledge sharing consists of multiple phases, such as the decision to seek and the search process which precedes knowledge sharing by the provider (Hansen, Mors, & Løvås, 2005). Despite this, research which acknowledges and tests these separate phases is scarce (Gray & Meister, 2004; Hansen, Mors & Løvås, 2005). Empirical studies of knowledge sharing must distinguish between providers who share their knowledge and recipients who both seek and acquire this knowledge in order to address the duality of the knowledge sharing process. Despite this, much of the existing research examining individual's knowledge sharing has either examined knowledge sharing by the provision of knowledge only or has not measured the various phases of knowledge sharing distinctly. This bias toward the "knowledge provider perspective" (Kim, Song, & Jones, 2011) has neglected to regard the role of the knowledge recipient to successful sharing. However, recipients of knowledge from the provider may first seek specific knowledge from specific providers, and also must acquire the knowledge that is shared or the knowledge sharing interaction will not be successful. Therefore, the shortcomings in existing "provider perspective" knowledge sharing research are problematic as they ignore the recipient. Specifically, how that recipient may seek out knowledge from providers and how they learn or acquire knowledge as a result of the sharing interaction. Consequently, much research has not shed light on whether the factors that explain one phase of knowledge sharing also explain other phases (Hansen, Mors, & Løvås, 2005; Tangaraja, 2015; 2016).

As one phase of the knowledge sharing process, knowledge seeking may help to explain how recipients best acquire knowledge from providers. Recent research has suggested that providers are more willing to provide knowledge when directly asked by other colleagues (Zhang et al., 2015), indicating knowledge seeking could be used as a strategy to acquire knowledge from reluctant providers. However, many studies that have examined sharing from one point to another have excluded the prior phase of knowledge seeking, or have not empirically disentangled the search from other phases of sharing. This is problematic as knowledge seeking by the recipient is likely to be motivated differently to sharing behaviours by the provider. Scholars therefore do not know much about the extent to which different factors explain knowledge seeking and sharing (Hansen et al., 2005). Therefore, there is a need for research that explores the extent to which different properties explain the seeking knowledge that the recipient needs separately to those properties which explain

providing knowledge to others (Hansen et al., 2005; Kim et al., 2011). Therefore, building on these research calls and recommendations, the purpose of this thesis is to identify and examine the individual and social factors which influence tacit knowledge seeking, and compare to those that influence knowledge sharing to better understand how these behaviours are differently enabled.

Additionally, while there has been extensive research on knowledge sharing from various perspectives, most studies to date have neglected the recipient perspective of knowledge acquisition instead targeting the knowledge provider perspective of sharing (Kim et al., 2011). When an individual has acquired knowledge, that person's knowledge has expanded or the application of knowledge has been enabled (Alavi & Leidner, 2001). Therefore, knowledge acquisition is an important activity in knowledge management and specifically an important outcome of knowledge sharing to measure its success. Therefore, it is critical for research to understand how individuals acquire the knowledge they need, and what strategies recipient's select to acquire that knowledge (Kim et al, 2011). Additionally, and aside from examining knowledge acquired, the learning process itself could represent a major source of differences between the tacit knowledge accumulated by different people (Armstrong & Mahmud, 2008). This thesis is informed by the 4i Organisational Learning Framework which offers an explanation of the processes through which people learn with and from others (Crossan et al., 1999). Furthermore, this thesis investigates knowledge seeking as a strategy for learning and acquiring knowledge more effectively, as it is an indirect learning behaviour (Gray & Mesiter, 2004) in which individuals attempt to learn from the experiences of others. Therefore, this thesis aims to identify and examine the role of knowledge seeking for learning and acquiring tacit knowledge from others.

In summary, given the importance of learning valuable tacit knowledge from others in the workplace, understanding how knowledge seeking is motivated and its acquisition outcomes will have broader theoretical and practical implications to existing research on knowledge sharing. This introductory chapter provides an overview of this dissertation. First, this chapter describes the aims and objectives of the study. Then the chapter will provide a brief overview of the theoretical backdrop, definitions and significance of research in the field. The overarching research questions driving this study will then be presented and the overarching methodology presented. Finally, the chapter will conclude with an overview of the structure of the thesis.

1.1.1 Aims and Objectives

This thesis consists of a conceptual review and two empirical studies. These three chapters aim to investigate the individual and social factors which effect knowledge seeking as distinct from knowledge sharing, and in the context of highly tacit knowledge. It also seeks to investigate the how knowledge seeking as a learning strategy can enable effective knowledge acquisition. To do so, Social Cognitive Theory (Bandura, 1986) is adopted to examine the link between the individual and

social factors which might explain knowledge seeking behaviours. Specifically, self-efficacy and outcome expectations are proposed as salient individual cognitive factors effecting knowledge seeking, acquisition and sharing behaviours. Additionally, Social Capital Theory (Nahapiet & Ghoshal, 1998) is examined to understand how social resources such as trust can be an important explanatory variable as to why people may seek and acquire knowledge from others. Finally, the 4i Organisational Learning framework (Crossan, Lane & White, 1999) is adopted to explain the learning process through which individuals who seek and share might best acquire knowledge. Specifically, the individual learning process of interpreting is examined. Two empirical studies are presented to explore these topics. Study 1 uses a qualitative research design in order to explore and compare how individual and social factors influence knowledge seeking, acquisition and sharing behaviours when solving non-routine problems in the workplace. Study 2 uses a cross-sectional quantitative research design to examine the cognitive and social factors which effect acquisition, and also assess the influence these factors had on interpreting, included as a mediating learning process to explain how knowledge seeking might lead to effective knowledge acquisition. By exploring and comparing the individual and social factors which effect knowledge seeking and learning (measured by both interpreting and acquisition) by the recipient, this research aims to understand which factors may enable knowledge seeking and consequently result in successful knowledge acquisition.

1.2 Theoretical background

1.2.1 Organisational Knowledge

The relationship between knowledge and an organisation has been conceptualised as the knowledge-based view of the firm (KBV) and views an organisation's knowledge as "*one of the most important resources*" (Pan & Scarbrough 1999, p.359). Organisational knowledge literature suggests that knowledge can exist at multiple levels within the organisation, from individual, group and organisational levels (De Long & Fahey, 2000). A firm's know-how or knowledge is embedded throughout the organisation in entities such as organisational culture and identity, routines, policies, and employees (Alavi & Leidner, 2001). The knowledge based-view of the firm argues that these knowledge assets may produce long-term sustainable advantage. Firms therefore must facilitate useful knowledge acquisition, creation, exploitation and transfer to manage their knowledge effectively (Little, Quintas, & Ray 2002, p124). Although knowledge can reside within multiple levels of the organisation, individual knowledge is of particular interest in this thesis. Lam (2000) defined individual knowledge as "*that part of an organisation's knowledge which resides in the brains and bodily skills of the individual*" (p. 491). It involves all the knowledge possessed by the individual that can be applied independently to specific types of tasks and problems. Individual knowledge is more specialised and domain-specific as individuals have cognitive limits to store and process information (Lam, 2000). Organisational learning literature supports the notion that

knowledge in organisations resides within individuals. Simon (1991) suggests that "*all organisational learning takes place inside human heads*" (p. 176). Organisations learn through individuals, and individual learning is enabled or inhibited by factors within the organisational learning system (Argyris, 1980). Knowledge must reside at the individual level because cognition is a function of individuals, and cannot be performed by organisations (Huber, 1991).

Knowledge is commonly distinguished from data and information (Baumard, 1999 p.19-20; Zack, 1999). Zack (1999) defines data as a representation of observations or facts out of context, and information as placing data within some meaningful context. Knowledge represents an accumulation of information which we believe through experience, communication or inference. In other words, knowledge is a subjective interpretation of information. Equally, Baumard (1999) describes information as a method to create, increase, restructure or modify knowledge and knowledge is a representation of this information. Zack also differentiates between general knowledge (that is widely available knowledge) and context-specific knowledge. However, this assumed hierarchy from data to knowledge is criticised by Alavi and Leidner (2001) who argue that it is actually an inverse relationship. Knowledge must first exist to allow information to be processed, which occurs through the articulation and verbalisation of knowledge. When information is then fixated and standard it becomes data. This concludes that knowledge is the result of cognitive processing triggered by new stimuli and shaped by one's needs and stock of knowledge.

Debates in definitions of knowledge have also addressed the conflict between knowledge as an object versus a state of knowing. Andriessen (2008) discusses the misuse of the propensity to use a "knowledge as stuff" metaphor, or "thingification" in talking about knowledge. Alavi and Leidner (2001) describe this as when knowledge is viewed as a thing or process to be stored and manipulated. Andriessen's (2008) article describes the use of metaphors as an integral tool in defining and talking about knowledge management, but warns language describing "knowledge as a thing" can mislead. For instance, things are objective and neutral but knowledge is not something that can be "stored and retrieved" without some distortion or misinterpretation. The "thingification" of knowledge can hide the social or human element of knowledge. An alternative view of knowledge sees it as "a state or fact of knowing" (Alavi & Leidner, 2001). Davenport and Prusak (1998, p5) describe it as "*a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knower*." They argue that knowledge is valuable because it is rooted in action, experience, ground truth, is complex, and makes use of judgment, intuition, values and beliefs. Nonaka and Takeuchi (1995) echo this by defining knowledge as "justified true belief." In other words, individuals justify the truth of their beliefs based on their interactions and experience. They also describe knowledge as an action, or potential action. Alavi and Leidner (2001) discuss knowledge as "personalised" information processed in the mind of the individual. Pan and

Scarbrough's (1999) definition identify knowledge as a social construct and occurring within social networks and communities of practise**.** This suggests that knowledge can occur both in the mind of the individual and in the collective.

Additionally, many authors have tried to identify different components of knowledge. For example, Zack (1999) deconstructs knowledge into three forms: declarative, procedural, and causal. Simply put; knowledge "about" something is defined as declarative or explicit, "how to" knowledge can be described as procedural or tacit, and the knowledge of "why" something occurs is called causal knowledge. These forms of knowledge have more typically been described and investigated as tacit and explicit knowledge (Davenport & Prusak, 1998; Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka & von Krogh, 2009).

1.2.1.1 Explicit Knowledge

Explicit knowledge is generally described as articulated and articulable knowledge (Saint-Onge, 1996; Zack, 1999). It is also called objective knowledge, verbal knowledge, and declarative knowledge (Ambrosini & Bowman, 2001). Hubert Saint-Onge explains explicit knowledge simply as "*the words we speak, books we read, and data we compile.*" Explicit knowledge is more easily codified, documented, transferred, shared and stored (Zack, 1999; Subashini, 2010, p.36.) It can be communicated in symbolic form from the possessor to the recipient, and the possession of this knowledge is not specific to a firm or person (Ambrosini & Bowman, 2001). Ambrosini and Bowman (2001) suggest that defining explicit knowledge is one way of highlighting what tacit knowledge is not. Nonaka and von Krogh (2009) suggest that explicit knowledge has a universal character which has relevance across contexts. Polanyi describes explicit knowledge as grounded in tacit knowledge; one can't exist without the other. Subashini (2010) further argues that "*explicit knowledge without tacit meaning loses its insight*." Tee and Karney (2010) claim that all knowledge, regardless of domain areas, contains a tacit characteristic. This indicates that explicit and tacit knowledge are not separate entities (Nonaka & Takeuchi, 1995), but complimentary (Subashini, 2010). However, Nonaka and colleagues (Nonaka & Takeuchi, 1995; Nonaka & von Krogh, 2009) suggest that explicit and tacit knowledge can be conceptually distinguished along a continuum, and that knowledge conversion explains the interaction between tacit and explicit knowledge. That is, aligned with other researchers, they claim that tacit knowledge is that which is not yet explicit (Linde, 2001; Nonaka & Takeuchi, 1995). Tacit knowledge becomes explicit through the process of externalisation, achieved through reflection and interactions between people (Nonaka & Takeuchi, 1995).

1.2.1.2 Tacit Knowledge

The importance of tacit knowledge specifically has been highlighted by Little, Quintas, and Ray (2002, p10). They argue that much of the knowledge upon which organisations rely is tacit and define tacit knowledge as one "*that resides within the heads and motor neurone systems of employees and has not been codified or made explicit."* Baumard (1999, p2) describes tacit knowledge in broader terms, as something we know but cannot express. Polanyi's (1967, cited in Ambrosini & Bowman, 2001) seminal definition simply states "*we know more that we can tell."* Tacit knowledge has been recognised in the literature as personal knowledge; rooted in commitment, ideals, values and emotions, and as practical knowledge demonstrated in "know how", action, procedures and routines. It can also be context specific, typically acquired on the job. (Ambrosini & Bowman, 2001; Little, Quintas, & Ray, 2002, p43). A simple example would be knowledge of wine tasting, or playing a violin (Nonaka & von Krogh, 2009). These definitions allude to one of the main characteristics and challenges of tacit knowledge; that it is difficult to formalise (Ambrosini & Bowman, 2001; Little, Quintas, & Ray 2002, p43),

Various authors attempt to break down the content of tacit knowledge into definable elements. Wagner (1987) investigated tacit knowledge within the individual and describes its components as managing self, managing tasks, and managing others. Managing self relates to self-motivation and organisation, such as knowing how to overcome procrastination. Managing tasks refers to the "know how" or procedural element of tacit knowledge that is often cited to in literature (Ambrosini & Bowman, 2001; Little, Quintas, and Ray, 2002, p43; Zack, 1999.) Finally managing others relates to capabilities and knowledge in social interactions. Wagner (1987) argues that most situations require each of the three kinds of tacit knowledge to lesser or greater degrees. Nonaka (1994) suggests that there are two components to tacit knowledge; cognitive (i.e. mental models, perspectives, beliefs, values) and technical (i.e. know-how, crafts and skills). Wagner's managing self and others relates to the cognitive dimension of tacit knowledge, while managing tasks is related to the technical dimension of tacit knowledge. Matzler et al. (2008) provides a similar break down of the "tacit dimensions" into five categories of knowledge; embrained, encultured, embodied, embedded and encoded knowledge. Embrained knowledge or "knowledge that" refers to conceptual skills and cognitive ability. Encultured knowledge relates to the shared understanding, socialization and acculturation of tacit knowledge. In other words, these two categories comprise of the elements defined by Nonaka (1994) as cognitive. Embodied knowledge is action orientated and acquired through doing, and embedded knowledge is rooted in routine; similar to Nonaka's technical tacit component. Finally, encoded knowledge is "codified" in codes of practice and can be made explicit through signs and symbols. Subashini (2010) notes that cognitive element (i.e. embrained and encultured knowledge) are often taken for granted and are difficult to communicate. Additionally, the various definitions illustrate that tacit knowledge can exist collectively through shared

interactions and understandings. Therefore, while tacit knowledge resides in individuals, social or collective knowledge can be created in the collective actions of a group (Aadne, von Krogh, & Roos, 1996).

In summary, the literature suggests that tacit knowledge resides in the human mind, is rooted in both action and ideals, is difficult to communicate and formalise and can exist at an individual and collective level (Aadne, von Krogh, & Roos, 1996; Ambrosini & Bowman, 2001; Little, Quintas, & Ray, 2002, p43, Nonaka, 1994; Nonaka & von Krogh, 2009). Recent literature has suggested that tacit knowledge should be conceptualised as a multifaceted term that relates to various levels of awareness (Asher & Popper, 2019). This is supported by scholars who have conceptualised tacit knowledge along a continuum, which classifies knowledge into subcategories based on the level of awareness (e.g. Ambrosini & Bowman, 2002). It starts from deeply embedded, unapproachable tacit knowledge, the next subcategory is partly describable using metaphors and stories, to end at the fully extractable tacit knowledge acquired through direct questioning (Ambrosini & Bowman, 2002). Therefore, despite the difficulty in communicating this knowledge, tacit knowledge can be "converted" to more explicit knowledge through processes of socialization and externalization (Nonaka & Takeuchi, 1995). This thesis supports the definition of tacit knowledge along a continuum from deeply embedded tacit knowledge to extractable tacit knowledge, aligned with Ambrosini and Bowman (2002).

1.2.4 Brief Introduction to Knowledge Management

The knowledge within a firm is only as useful as the firm's ability to apply it, create it, and take action from it. Knowledge management is a process to help organisations achieve this (Alavi & Leidner, 2001). Pan and Scarbrough (1999) define knowledge management as *"the capacity (or processes) within an organisation to maintain or improve organisational performance based on experience and knowledge"* where knowledge is multi-layered and multi-faceted. Or more simply; "*getting the right knowledge to the right people at the right time*" (Liebowitz, 1999, p1-6). However, Kreiner (2002) states that "*tacit knowledge needs to be managed in tacit ways*" and suggests knowledge management comprises of explicit inputs of information and knowledge and tacit processes of mobilization, interpretation, and use. This indicates that collective and individual explicit knowledge can only be properly utilised by the worker using their own tacit knowledge. This indicates that *tacit* knowledge management specifically is unique to general knowledge management methods because tacit knowledge "is owned" by the knowledge worker rather than the organisation (Kreiner, 2002; Wright & McMahan, 2011) and is thus "invisible" to the organisation. This view criticises traditional knowledge management literature which has been dominated by information technology or technological perspectives (Davenport, De Long, & Beers, 1998; Gourlay, 2001). Instead, the role of the individual is increasingly recognised within the 'people perspective' or personalization strategies to knowledge in organisations (Hansen, 1999; Earl, 2001; Stenmark,

2001). This perspective views the connections between individuals as key to successfully managing knowledge (Brown & Duguid, 1991; McDermott, 1999) and is underpinned by human resource management literature which recognises the importance of managing 'human capital' or individual knowledge, skills, abilities and other characteristics residing in the minds of individuals (Wright & McMahan, 2011). In order to manage knowledge and the people who hold it, firms must recognise the importance of individual behaviours as employees can choose to withhold the knowledge and abilities that their firm requires (Wright & McMahan, 2011; Matzler et al., 2008).

While authors have proposed various processes required for managing knowledge, most are underpinned by the awareness that organisations must effectively utilise the knowledge resources that already exist within the organisation (Damodaran & Olphert, 2000; Davenport & Prusak, 1998; Spender & Grant, 1996). Organisations must also consider how to transfer expertise and knowledge from experts in possession of it to novices who need to know (Hinds, Patterson, & Pfeffer, 2001). Authors have identified multiple processes of interest to manage knowledge such as creation, storage/retrieval, transfer, application of knowledge, and acquisition or capture (Alavi & Leidner, 2001; Kakabadse, Kouzmin, & Kakabadse, 2001; Yahya & Goh, 2002). Organisational learning literature focuses on creation, retention and transfer of knowledge as central to supporting learning across all levels of the firm (Argote, 2012). However, of primary interest to this thesis is the knowledge sharing component, as it enables employees to contribute to the creation and retention of organisational knowledge, and ultimately the competitive advantage of the organisation (Jackson, Chuang, Harden, Jiang, & Joseph, 2006). Tacit knowledge sharing between employees allows organisations to exploit and capitalise on this knowledge-based resource (Davenport & Prusak, 1998; Cabrera & Cabrera, 2005).

1.2.5 Knowledge Sharing: The Bi-Directional Perspective

Individual knowledge sharing is a relational behaviour between provider and recipient, in which the provider must share their knowledge and the receiver must understand and acquire it (Argote & Ingram, 2000; Foss, Minbaeva, Pedersen, and Reinholt, 2009; Hansen, 1999). A central interest of this thesis is the duality or bi-directional nature of knowledge sharing. Past literature has viewed knowledge sharing as either unidirectional or bidirectional (Tangaraja et al, 2015). The uni-directional perspective claims that knowledge sharing only involves the dissemination of knowledge in a single direction from provider to recipient (e.g. Yi, 2009). Knowledge sharing viewed through the unidirectional perspective suggests the key player is the knowledge provider, and therefore the knowledge recipient is not an active player in the success of sharing efforts (Tangaraja et al., 2015). This may be most relevant to situations in which the provider is sharing knowledge to a document or an online repository rather than responding to a context-specific requirement or need for knowledge. For researchers interested in bi-directional tacit knowledge sharing, it is necessary to examine interpersonal interactions as tacit knowledge conversion occurs through socialization and

externalization processes which require social interaction (Nonaka & Takeuchi 1995). Therefore, research investigating the bi-directional perspective of knowledge sharing is more pertinent.

The bi-directional perspective views knowledge sharing as an exchange of knowledge between individuals, namely the provider and recipient (e.g. van den Hooff & de Ridder, 2004, Foss, Minbaeva, Pedersen, & Reinholt, 2009). The bidirectional perspective suggests active knowledge sources are both knowledge provider and knowledge recipient who share/exchange knowledge, therefore this process is not an individual acting in isolation but can occur beyond the individual level and involves at least two people (Tangaraja et al., 2015). However, research taking bi-directional perspective investigating the actions of exchanging knowledge have not reached a consensus regarding what recipient actions are involved in receiving knowledge. Research has considered various actions recipients can take such as the active processes of 'collecting', seeking, and more passive process of acquiring or 'receiving' knowledge as (e.g. van den Hooff & de Ridder, 2004; Hansen et al., 2005; Wilkesmann & Wilkesmann, 2011). However, these actions have been defined differently, are rarely researched together, and there remains conceptual disclarity as to how or if they overlap.

1.2.6 The Recipient Perspective: Knowledge Seeking and Acquisition

Increasingly, knowledge sharing literature has acknowledged knowledge seeking as a phase of knowledge sharing (Hansen et al., 2005). Despite this there is the lack of theory and empirical evidence on interpersonal knowledge seeking (Hansen et al., 2005). Indeed, there is still no theoretical framework of knowledge sharing which includes the prior step of knowledge seeking. This has resulted in a lack of clarity concerning how the recipient can shape their experience and learning outcomes within the knowledge sharing process. In addition, there is a lack of research explaining possible causal factors of knowledge seeking and how they may differ from related knowledge sharing processes (Hansen, Mors, & Løvås, 2005). Prior literature has suggested that four main elements are pertinent to the knowledge sharing; the characteristics of knowledge, characteristics of knowledge senders, characteristics of knowledge receivers, and characteristics of the relationships between senders and receivers of which increase the degree of knowledge transfer (Minbaeva, 2007). In the context of examining tacit knowledge seeking specifically, pertinent elements which may influence this behaviour include individual factors relating to the seeker and social factors influencing the relationship between seeker and provider. While a few studies have investigated some individual and social factors of seeking (e.g. Borgatti & Cross, 2004; Gray & Meister, 2004; 2006), most have failed to distinguish between information and knowledge (e.g. Borgatti & Cross, 2004), or do not examine the influence of tacit knowledge on these relationships (e.g. Gray & Meister, 2004; 2006). No previous study has examined the individual and social factors which influence of tacit knowledge seeking, acquisition and sharing within the same study. Doing so should clarify how these factors may influence the processes of seeking, acquisition and sharing

differently within the same workplace context. In response, this thesis adopts Social Cognitive Theory (Bandura, 1986) and Social Capital Theory (Nahapiet & Ghoshal, 1998) to understand, propose and investigate how individual and social factors may influence knowledge seeking behaviours.

Additionally, no other study has compared the individual and social factors influencing knowledge seeking with those that influence knowledge sharing and acquisition. Therefore, this thesis examines whether the factors which influence knowledge sharing might also influence knowledge seeking and acquisition as separate behaviours. This represents a significant contribution to the knowledge sharing field by questioning the relevance of prior research which has examined sharing as either a uni-dimensional concept or a combined concept entailing both seeking and sharing.

Another research problem of interest relates to the lack of research on recipient acquisition within the knowledge sharing process (Kim et al., 2011). Successful knowledge sharing is informed by the extent the recipient acquires and learns knowledge from the interaction. Therefore, investigating the value of knowledge seeking to acquiring tacit knowledge is valuable for further understanding of effective knowledge sharing interactions. Prior research has confirmed that knowledge seeking from various sources can lead to better learning outcomes and effectiveness (Gray & Meister, 2004; 2006; Wang et al., 2014; Kankanhalli et al., 2011) and allow seekers to resolve problems, accomplish more complex tasks, and make decisions more effectively (Gray & Meister, 2004; Gray & Durcikova, 2005). Despite this, there is a lack of research explaining how individuals acquire the knowledge they need, and what strategies recipient's select to acquire that knowledge (Kim et al, 2011). No previous study has examined knowledge seeking as a learning strategy which may lead to effective acquisition. To examine how knowledge seeking behaviours may fit within the theoretical literature examining knowledge sharing and learning, this thesis adopts the 4i framework to understand, propose and investigate how seeking may impact individual learning through the process of interpreting.

1.3 Summary: The Importance of this Study

This research is justified on three grounds. Firstly, as noted in the preceding sections, there are many gaps in our understanding of knowledge seeking in the context of acquiring highly tacit knowledge. This study addresses these gaps and conducts a comprehensive investigation of tacit knowledge seeking to enhance understanding of the influencers of tacit knowledge seeking, the dimensions of knowledge seeking behaviour, and the relationship between knowledge seeking and knowledge acquisition. Secondly, the integrated qualitative and quantitative findings enable the presentation of practical recommendations which can be employed by organisations interested in better enabling their employees to acquire tacit knowledge. Thirdly, the study findings identify

additional avenues which have potential for researchers in this area. The findings can be further tested and built upon by researchers in other organisational settings and across cultures, which will further enhance our understanding of knowledge seeking when engaged in highly tacit tasks.

1.4 Research Questions

Overall the objective of this study is to address the lack of research on knowledge seeking and provide a more nuanced understanding of this concept. In doing so, it aims to provide scholars and practitioners with a better understanding of the individual and social factors which effect knowledge seeking as well as its learning outcomes of knowledge acquisition. Guided by this purpose, the study seeks to empirically address two questions which are central to clarifying and advancing understanding of the process of knowledge seeking:

RQ1: What factors influence the knowledge seeking behaviours of individuals engaged in tasks with high levels of tacit knowledge?

RQ2: How do knowledge seeking behaviours improve the learning outcomes of the recipient?

1.5 Methodology

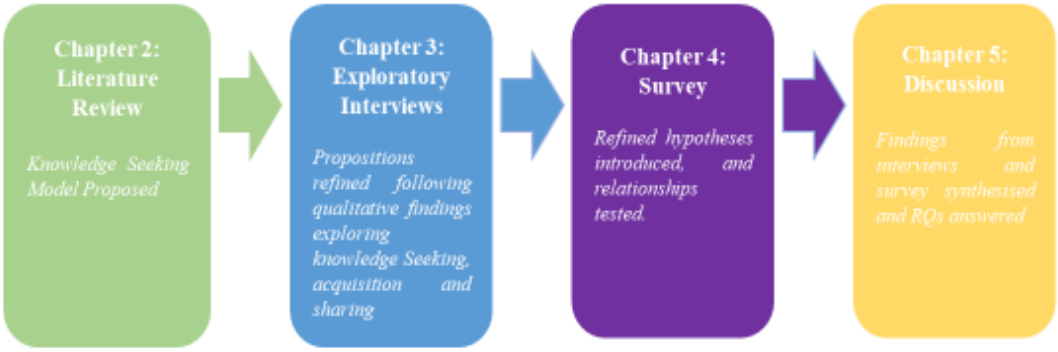
1.5.1 Research Development and Design

Knowledge sharing literature has been dominated by quantitative studies. Following a systematic review of knowledge sharing literature, Sergeeva and Andreeva (2015) found 40 quantitative studies, 11 qualitative studies and only one with mixed methodologies. Research investigating interpersonal knowledge seeking specifically is still somewhat limited, but is also dominated by quantitative studies with the exception of a few qualitative studies (e.g. Cross & Borgatti, 2004; Tippmann et al., 2013; Yuan et al., 2011; Wan et al., 2015). However, mixed method studies enable researchers to develop an in-depth, holistic understanding of a phenomenon (Venkatesh, Brown, & Bala, 2013). Mixed methods studies can facilitate the realisation of many advantages. By combining quantitative and qualitative methods, these studies offset the weaknesses inherent in single method studies (Amaratunga et al., 2002; Creswell & Plano Clark, 2007). Mixed methods are viewed as a superior avenue to conduct research in three areas: (1) to answer research questions other methods cannot answer, (2) to develop stronger inferences from data, and (3) to present divergent views which force the re-examination of assumptions underlying the qualitative and quantitative components of a study (Teddlie & Tashakkori, 2003). Mixed methods can also facilitate both the generation of theory through qualitative methods and the confirmation of hypotheses and theory through quantitative methods (Teddlie & Tashakkori, 2003; Teddlie & Tashakkori, 2009). The primary disadvantage of mixed methods relates to the greater time and effort required (Teddlie & Tashakkori, 2003).

A mixed methods research design was chosen in this study due its applicability with the study's aim and research questions. Figure 1.1 depicts the design of this research project. This study is a response to multiple calls by researchers (Gray & Meister, 2004; 2006; Hansen, Mors & Lovas, 2005; He et al., 2009; Wan et al., 2015; Zhang, 2020) for research to investigate knowledge seeking as an under theorised sub-process of knowledge sharing and explore the factors which influence it. It does so by developing a conceptual model of interpersonal knowledge seeking, which leverages several theories to conduct an investigation of knowledge seeking in the context of seeking highly tacit knowledge. The framework includes antecedents that have been employed in previous knowledge sharing studies, such as trust, self-efficacy, and outcome expectations. However, this study moves beyond prior studies by investigating useful knowledge acquisition as an outcome of knowledge seeking. In addition, the framework proposes interpreting as a mediating variable to explain the relationship between knowledge seeking and useful acquisition of knowledge, which is examined for the first time in the context of knowledge seeking. This first stage of the research therefore proposes a framework for understanding knowledge seeking in the context of exchanging tacit knowledge.

This study employs a mixed method approach in order to explore and test the proposed framework, which provides a more comprehensive understanding of the knowledge seeking construct in the context of highly tacit knowledge. Of particular relevance to this thesis is the assertion that through mixed methods, qualitative data can help the quantitative study during design by aiding with conceptual development and instrumentation and that quantitative analysis may complement the findings of qualitative methods by confirming or rejecting apparently significant data and relationships (Amaratunga et al., 2002). Therefore, in this thesis the mixed methods strategy follows a sequential design (Teddlie & Tashakkori, 2009) with two stages of data collection. The initial proposed framework is first refined through an explorative qualitative study in Chapter three. This study tested the assumptions of knowledge seeking as a distinct construct from the related processes of knowledge sharing and acquisition through an explorative qualitative study. Findings provided evidence of the individual and social factors which influence seeking and how they may be differentiated from those which influence acquisition and sharing. It also elucidated the differing dimensions of knowledge seeking, such as the motivation to seek and decisions of whom to seek from, thereby a more granular insight into the factors influencing interpersonal knowledge seeking for tacit knowledge. The second stage of the study is explanatory, and involves testing the relationships proposed in the conceptual framework using a survey in Chapter four. Following separate analysis of each, the quantitative and qualitative findings are integrated in Chapter five to provide in-depth explanations of the complex relationships effecting individual knowledge seeking in high tacit knowledge contexts.

Figure 1-1: Research Process and Design



1.5.2 Research Philosophy

This mixed method research design was underpinned by a pragmatist research philosophy. While paradigmatic positions are often assumed with quantitative (positivist) and qualitative (constructivist) methods, there is much debate regarding what paradigm is suitable for mixed methods studies. However, pragmatism is proposed as the most appropriate paradigm (Teddlie & Tashakkori, 2003). Pragmatism supports both singular and multiple realities which allows the researcher to test hypotheses and present multiple perspectives. Therefore, the pragmatism paradigm combines the ontological views of post-positivism and constructivism, assuming that singular and multiple realties can exist, as opposed to arguing for one reality. This perspective is a more flexible approach when compared with post-positivism and constructivism as it rejects a forced choice between existing paradigms with regard to logic, ontology, and epistemology. The epistemology of pragmatism supports the view that data can be collected by 'what works' to address research questions, rather than the distance and impartiality epistemology of post-positivism or the necessity of closeness advocated by constructivism (Creswell & Plano Clark, 2007). Pragmatism is a practical, applied research philosophy which uses a methodology of abductive reasoning to move iteratively from deductive to inductive reasoning (Venkatesh, Brown & Bala, 2013). This approach allows the research to provide meaningful insights into the phenomenon of interest. Adopting the pragmatist paradigm involves deciding on appropriate methods based on the research question, context, and practical considerations (Greene & Caracelli, 2003). Additional characteristics of pragmatism include the view that theories are instruments judged by how well they currently work, and advocating action over philosophy (Teddlie & Tashakkori, 2009). This thesis applies pragmatism as its research philosophy due to its flexibility and practical nature.

1.5.3 Research Context

The thesis investigated two different research contexts within Ireland, Study 1 took place within the manufacturing sector in Ireland across three multinational organisations, while Study 2

took place in the health care sector in Ireland across several hospitals. These industries were deemed appropriate contexts to study tacit knowledge as research has shown that intellectual capital or knowledge represents the majority of added value in services and manufacturing industries (Quinn, Anderson & Finkelstein, 1996).

In addition, the job roles of the populations investigated were appropriate for examining knowledge behaviours. Study 1 investigated technicians and engineers and production supervisors who were asked about their behaviours when engaged in non-routine problems solving tasks. Study 2 investigated junior doctors who were also asked to refer to specific tasks which consultant doctors chose prior to the study due to their tacit nature. These roles and job tasks are particularly relevant for investigating tacit knowledge as both the technicians and engineers investigated in Study 1 and the junior doctors investigated in Study 2 engage in knowledge-intensive work, and the tasks that were specifically investigated required experiential, context-specific, tacit knowledge in order to complete them effectively. Therefore, the employees investigated engaged in tasks that required them to rely on colleagues for knowledge to solve problems or complete tasks. The job specifics are important to acknowledge as they are likely to have an impact on seeking behaviours. For example, job characteristics theory suggests that in roles where seeking is key to completing a task, people may be "forced" or expected to seek (Foss, Minbaeva, Pedersen, & Reinholt, 2009; Hackman & Oldham, 1976) and this is likely to impact on their seeking behaviours (Sergeeva & Andreeva, 2015), therefore contextualising our understanding of who seeks knowledge.

The populations investigated compare with a variety of prior research on knowledge sharing which also focused on knowledge-intensive work, including professionals in pharmaceutical companies, life scientists, employees in high-tech firms, engineers within manufacturing sectors in the U.S, nurses in Canada (e.g. Andrews & Delahaye, 2000; Levin & Cross, 2004; Collins & Smith, 2006; Hsiao, Tsai, & Lee, 2006; Leiter, Day, Harvie, & Shaughnessy, 2007; Siemsen, Balasubramanian, & Roth, 2007). Research specifically focused on interpersonal knowledge seeking has examined consultants, frontline employees, project managers and supervisors (Cross & Borgatti, 2004; Gray & Meister 2004; Hansen et al., 2005). In addition, some knowledge sharing studies specified a focus on investigating knowledge sharing for completing a project together (Constant, Spoull & Kiesler, 1996; Barrett & Oborn, 2010) or collaborating (Andrews & Delahaye, 2000; Hsiao, Tsai, & Lee, 2006) similar to this research. However, this thesis represents a further contribution to existing research as it is the first to investigate the three sharing processes of knowledge seeking, acquisition and sharing within the same contexts. As this research examines all three behaviours in two separate industries, this provides more certainty regarding the applicability of findings to other knowledge-based work contexts. Additionally, this research exclusively focuses on tasks which require more tacit knowledge, and provides contextual consideration of the role tenure and expertise in the sampled populations play in differentiating knowledge seeking, acquisition and sharing.

1.6 Thesis Structure

The three studies presented in this thesis address the thesis research questions by proposing and examining individual and social factors which influence interpersonal knowledge seeking and may effect knowledge acquisition within a high tacit knowledge context from a conceptual, qualitative and quantitative perspective.

Prior to presenting these three studies, the theoretical background of organisational knowledge and knowledge sharing have been presented in this chapter (Chapter 1). This chapter illustrates the broad research gaps within the knowledge sharing field, the overall research objectives of this thesis, and specific research questions guiding this thesis. In addition, this chapter discussed the methodology underlying the research in terms of its design, philosophy, and chosen contexts.

Chapter 2 reviews the theoretical underpinnings of knowledge sharing and examines prior literature on knowledge seeking in order to propose a conceptual framework guiding the following studies. The literature review highlights the conceptual and measurement inconsistencies surrounding behaviours of knowledge seeking and acquisition within sharing literature. This study uses the 4i Organisational Learning Framework (Crossan et al., 1999) to understand how individuals may learn within the knowledge sharing process through seeking. It also introduces both Social Cognitive Theory (Bandura, 1986)) and Social Capital Theory (Nahapiet & Ghoshal, 1998) to investigate possible individual and social factors which may influence interpersonal knowledge seeking behaviours. From this, a conceptual framework is proposed to investigate knowledge seeking from others when engaged in tasks requiring tacit knowledge.

Following the review of knowledge seeking and propositions concerning individual and social capital factors which may influence knowledge seeking, Chapter 3 explores and distinguishes between those individual and social factors which influence seeking to those which influence acquisition and sharing. This study addresses the thesis research question “what factors influence the knowledge seeking behaviours of individuals engaged in tasks with high levels of tacit knowledge?”. To do so, analysis is presented from 33 semi-structured interviews with employees from three multinational organisations who must solve non-routine problems.

Chapter 4 empirically tests the specific propositions described in Study 1, which are fine-tuned based on the exploratory findings within Study 2. This study addresses the thesis research questions 1 and 2 using a cross-sectional design with a sample of 238 junior doctors in Ireland engaged in tacit tasks.

Finally, Chapter 5 concludes by synthesising and discussing the findings from Chapter 3 and 4 in light of the two research questions introduced in Chapter 1. The main theoretical, empirical and methodological contributions of the research are discussed, as well as the practical implications. The limitations of the studies and recommendations for future research will also be presented.

CHAPTER 2: **LITERATURE REVIEW**

Knowledge Seeking and its Individual and Social Antecedents – A Review and Conceptual Model

2.1 Introduction

Sharing tacit knowledge can create a sustained competitive advantage for organisations (Grant, 1996) as it is rare, difficult to substitute, imitate and transfer (Grant, 1996; Nonaka, 1991). Knowledge sharing is defined as the provision or receipt of task information, know how, and feedback on a product or a procedure (Hansen, 1999). However, sharing tacit knowledge can be particularly difficult due to its less than articulable nature (Kogut & Zander, 1992). As tacit knowledge resides in the minds of individuals rather than organisations (Grant, 1996), it's value is only apparent when individuals are motivated to share this type of knowledge with their peers (Hansen, Mors, & Løvås, 2005; Szulanski, 1996) and recipients are motivated to learn from the provider (Hurley, 2002). It is only when both provider and recipient take part in this two-way sharing process that tacit knowledge is effectively acquired. Despite this recognition of the particular value of tacit knowledge and the social complexity in sharing it, extant knowledge sharing literature has tended to focus on a concept of knowledge which does not distinguish between explicit and tacit knowledge. This is problematic as factors that enable the sharing and acquisition of explicit knowledge may not also enable the transfer of tacit knowledge..

Additionally, the knowledge sharing literature generally focuses on the uni-directional exchange of knowledge from the provider to the recipient (Hansen, Mors, & Løvås, 2005; Kim, Song, & Jones, 2011) i.e. the knowledge "provider", "supply" or "push" perspective (Kim et al., 2011; Lin, Geng, & Whinston, 2005; McElroy, 2003). Research from this perspective focuses on exploring factors which increase the individual's exposure to knowledge and expecting that acquisition will naturally follow. However, knowledge which is "pushed" or "shared" will not necessarily be successfully transferred or acquired if the "recipient" cannot or does not locate, access, and learn that which they require. Learning literature identifies that knowledge is only acquired from others in the workplace (Eraut, 2000; Le Clus, 2011) when people have the need, motivation or opportunity for learning (Marsick & Watkins 2001) and therefore control of learning rests primarily in the hands of the learner (Marsick & Watkins, 1997), who is trying to learn from an experience (Foley, 2004). It follows that simply "pushing" knowledge to the recipient may not be an effective approach to ensuring they acquire this knowledge for two reasons. First, they may not have a need for knowledge at that time, and second the recipient may not be motivated to learn from the knowledge provider. As a result, shifting the focus on how the recipient acquires knowledge may add insight into how to enable successful knowledge sharing.

The recipient perspective focuses on the need for employees to successfully acquire and learn from the knowledge that they seek (Argote & Ingram, 2000; Quigley, Tesluk, Locke, & Bartol, 2007). Knowledge search by the "recipient" is the logically prior phase of knowledge sharing (Hansen, Mors & Løvås, 2005) and an important but under-researched phase of the knowledge

sharing process (Hansen, Mors & Løvås, 2005; Hansen, Nohria & Tierney, 1999; Zhang, 2020). Consequently there are calls for theory and research on the knowledge seeking, "pull" or "recipient" perspective (Chatti, Jarke, & Frosch-Wilke, 2007; Hansen et al., 2005; Naeve, 2005; Kim et al., 2011; King, Chung & Haney, 2008; Lai & Graham, 2009).

While theories investigating knowledge seeking are notably absent, insight on tacit knowledge sharing and acquisition processes are garnered from existing theories with a particular focus on tacit knowledge, and the face-to-face interaction neccesary when sharing and learning tacit knowledge. These include the SECI (socialization externalization combination and integration) model (Nonaka & Takeuchi, 1995) and the 4i organisational learning framework (Crossan, Lane, & White, 1999). However, while the SECI model outlines the phases involved in tacit-explicit-tacit knowledge conversion, it is criticised for failing to explain the processes that enable this conversion and ensure that knowledge made explicit is understood and learned (Freyens & Martin, 2007; Gourlay, 2003; 2006; McIver, 2012). The 4i organisational learning framework focuses more on how knowledge is learned and so is a useful complement to the SECI model. However, due to a lack of empirical research investigating the on the 4i framework (Crossan, Maurer, & White, 2011), the processes enabling or impeding the 4i's are insufficiently understood. Both the SECI and 4i and related research (Bartol & Srivastava, 2002; Hansen, Nohria, & Tierney, 1999; Levin and Cross, 2004; Nonaka, 1994; Osterloh & Frey, 2000; Yang & Farn, 2006; 2009) identify that socialization is central to tacit knowledge sharing and learning, however the enabling or impeding factors for socialization are unarticulated. Both models remain vague about the concrete underlying cognitive and social mechanisms (Kump, et al., 2015).

Two theoretical lens through which to more precisely investigate the cognitive and social processes behind tacit knowledge seeking are social cognitive theory (SCT) and social capital theory. Social cognitive theory suggests that both individual cognition and environmental factors including social factors are predictors of individuals' behaviour (Bandura, 1986, 1997) (in this case knowledge seeking). One component of cognition, self-efficacy, suggests that expectations are major factors in determining affective and behavioural reactions in numerous situations, including behaviour (Bandura, 1986; Martinko, Henry, & Zmud, 1996). SCT identifies social interaction as an environmental factor predictive of individuals behaviour, however research to-date has not investigated this component of SCT (Chiu, Hsu, & Wang, 2006) or explored this component in any detail. Therefore, social capital theory, which describes the characteristics of social relationships and the resources embedded within these relationships that can be used to acquire knowledge (Nahapiet & Ghoshal, 1998**),** is useful for both exploring the social interaction component of SCT and the socialization process central to the SECI and 4i frameworks. Combined, these two theoretical lens can be used to investigate the pertinent cognitive and social interaction factors impacting tacit knowledge seeking processes.

This chapter reviews existing knowledge sharing literature on the recipient perspective and thereafter proposes a framework of tacit knowledge seeking, which emphasises the role of the recipient in knowledge sharing interactions. This framework is underpinned by social cognitive theory and social capital theory as a basis to explain behaviour in the context of social interactions, and proposes that certain cognitive and social capital factors influence knowledge seeking. First, this chapter will define tacit knowledge, introduce relevant knowledge sharing theories and then investigate the recipient processes of knowledge seeking and acquisition as part of the knowledge sharing process. Finally, it considers the cognitive and social factors which may influence the success of tacit knowledge seeking and present a set of propositions surrounding the conditions of enabling knowledge seeking.

2.2 Literature review

2.2.1 Tacit Knowledge

Tacit knowledge can be defined as unarticulated knowledge which is tied to the senses, skills, personal experiences, intuition, or implicit rules of thumb (Nonaka & von Krogh, 2009). It is described as both personal knowledge rooted in commitment, ideals, values and emotions, and as practical knowledge demonstrated in "know how", action, procedures and routines (Ambrosini & Bowman, 2001). It can also be situation or context specific, typically acquired on and relevant to the job (Ambrosini & Bowman, 2001). It is distinguished from explicit knowledge, which is easily articulated and has a more general nature which is relevant across contexts (Nonaka and von Krogh, 2009). Tacit and explicit knowledge overlap and cannot be delineated as completely separate, but exist along a continuum (Nonaka & Takeuchi, 1995; Nonaka & von Krogh, 2009; Subashini, 2010). The seminal author on tacit knowledge, Polanyi (1967), describes explicit knowledge as grounded in tacit knowledge supposing that one can't exist without the other. However, notable authors Nonaka and von Krogh (2009) describe explicit and tacit knowledge as existing along a continuum of knowledge; but acknowledge the danger of overly differentiating the two concepts. Despite differing opinions on the distinction between tacit and explicit knowledge, this research subscribes to the view that tacit knowledge exists along a continuum and therefore some part of tacit knowledge may be explicated (Nonaka & Takeuchi, 1995; Nonaka & von Krogh, 2009; Subashini, 2010). Ambrosini and Bowman (2001) claim that there are degrees of tacitness, some of which may be deeply ingrained skills, be imperfectly articulable, or easily articulated. Nonetheless, due to the characteristics of tacit knowledge it is more difficult for it to be converted into an explicit form in order to be easily transferred and shared (Berman et al., 2002). The personal nature of tacit knowledge ensures that managing tacit knowledge is unique to general knowledge management methods as tacit knowledge is owned by the knowledge worker rather than the organisation (Kreiner, 2002; Wright & McMahan, 2011) and is thus "invisible" to the organisation. Due to these characteristics, sharing tacit knowledge

with another individual and therefore within the wider organisation is a major and well documented challenge in the literature.

2.2.2 Theoretical Perspectives of Tacit Knowledge Sharing

Knowledge sharing is defined as a process comprising of both providers and recipients exchanging knowledge (Foss, Minbaeva, Pedersen, and Reinholt, 2009; Hendriks, 1999; Kuo & Young, 2008; Nonaka & Takeuchi, 1995), however much of the literature ignores the recipients role in knowledge sharing. This sharing process requires two behaviours: providing one's knowledge to others and receiving and understanding knowledge from others (Bircham-Connolly, 2005). It is through interaction that this knowledge can be shared between individuals (Nonaka & Takeuchi, 1995). Knowledge providers can share their knowledge through codifying, showing, and describing (Hendriks, 1999). Knowledge recipients need to understand the knowledge that they seek (Argote & Ingram, 2000; Quigley, Tesluk, Locke, & Bartol, 2007), and therefore the expected outcome of knowledge sharing from the receiver perspective is acquiring and learning knowledge.

As tacit knowledge sharing is a reciprocal relationship between a provider and recipient, knowledge sharing can be either proactive or responsive for both provider and recipient. For example, the provider might share their knowledge proactively (providing advice, guidance, or expertise) or responsively (answering questions, responding to a request for help) (Zhang et al., 2015). Similarly, the recipient may proactively seek knowledge or responsively learn the knowledge provided. Much of the current literature assumes and investigates proactive knowledge sharing behaviour by the provider and responsive knowledge acquisition by the recipient, for example that the knowledge source or provider voluntarily shares their understanding and experiences unprompted in order that the recipient learns. In this scenario, as the recipient is a passive part of the sharing process, they rely on the provider to identify knowledge that they may need. However, the alternative scenario also occurs - that the knowledge provider responsively shares knowledge when asked specific questions or presented with an unsolved problem by the recipient. In this scenario, the "recipient" identifies a knowledge gap or problem and seeks the knowledge they need to effectively do their job. This is an important distinction for knowledge sharing research, as individuals are more willing to provide knowledge when directly asked by other colleagues (Zhang et al., 2015).

Knowledge sharing in which the recipient has a responsive role is interested in whether its recipients acquire the knowledge provided. This has been referred to as knowledge acquisition; defined as the extent to which an individual acquires experiences and know-how from co-workers (Yang & Farn, 2010). This term has also been used interchangeably with "learning" at both individual (e.g. Ryu, Kim, Chaudhury, & Rao, 2005; Assimakopoulos & Yan, 2006), team, and organisational level (e.g. Argote, 1999; Sherwood & Covin, 2008). This is because knowledge acquisition is a form of learning from others, which happens in the minds of recipient via sense-making over time

(Tangaraja et al., 2016). This occurs when the recipient acquiring knowledge from the provider integrates their new knowledge into their existing knowledge (Wilkesmann & Wilkesmann, 2011). Therefore, knowledge cannot be shared intact because learning knowledge acquired is an active process of constructing knowledge in the receivers' mind (Savery & Duffy, 1995; Duffy & Cunningham, 1996; Oliver, 2001). When an individual has acquired knowledge, that person's knowledge has expanded or the application of knowledge has been enabled (Alavi & Leidner, 2001). Recent literature has suggested that it is under-researched but important to understand how individuals acquire the knowledge they need. Differences in how individuals acquire tacit knowledge could stem from the learning process itself (Armstrong & Mahmud, 2008).

The process of sharing and acquiring tacit knowledge is addressed in both the organisational learning and knowledge management literatures, although knowledge seeking is notably absent within the theories of these literatures. The prevailing theory within knowledge management literatures propose that sharing tacit knowledge is achieved via a process of conversion between tacit and explicit knowledge. This is exemplified by the work of Nonaka and others (Nonaka, 1994; Nonaka & Takeuchi, 1995; Davenport & Prusak, 1998; Brown & Duguid, 2001). Specifically, the theory of organisational knowledge creation theorises that knowledge is converted and therefore shared via a spiralling process composed of internalization (conversion of explicit-to-tacit knowledge), socialization (conversion of tacit-to-tacit knowledge), externalization (conversion of tacit-to-explicit knowledge) and combination (conversion of explicit-to-explicit knowledge) – namely the SECI model (Nonaka, 1994; Nonaka & Takeuchi, 1995).

Particularly relevant to sharing and acquiring tacit knowledge within the SECI model is the both the socialization and externalization processes. Socialization refers to the sharing tacit knowledge between individuals, without the need to explicate it. Individuals involved in socialization acquire or learn tacit knowledge through shared experiences. In this process the individual acquires or learns through observation, imitation, and practice (Nonaka, 1991). Thus, socialization usually emerges from close interactions that enable experience sharing (Nonaka, 1994). However, tacit knowledge may also be exchanged in a more explicit way through converting tacit experiences to more explicit understandings between people. The externalization process - the conversion of tacit knowledge to explicit knowledge - requires expressing tacit knowledge in an adequate way in order to increase comprehension by other individuals. The satisfactory conversion of tacit into explicit knowledge depends on a sequential use of metaphor, analogy and models (Nonaka, 1991). At this stage, knowledge conversion is a social process, in that it takes place not only within individuals but also in the interaction between individuals and their environment (Poell & Van der Krogt, 2003).

However, there are several criticisms of the implicit assumption that all tacit knowledge can be "converted" to explicit knowledge and arguments that it is underinvestigated in the Socialization-

Externalization-Combination-Internalization (SECI) model (Gourlay, 2003, 2006; Gueldenberg & Helting, 2007; Tsoukas, 2003, 2005; Tsoukas & Vladimirou, 2001). Some authors argue that the SECI model is over-simplified and does not adequately explain the sharing processes that enable tacit-to-tacit and tacit-to-explicit knowledge conversion (Freyens & Martin, 2007; Gourlay, 2003, 2006). Additionally, this model does not address why, how, when, or where individuals would seek and share knowledge (Lottering & Dick, 2012). The model treats knowledge as something that, once made explicit, can be internalised by individuals regardless of their current levels of knowledge or their embeddedness in their social community (Powell et al., 2007). Crossan, Lane and White (1999) suggest that making something explicit does not necessarily mean that understanding is shared. Some criticisms specifically note the lack of focus paid to the recipient of knowledge shared in the socialization and externalization processes (Bereiter, 1999; Powell et al., 2007). Specifically, that the SECI model does not take into account the incremental nature of acquiring knowledge and thereby how depth of understanding is achieved (Bereiter, 1999: 175-79). This illuminates the importance of explaining what learning processes the recipient uses to acquire knowledge from others within the knowledge sharing interaction.

The organisational learning literature's 4I model (Crossan, Lane & White, 1999) can help to explain the learning processes involved in acquiring knowledge within the sharing process. It is concerned with how sharing knowledge (i.e. cognition – knowledge, understanding, and beliefs) results in changes in behaviour (action). This emphasis is important, and a complement to the SECI model, as it focuses on the learning processes individuals engage in when the provider shares knowledge. The 4I model looks at knowledge sharing from the individual level through to the organisation level. There are four processes through which this model argues learning occurs: intuiting, interpreting, integrating and institutionalizing (Crossan, Lane, & White 1999) through either a feed-forward or feed-back loop. Individuals identify new ways of thinking or acting through a process of intuiting. This is predominantly subconscious and results in new insights. Later literature proposed that intuiting can also involve a more active state of "attending" through consciously seeking information and opposing views from their environment (Zietsma, Winn, Branzei & Vertinsky, 2002). This supposes that learning not only arises from a subconscious and pre-verbal internal intuiting process but also from an active engagement with new information and stimuli which warrants thought and examination. Interpreting assumes that individuals learn during the process of knowledge sharing by verbalizing or explaining their insights to themselves and others. This takes place through interaction within the work group (Crossan et al, 1995). Integrating involves the members of the group forming a new shared understanding and confronting existing organisational structures and thoughts. If this is successful and sustained, those existing structures must be adjusted to accommodate the new way of doing things. This last step is the organisational level process of institutionalizing where coordinated actions occur through a shared understanding resulting from dialogue and joint actions (Crossan et al., 1999; Crossan, Maurer, & White, 2011). Feed-forward

learning takes place when such individual gains are shared with other employees and with managers (interpreting and integrating). Feedback flows occur as a result of tacit knowledge being codified so that it can be disseminated throughout the organisation. Overall, this framework proposes specific processes at individual, team, and organisational levels which explain how individuals move from intuitive individual learning, to sharing and acquiring knowledge from groups, to group and organisational learning through routines and procedures. Of particular interest to this research is the individual learning process of interpreting, which describes how individuals learn through sharing and verbalising insights. As a result, the framework can offer an understanding of how the individual learning process, namely interpreting, can enable effective understanding and acquisition. However, the 4i framework does not offer an insight into knowledge seeking, or whether individuals who seek may better engage with the interpreting processes to acquire knowledge.

While these theories offer different insights into processes involved in sharing knowledge and how they lead to organisational outcomes, both the SECI and 4i framework propose that social interaction is part of the process of learning and acquisition. Specifically, the socialization process of the SECI suggest that recipients acquire tacit knowledge from others through shared experiences, whereas the intuiting process of the 4i framework suggest that the recipient acquires knowledge both through "attending" to their environment, which then leads to interpreting as recipients question their own insights with others and use their cognitive maps to share knowledge through words or actions. These processes are related in the way they conceptualise how tacit knowledge can be "converted" through social interaction. Within socialization, tacit knowledge is converted to a more explicit form through language using metaphors, analogy and shared mental models. Similarly, the interpreting process facilitates the development of shared understandings through verbalization and prompts integrating, a process occurring through dialogue and joint action within a group. Shared understandings become preserved in language, embedded in shared cognitive maps, and enacted in a coordinated fashion. These interpreting and integrating processes can therefore be compared to the tacit to explicit "conversion" in Nonaka's (1995) externalization process.

Additionally, both theories recognise that the conversion of tacit to explicit knowledge is an integral element to sharing tacit knowledge. The key to "converting" and exchanging tacit knowledge between people, identified in both models, lies in sharing knowledge in social interactions through "socialization" and understanding knowledge through "intepreting". Engaging in discourse with others leads to the "integrating" or "externalisation" of knowledge to the wider group. Both theories recognise that individual level learning is part of the sharing process which can enable team and organisation level learning. Individual level learning can be defined as individual competence, capability, and motivation to undertake the required tasks (Bontis, Crossan, & Hulland, 2002). This definition describes the activities the recipient must engage in to acquire tacit knowledge; they must be motivated to learn, as well as having the competence and capability to learn new knowledge.

However, the SECI model is not explicit in how the recipient acquires knowledge within the knowledge sharing process and neither model emphasises seeking behaviour as part of the sharing process. Indeed, recent research identifies that the part knowledge seeking plays in sharing tacit knowledge is under-theorised and not empirically investigated (King, Chung & Haney, 2008; Lai & Graham, 2009). These models also do not identify the causative or impeditive factors in such seeking and sharing behaviour. Specifically, the factors which prompt individuals to seek and what aids the social interaction and learning process between seeker and provider are not addressed in theory and there is a consequent lack of empirical research. This has led to criticism of the SECI model (Freyens & Martin, 2007; Gourlay, 2003, 2006) and calls by Crossan et al., (2011) for empirical research on the 4i framework.

2.2.3 Defining Tacit Knowledge Seeking

Knowledge seeking is defined as the extent to which an individual accesses other employees' expertise, experience, insights, and opinions (Gray & Meister, 2004). The decision to seek knowledge may result in actual seeking behaviours to find knowledge that may be useful (Hansen, Mors, & Løvås, 2005) and a successful search of knowledge culminates in locating and retrieving needed information and expertise to complete certain tasks (Yuan, Rickard, Xia, & Scherer, 2011).

Knowledge seeking is distinct from related concepts such as information seeking. Information seeking is a broad concept that can describe both active and passive acquisition of facts from others (e.g., Borgatti & Cross, 2003) or from one's environment (e.g., Johnson, 1996). On the other hand, knowledge seeking describes an individual's efforts to search out and access knowledge produced by individuals, and thus not available elsewhere. The difference between obtaining facts (available through multiple sources) and knowledge (only available from a person with experience and insight) is critical to understanding the unique role played by knowledge in organisations (Gray & Meister, 2004). Just as sharing tacit versus explicit knowledge requires distinctly different sharing methods (Hislop, 2013), seeking tacit knowledge requires person-to-person interaction with the provider who has experience and insight. Particularly as tacit knowledge is best acquired through socialization and face-to-face interaction (Nonaka & Takeuchi, 1995) which enables interpretation, negotiation and storytelling to take place (Orr, 1996; Wenger, Snyder, & McDermott, 2002). Therefore, research interested in tacit knowledge seeking must examine interpersonal knowledge seeking which occurs between people. Interpersonal seeking can take the form of dyadic, one-to-one seeking or collective, one-to-many seeking in order to learn (Gray & Meister, 2004). Dyadic knowledge seeking refers to a single knowledge seeker engaging in dialogue with an individual source, and is part of the knowledge management strategy which promotes person-to-person contacts (Hansen et al., 1999). Collective knowledge seeking involves knowledge exchange in a setting containing multiple individuals. This research defines knowledge seeking as in interpersonal process

in which a seeker looks for and identifies potentially useful knowledge (Hansen, 1999) in order to access other employees' expertise, insights, and opinions (Gray & Meister, 2004).

However, many studies do not distinguish between interpersonal seeking and seeking from other sources such as documents, online repositories, or virtual communities of practice (e.g. Gray & Meister, 2004, Kankanhalli et al., 2011) and therefore we do not fully understand the factors which may effect seeking for tacit knowledge specifically through interpersonal means. The few studies that do research interpersonal knowledge seeking and its antecedents or outcomes (e.g. Gray & Meister, 2006; Hansen, Mors & Løvås, 2005; & Cummings; 2015) do not illuminate how these antecedents or outcomes of seeking may differ in highly tacit contexts or between methods of seeking such as dyadic or collective exchanges.

2.3 Learning Outcomes of Knowledge Seeking

Seeking knowledge from others does not ensure that the knowledge received is useful or fully acquired (Tangaraja et al., 2016). Therefore, in order to investigate successful knowledge seeking and sharing, research must assess the learning outcomes such as useful knowledge acquisition (Levitt & March, 1988; Wasko & Faraj, 2000; Lai & Graham, 2009). Seeking knowledge should enable its acquisition (Huber, 1991, p. 125; Wilkesmann, Wilkesmann & Virgillito, 2009), where acquisition refers to the extent to which an individual learns from the experiences and know-how from co-workers (Yang & Farn, 2010). Knowledge seeking is likely to be an effective method to acquire knowledge as it is motivated (there is a specific need) and the knowledge is timely. Motivation (for receiving knowledge), timeliness and relevance of knowledge are important determinants of learning, and therefore relevant to knowledge acquisition.

As illustrated by the SECI and 4i framework, *tacit* knowledge is best exchanged through socialization between people (Nonaka & Takechi, 1995) and individuals acquire knowledge through the knowledge sharing process by interpreting. This indicates that recipients who can engage in verbalisation, shared dialogue and action can reach a shared understanding and acquire tacit knowledge. While there is limited research operationalizing the 4i framework, one such study found that individuals who actively sought and attempted to understand divergent views were more likely to engage in the feed-forward learning processes of intuiting and interpreting (Zietsma et al., 2002). This suggests that interpreting may be an important outcome of knowledge seeking which can ultimately lead to knowledge acquisition. Therefore, this research proposes that interpersonal knowledge seeking is a sequential process in which successful seeking requires the seeker to approach a provider for knowledge, engage in the interpreting process and acquire knowledge received. Investigating this process ensures that knowledge seeking results in useful learning.

> *Proposition 1: Interpreting will positively mediate the relationship between interpersonal knowledge seeking and knowledge acquisition.*

2.4 Factors Influencing Knowledge Seeking

2.4.1 Existing Literature on Knowledge Seeking

Despite the importance of the recipient and their learning in the knowledge sharing process, confusion in the definition and operationalization of recipient behaviours is evident in much of the sharing literature. Prior literature which has measured bi-directional knowledge sharing suggests providers "donate" knowledge and receivers "collect" knowledge (e.g. Tangaraja et al., 2015, 2016). Collecting knowledge, largely identified in bi-directional knowledge sharing literature, has been defined as "consulting with colleagues in order to get them to share their intellectual capital (van den Hooff & de Ridder, 2004), and has been empirically tested in various studies (e.g. van den Hooff & de Ridder 2004; van den Hooff & van Weenen, 2004; De Vries et al., 2006; Lin, 2007). However, literature has operationalised collecting inconsistently as a behaviour involving both giving knowledge and receiving knowledge (e.g. van den Hooff & van Weenen, 2004; Lin, 2007), as well as simply receiving knowledge from colleagues by asking (e.g. van den Hooff & de Ridder 2004; De Vries et al., 2006). Different operationalizations of similar constructs and concepts or vice versa have led to having mixed-up antecedents and outcomes and have eventually created confusions on the cumulative understanding of the concepts (Tangajara et al., 2016). Other related research in the form of 'exploration', 'information acquisition' and 'information seeking' exists within the knowledge management literature (e.g. Bock, Kankanhalli, & Sharma, 2006; Gray & Meister, 2004, 2006; He, Fang, & Wei, 2009; Kankanhalli, Tan, & Wei, 2005; Lin, Geng, & Whinston, 2005; Sharma & Bock, 2005). However, these concepts are distinct from interpersonal tacit knowledge seeking, as they tend to focus on information rather than knowledge or specifically tacit knowledge, and fail to recognise tacit knowledge seeking as a socially grounded learning process.

Prior research investigating *information* seeking has shown that people are motivated to seek information to reduce perceived uncertainty in their social and work environments (Huber & Daft, 1987; Hass & Witte, 2001), to make sense of changes in the external environment, to develop personal expertise, and to support decision making (Pereira & Barbosa, 2008). When choosing a knowledge source, research finds that organisational members seek information from colleagues they perceive to be knowledgeable in relevant knowledge domains (Contractor et al., 2004; Cross, Rice, et al., 2001; Palazzolo, 2005), particularly when a work task requires knowledge beyond their areas of expertise (Brandon & Hollingshead, 2004; Hollingshead, 1998). Other pertinent factors include the seeker's perception of the quantity and quality of the information to be obtained (Zmud, 1978), the credibility of the source (Fisher, Ilgen & Hoyer, 1979; O'Reilly & Roberts, 1976), the anticipated accessibility of the source (O'Reilly, 1982), the perceived costs of obtaining information from this source (Hansen & Haas, 2002), the seeker's expectation of how the person contacted will respond (Dewhirst, 1971), the strength of the social relationship with the knowledge source (Allen, 1977), previous frequency of interaction (Gerstberger & Allen, 1968), and geographic proximity (Monge,

Rothman, Eisenberg, & Kristie, 1985), and cultural distance between the seeker and the knowledge source (Shenkar, 2001). A recent study (Yuan, Fulk, Monge, & Contractor, 2010) confirms that team members are more likely to engage in information exchange with other team members when they have developed a sense of "who knows what" within the team. To summarise, seekers may be motivated to seek due to environmental factors (i.e. reduce uncertainty or address changes) or personal goals (support decision making and gain expertise). In addition, this research indicates that characteristics of the provider and the seekers relationship with them are important. Namely, seekers choose knowledgeable sources, who have relevant knowledge, are credible, accessible, close by and with whom the seeker has a good relationship. However, most of this research focuses on personal characteristics of the provider rather than the seeker. However, seeking is a learning behaviour, and learning theories such as Social Cognitive Theory suggest that the learner's cognition and associated factors are important determinants of behaviour (Bandura, 1986). This indicates that more understanding of seeker attributes is needed to understand why people seek.

When considering research which has investigated *knowledge* seeking specifically, some seeker characteristics come to light (see table 2.1 for an illustration of the review results). This research examines knowledge seeking predominantly from an individual perspective, although one study examines the knowledge seeking behaviour between teams (e.g. Hansen, Mors & Løvås, 2005). In particular, this research has shown that seeker's characteristics such as learning orientation (Gray & Meister, 2004; Gray & Durickova, 2005), self-efficacy (Bock et al., 2006; Lin, 2007) and risk aversion (Gray & Durcikova, 2005) effect knowledge seeking.

In addition, various facets of the relationship between seeker and provider are important for knowledge seeking. For example, elements of structural social capital including relationship strength (Hansen, Mors, & Løvås, 2005) negatively effect within-team decisions to seek outside the team. In other words, teams who have strong internal relations are less likely to seek outside that network. Relational social factors such as collaborative norms, (Bock et al., 2006), norms of reciprocity, interpersonal trust, (Chen & Hung, 2010), and cognition and affect-based trust (Nebus, 2004; Zhang & Chen, 2018) effect knowledge seeking. However, much of this research has examined knowledge seeking only through online sources (Bock et al., 2006; Gray & Durickova, 2005) or not distinguished between interpersonal and online sources (Gray & Meister, 2004), or seeking and sharing (Lin, 2007; van den Hooff & van Weenen, 2004) or have not considered characteristics of knowledge sought, such as the tacitness of knowledge exchanged. Therefore, research investigating which factors influence the interpersonal knowledge seeking behaviours in the context of completing highly tacit tasks is limited.

Table 2-1: Prior Literature Investigating Knowledge Seeking

Authors:	Type of seeking investigated:	Factors influencing seeking:	Outcomes of seeking:	Criticisms:
Gray & Meister (2004)	Knowledge seeking from dyadic, published and collective sources.	Intellectual Demand (+) Learning orientation (+),	Learning outcomes [formative – replication, adaption, innovation] (+)	Does not distinguish between interpersonal seeking and published seeking
Nebus (2004)	Knowledge Seeking	Affect-based trust (+), indirect Cognition-based trust (+), indirect		Does not consider the nature of knowledge
van den Hooff & de Ridder (2004)	Knowledge Seeking or 'collecting'	Communication climate (+)	Knowledge donating (+)	Does not distinguish between different methods of interpersonal seeking
van den Hooff & van Weenen (2004)	Knowledge Seeking & Providing	Computer-mediated communication (+) Commitment (+)	Knowledge Donating (+)	Does not distinguish between seeking and sharing
Hansen, Mors & Løvås (2005)	Team knowledge seeking (outside team)	*Team seeking across subsidiaries effected by:* Within team size (-) Within team relation strength (-) Inter subsidiary team size (+)	N/A	Measures intra-team seeking rather than individual level interpersonal seeking
De Vries, van den Hooff & de Ridder (2006)	Knowledge Seeking or 'collecting'	Knowledge sharing willingness (+) Knowledge sharing eagerness (+) Team Extraversion (+), (direct and indirect) Job satisfaction (+), (indirect) Team Agreeableness, (+) (indirect) Self-rated performance (+), (indirect)	N/A	Does not distinguish between different methods of interpersonal seeking
Gray & Meister (2006)	Three types of Knowledge Seeking: dyadic, group, and published	N/A	*Group sourcing ->* Behavioural replication (+) Behavioural adaption (+) Behavioural innovation (+) *Dyadic sourcing ->* Behavioural adaption (+)	
Lin (2007)	Knowledge Seeking & Providing	Enjoyment in helping others (+); Knowledge self-efficacy (+); Top management support (+), ICT use (+).	Firm innovation capability (+)	Operationalization does distinguish between proactive sharing and proactive seeking

Tohidinia & Mosakhani (2010)	Knowledge Seeking	Intention to share (+), Level of ICT use (+)	N/A	Does not distinguish between different methods of interpersonal seeking
Wang, Gray & Meister (2014)	Internal and External Knowledge Seeking Occurring through dyadic, group and published means	Task interdependence (+) Task non-routineness (+)	Replication (+) Adaption (+) Innovation (+)	
Haas & Cummings (2015)	Dyadic Knowledge Seeking	Geographic differences (-) Nationality differences (-) Demographic differences (-)	N/A	
Zhang & Chen (2018)	Dyadic Tacit Knowledge Seeking	Cognition based trust (+) Affect-based trust (+)	N/A	Only examines dyadic seeking, not collective. However, does consider tacit knowledge.

2.4.2 Individual Factors Effecting Tacit Knowledge Seeking and Sharing

In order to understand why and under what circumstances people seek knowledge, we draw from Social Cognitive Theory (Bandura, 1986). Bandura's (1986) Social Cognitive Theory (SCT) facilitates explanation of how both cognition and social interaction can effect behaviours such as tacit knowledge sharing and seeking. SCT is based on a triadic model which postulates that behaviour, cognition and the environment are related in a reciprocal manner. In other words, a person's behaviour is partially shaped and controlled by the influences of a person's cognition (e.g., expectations, beliefs) and their social environment (within their environment, social systems, social networks). Cognition relates to the individuals' thought processes which contribute to human motivation and attitudes, such as self-efficacy. The social environment refers to the factors physically external to the person that can effect their behaviour. As people constantly interact with their social environment, most things they seek are achievable only by working together (Bandura, 2012).

2.3.2.1 Self-efficacy to Seek and Share Knowledge

Self-efficacy suggests that expectations are major factors determining affective and behavioural reactions in numerous situations, including employee behaviour in organisations (Bandura, 1986; Martinko, Henry, & Zmud, 1996). The self-efficacy concept maintains that all processes of psychological and behavioural change operate through the alteration of the individuals sense of personal mastery or efficacy (Bandura, 1977, 1982, 1986). It is the belief that one possesses the skills and abilities to successfully accomplish a specific task (Ormrod, 2006). Self-efficacy determines the individuals level of persistence in learning a task and influences their perception of future outcomes. Perceived self-efficacy plays an important role in influencing individual motivation and behaviour (Bandura, 1982, 1986; Igbaria & Iivari, 1995). Therefore, individuals who have high self-efficacy will be more likely to perform related behaviour than those with low self-efficacy.

Prior research relating self-efficacy to knowledge sharing is divided in their definition of self-efficacy. One stream of research focuses on self-efficacy beliefs of self and capabilities possesed (e.g. Liu & Liu, 2011; Lu, Leung, & Koch, 2006; Okyere-Kwakye & Nor, 2011). This perspective argues that the application of social cognitive theory toward knowledge sharing would suggest that the desire or ability to share knowledge is not sufficient to carry it out, a knowledge producer must also have the perceived capabilities to complete the sharing process (Okyere-Kwakye & Nor, 2011). Some studies refer to this as perceived self-efficacy (Liu & Liu, 2011) and express this form of efficacy as an individuals belief that they possess the sharing ability to make useful contributions of knowledge (Liu & Liu, 2011; Lu, Leung, & Koch, 2006). Other studies define self-efficacy in the knowledge sharing context as an individuals judgement of their expected contribution to the organisations performance (Bock & Kim, 2002; Cho & Li, 2007; Kankanhalli, Tan, & Wei, 2005b). In other words, if an individual believes that their knowledge can help to solve job-related problems,

improve work efficiency, or make a difference, they are more likely to share knowledge. In their 2002 review of knowledge sharing, Cabrera and Cabrera (2002) refer to information self-efficacy and connective efficacy as possible factors that would influence willingness to act. Information self-efficacy refers to an employees belief that the information they have would be helpful to co-workers, and connective efficacy is the belief others will actually acquire the information if it is shared (Kalman, 1999, found in Cabrera & Cabrera, 2002). As the ideal outcome of knowledge sharing is that the recipient understands and values the knowledge shared, this paper defines "self-efficacy" in the knowledge sharing context as "the confidence in one's ability to provide knowledge that is valuable to the recipient" (Constant et al. 1996; Kalman 1999).

Self-efficacy positively impacts attitudes toward knowledge sharing (Bock & Kim, 2002), willingness to share knowledge (Liu & Liu, 2011), intention to share knowledge, use of knowledge sharing mechanisms (Cho & Li, 2007), tacit knowledge sharing intention (Yang & Farn, 2010), and knowledge contribution or sharing behaviour both within and outside of electronic repositories (Cabrera et al., 2006; Kankanhalli, Tan, & Wei, 2005; Lu, Leung, & Koch, 2006). However, as the preceeding research has used different defintions of self-efficacy and knowledge sharing the concluding findings are unclear. In addition, many studies investigated knowledge sharing behaviour by focusing on either willingness (or intention) to share knowledge. Therefore, actual knowledge sharing behaviour is not investigated as it is assumed that behavioural intention is highly related to behaviour. However, a study by Yang and Farn, (2009) found that an employees tacit knowledge sharing intention is not significantly related to tacit knowledge sharing behaviour. Therefore, we propose a specific focus on (i) self-efficacy by the knowledge sharer that they can provide valuable knowledge to the recipient, rather than the definitions used in above studies (ii) tacit knowledge, (iii) knowledge sharing behaviour to investigate:

Proposition 2: Self-efficacy to share will be positively related to tacit knowledge sharing.

There is scant research to date investigating self-efficacy in terms of its relationship with knowledge seeking. Related empirical research differs in its definition of knowledge seeking, or focuses on information or explicit knowledge from information technology, systems or online information sharing media. This research identifies that self-efficacy can facilitate recipients knowledge acquisition strategies (i.e. seeking and providing) in virtual communities, mediated by the recipients cognitive replication goals. Knowledge acquisition in this context comprises of both the recipients seeking and the information provided by other people without any direct communication (e.g., traditional web pages, web-blogs, search engine, FAQs, etc.) (Kim et al., 2011). That is individuals with higher self-efficacy are more likely to pursue their cognitive goals such as knowledge seeking and acquisition (Kim et al., 2011). However, no prior research has investigated the effect of seeking self-efficacy to interpersonal tacit knowledge seeking. Therefore, we propose a

specific focus on (i) perceived self-efficacy by the knowledge seeker, which we define as the belief in their capability to search for and learn tacit knowledge from others (ii) knowledge rather than information (iii) tacit knowledge, (iv) interpersonal seeking by the recipient:

Proposition 3: Self-efficacy to seek will be positively related to tacit knowledge seeking.

2.3.2.2 Outcome expectations of seeking knowledge

Outcome expectations (OE) are an important construct that can be used to explain and predict human behaviour (Bandura, 1986), particularly intentional behaviour (Schunk, 2001, p.106). According to Lent and his colleagues (1994), outcome expectations involve the anticipated outcomes of an action (If I do X, Y will happen). In this context, "if I seek knowledge to solve a problem, I will perform better in the task". Outcome expectations have been investigated in prior literature as the usefulness or perceived usefulness of engaging in a behaviour (e.g. Albion, 2001; Davis, 1989; Delcourt & Kinzie, 1993, Niederhauser & Perkmen, 2010). Therefore, individuals' expectations that seeking knowledge is useful for task performance is one possible outcome expectation of seeking knowledge. When an individual perceives seeking to be useful for their performance, they are more likely to actively pursue seeking as a strategy to acquire knowledge.

Prior literature investigating outcome expectations related to task performance and seeking knowledge are scarce. Related knowledge research has looked at individual's attitude toward sharing knowledge and found that perceptions that sharing knowledge is useful for performance is related to positive knowledge sharing attitudes, this in turn was related to knowledge sharing intentions and behaviours (Bock & Kim, 2002). Research on the outcome expectations of seeking have predominantly focused on seeking through online repositories, virtual communities or other technological means. For example, He, Fang and Wei (2009) found that the perceived usefulness of seeking knowledge for performance lead to intentions to use electronic knowledge repositories (EKRs). In the context of seeking tacit knowledge from others, it is anticipated that individuals are more likely to decide to seek knowledge if they think the tacit knowledge that they seek will lead to positive performance outcomes. As tacit knowledge is dominant among experts who excel at their jobs (Asher & Popper, 2019), it is therefore likely to be coveted by others seeking this knowledge for performance benefits. Therefore, the perceived usefulness of seeking *tacit* knowledge is likely to positively influence knowledge seeking behaviour. Therefore, we propose a focus on (i) perceived usefulness of seeking knowledge, which we define as the belief in positive performance outcomes from seeking and in the context of (ii) tacit knowledge, (iv) interpersonal seeking by the recipient:

Proposition 4: Positive outcome expectations of seeking knowledge will be positively related to tacit knowledge seeking.

2.4.3 Relational Factors Effecting Tacit Knowledge Seeking

As both provider and recipient are involved in these processes, there is a social interaction component to sharing and seeking behaviour. Social cognitive theory recognises that behaviour is learned from others partly through social relationships (Bandura, 2001). However, social cognitive theory does not detail the characteristics of these relationships and how they effect individual's behaviour. Equally, there is scant research attention paid to social component of SCT. For these reasons, we use the lens of social capital theory to inform a more detailed investigation of the social component of SCT in the context of tacit knowledge seeking.

Social capital theory describes both the network of relationships possessed by an individual and the set of resources embedded within the network that can be used to acquire knowledge (Adler & Kwon, 2002; Gabbay & Leenders, 1999). As social capital is characterised as an asset, people have to invest time and effort to access the resources (i.e. tacit knowledge) of their social relations. In addition, both the characteristics of the network and the set of resources embedded within it influence the extent to which interpersonal knowledge sharing occurs (Nahapiet & Ghoshal, 1998). Social capital has three dimensions: structural (the overall pattern of connections between actors), relational (the kind of personal relationships people have developed with each other through a history of interactions), and cognitive (those resources providing shared representation, interpretations, and systems of meaning about parties) (Nahapiet & Ghoshal, 1998). The opportunity to seek and share is increased when individuals spend more time together, not only because increased interaction leads to more frequent communication, but also because communication is more effective as these interactions cognitively result in a shared language and code. Thus, increasing structural and cognitive social capital should help to facilitate knowledge sharing and seeking (Cabrera & Cabrera, 2005). There is extant research on the structural dimensions of social capital but the relational dimension has received much less attention (Makela & Brewster, 2009) and less is known about the ways in which relationships condition information flow and learning in networks (Borgatti & Cross, 2003). The relational dimension of social capital refers to the social characteristics of trust, norms, obligations and identification. From the relational perspective, social capital theory can enable exploration of factors that impact the exchange of knowledge from provider to seeker, and seeker to provider (Oldroyd & Morris, 2012).While structural social capital provides the opportunity to share knowledge, it is relational social capital that facilitates actual sharing and transfer of knowledge (Hansen, 1999). Both trust in others and team norms of collaboration are components of relational social capital likely to influence whether individuals engage in sharing and seeking behaviours.

2.3.3.1 Trust and Knowledge seeking

There is significant research attention on the influence of trust on knowledge sharing (Wang & Noe, 2010). Knowledge sharing through social interaction is effected by individuals' beliefs and

feelings about each other, particularly their levels of trust in each other (Lee, Gillespie, Mann, & Wearing, 2010). Gillespie (2012) defines trust as "the willingness to be vulnerable to the actions of another party". Additionally, Gillespie (2012) claims that despite convergence in the definitions of trust, many researchers do not link the conceptual definition of trust with its operational definition (Gillespie, 2003). As recent reviews identify, the large majority of studies use measures of perceived trustworthiness rather than trust (Dietz & den Hartog, 2006; Dirks & Ferrin, 2002; McEvily & Tortoriello, 2011). Perceived trustworthiness, although an important and significant determinant of trust, does not equate to trust as it does not include risk, vulnerability or interdependence that distinguish trust from concepts such as confidence and cooperation (Gillespie, 2003). Trust is significant in its action; a willingness to be vulnerable by engaging in trusting behaviour is proximally closer to trust behaviour. Gillespie (2003) specify reliance-based trust and disclosure-based trust as a way to identify trust, rather than perceived trustworthiness. Reliance is defined as an individuals willingness to rely on anothers skills, knowledge, judgements or actions, including delegating and giving autonomy (Gillespie, 2003). Disclosure is defined as an individuals willingness to share work-related or personal information of a sensitive nature to another (Gillespie, 2003). This two-dimensional model of trust is consistent with the view that people choose to trust in some ways but not in others (e.g. Gabarro, 1978; Lewis & Weigert, 1985). For example, an individual may be willing to discuss personal difficulties effecting their work with a sympathetic peer, but unwilling to rely on this peer to complete a job on their behalf (Gillespie, 2003). This captures the vulnerability and risk that is inherent to trust (see Lewis & Weigert, 1985; Rousseau et al., 1998; Zand, 1972).

Trust has been shown to promote knowledge acquisition (Inkpen & Tsang 2005), because it fosters norms of reciprocity (Nahapiet & Ghoshal, 1998) escalates the commitment of parties to a cooperative relationship (Inkpen & Beamish 1997), and reduces partner protectiveness (Inkpen, 2000; Yin and Bao, 2006). Other studies show that trust enhances the extent to which people listen to and absorb others' knowledge (Levin & Cross, 2004; Mayer, Davis, & Schoorman, 1995). Alexopolous and Buckley (2013) found that both professional (reliance) and personal (disclosure) based trust were associated with the receipt of useful knowledge by the knowledge recipient, a form of passive learning. They also found that professional trust was significantly stronger than that of personal trust in shorter-duration relationships, while personal trust was particularly strong in longer-duration relationships. Reliance and disclosure based trust have differing levels of importance in this exchange of knowledge to the recipient and the provider of knowledge. As selecting knowledge sources is an evaluative process, prior research suggests that the decision to seek is dependent on evaluating the knowledge of the source or provider (Hansen, Mors, & Løvås, 2005; He & Wei, 2009). Research has shown that decisions to seek were influenced by the quality of the knowledge source (Xu et al., 2006). Trust in the source's knowledge and competence is an important predictor of knowledge seeking, and both the willingness to rely on another's skills and expertise and the willingness to disclose their lack of knowledge may motivate the knowledge seeker's decision to

seek that person's expertise and knowledge. This neccessitates reliance on the knowlede providers tacit knowledge. Therefore, we propose a specific focus on (i) reliance-based trust (ii) tacit knowledge and (iii) knowledge seeking behaviour

Proposition 5: Reliance-Based Trust will be positively related to tacit knowledge seeking.

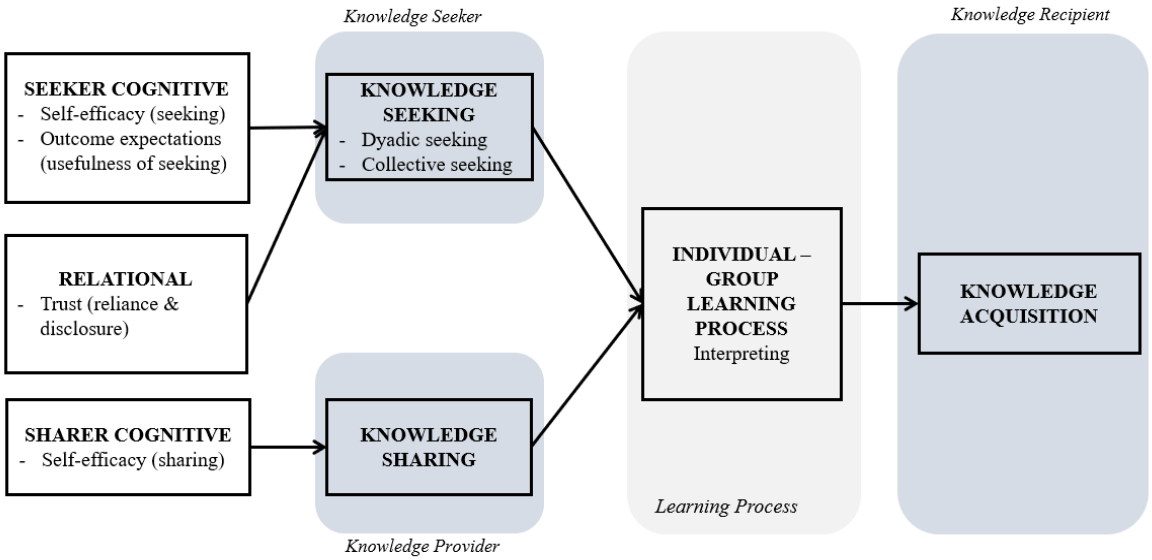
High levels of trust have been shown to foster more risk-taking behaviour (Colquitt et al., 2007; Mayer et al., 1995). Knowledge seeking could be seen as a risk-taking behaviour as seeking assistance from others admits incompetence, ignorance, inferiority, and dependence, resulting in embarrassments and loss of face (Ashford, 1986; Lee, 1997, Lee, 2002). This requires trusting others and being vulnerable, particularly when seeking from more senior colleagues or managers. Interpersonal trust can make knowledge seekers more forthcoming about their lack of knowledge (Brogatti & Cross, 2003), therefore, it is likely that the knowledge seeker's willingness to share personal or work information, such as lack of knowledge, may also impact decisions to seek knowledge from others. Therefore, we propose a specific focus on (i) disclosure-based trust (ii) tacit knowledge and (iii) knowledge seeking behaviour;

Proposition 6: Disclosure-Based Trust will be positively related to tacit knowledge seeking.

2.4.4 Proposed Conceptual Model

Figure 2.1 introduces the proposed conceptual model based on the review of knowledge seeking and the relationships proposed.

Figure 2-1: Conceptual Model



2.5 Conclusions

This review aimed to shed light on the lack of theory and literature surrounding proactive knowledge seeking by the "recipient" as part of the knowledge sharing process. This chapter contributes to the current debate on organisational learning and knowledge management research on two fronts. First, as suggested by both Hansen, Mors, & Løvås (2005) and Kim, Song, and Jones (2011), we have examined the underexplored "recipient" side of the knowledge sharing process. It is clear that current theory does not capture the entirety of knowledge sharing process mainly because of the omission of knowledge seeking. While much literature draws on the SECI and the 4i framework to discuss how knowledge is shared, the focus has been on the provider sharing knowledge and assuming that the recipient passively is accepting and absorbing it. This does not shed light on what aids learning by the knowledge "recipient". Failure to understand how the knowledge seeker learns and what their role is in this knowledge sharing process will result in an incomplete picture of how knowledge sharing can be successful.

Secondly, by reviewing prominent theory and literature it was clear that social interaction plays a large role in the success of sharing tacit knowledge (Bartol and Srivastava, 2002; Hansen, Nohria, & Tierney, 1999; Levin & Cross, 2004; Nonaka, 1994; Osterloh & Frey, 2000; Yang & Farn, 2006; Yang & Farn, 2009). However, current Knowledge Management or Organisational Learning theories do not explain the causative or impeditive factors in sharing or seeking behaviour through social interaction. As a result, this paper proposes that Social Cognitive Theory and Social Capital Theory can help to explain why individuals would choose to seek and share tacit knowledge through social interaction. This should encourage future studies to consider the merit in separating the roles

of sharing and seeking to fully understand whether individuals are differentially motivated depending on their role as a seeker/recipient or sharer/provider of knowledge.

The next two chapters will examine aspects of the conceptual framework over two empirical studies. Study 1 will investigate the individual and social antecedents of knowledge seeking as compared to those of knowledge acquisition and sharing. This will explore the salience of the proposed relationships through conducting a qualitative investigation and add to understanding of why these factors influence seeking differently to acquisition and sharing. Participants are prompted to discuss their knowledge seeking, acquisition and sharing behaviours when solving non-routine problems using a critical incident technique. This will allow the research to explore whether and how the proposed relationships influence seeking, and could uncover other salient factors this model does not consider. Study 2 will follow, and investigates the proposed framework in a quantitative study analysed using SEM.

CHAPTER 3: **A QUALITATIVE INVESTIGATION OF THE INFLUENCERS OF TACIT KNOWLEDGE SEEKING, ACQUISITION AND SHARING**

3.1 3.1 Abstract

Knowledge recipients have an important, but under-researched, role in the knowledge sharing process. While providers must share knowledge, recipients must learn this knowledge. Recent literature has suggested that recipients may also engage in proactive behaviours to learn from others, such as knowledge seeking. However, research has yet to investigate and compare factors which effect knowledge seeking, acquisition and sharing within one study. In addition, research which has not investigated these behaviours as separate lack the power to explain how factors which effect one behaviour may not effect the other. This chapter investigates how individual and social antecedents may influence knowledge seeking, acquisition and sharing. As tacit knowledge is of particular organisational value, is experiential and context-specific, and may only be exchanged in face-to-face interactions, this research investigates interactions between workers when trying to solve non-routine work problems. As the level of expertise is likely to effect the need for knowledge, and the ability to understand and share this knowledge, this chapter also investigates how level of expertise may effect these three behaviours. Data were collected through semi-structured interviews with thirty-three technicians and engineers engaged in solving non-routine complex problems. The thematic analysis identified various individual and social influencers of knowledge seeking, acquisition and sharing. While there were some similarities in the factors influencing knowledge seeking, acquisition and sharing behaviour, these behaviours were differently motivated. In addition, the level of expertise can influence how respondents experienced these factors and how they influence their behaviour. Discussions as to how influencers of knowledge seeking, acquisition and sharing differ and complement may contribute to clarity in the knowledge sharing research regarding the distinct factors which effect the different behaviours involved in recipient and provider behaviours within the knowledge sharing process. This can enlighten research interested in promoting both individual learning from others and willingness to provide knowledge to others.

3.2 3.2 Introduction

Knowledge is recognised as the only resource that increases in value and so organisations put great effort into managing it (Witherspoon et al., 2013). In particular, an organisation's valuable knowledge is embodied in the tacit knowledge of individuals and groups (Bertels & Savage, 1998). Tacit knowledge includes unarticulated knowledge tied to the senses, skills, personal experiences, intuition, or implicit rules of thumb (Nonaka & von Krogh, 2009). Tacit knowledge management specifically is unique to general knowledge management methods because tacit knowledge "is owned" by the knowledge worker rather than the organisation (Kreiner, 2002; Wright & McMahan, 2011) and is thus "invisible" to the organisation. While explicit knowledge can be shared via information processing methods such as guidelines and documents (Hislop, 2013), sharing tacit knowledge requires distinctly different methods (Hislop, 2013) such as face-to-face meetings for interpretation, negotiation and storytelling to take place (Orr, 1996; Wenger, Snyder & McDermott, 2002). Tacit knowledge is therefore first acquired at the individual level through these face-to-face interactions which promote shared experiences, values, perceptions, and mental models (Nelson & Winter, 1982) which enable acquisition. As tacit knowledge is possessed by individuals and not the organisation (Grant, 1996), individuals need to be particularly motivated to share this type of knowledge with their peers (Hansen, Mors, & Løvås, 2005; Szulanski, 1996) and recipients need to

be motivated to learn from their peers (Hurley, 2002). This research examines the tacit knowledge required to solve non-routine complex problems in the workplace. As these problems are usually ill-defined and complex (Lyles & Mitroff, 1980), and the knowledge necessary to resolve such organisational tasks is frequently distributed across multiple individuals (Argote & Ingram, 2000; Thomas-Hunt et al., 2003), this requires multiple individuals working together to find answers to questions or otherwise resolve organisational problems (Paulus, 2000; Boh et al., 2007). To do so, individuals must combine their individually held tacit knowledge. The resultant collective knowledge exists between rather than within individuals. It can be more or less, than the sum of the individuals' knowledge (Glynn, 1996). In order to create collective knowledge, individuals can apply their own tacit knowledge to improve their performance or they can draw on others tacit knowledge and share theirs to generate linked tacit knowledge (Shamsie & Mannor, 2013) in order to enhance performance. Therefore, to understand how individuals effectively solve these problems, it is necessary to examine how employees share and learn relevant tacit knowledge and what factors may hinder or enable these processes.

Unsurprisingly, inter-employee knowledge sharing has become one of the most critical issues facing contemporary managers (Serenko & Bontis, 2016), and of particular interest to this research. Knowledge sharing between individuals is the process by which knowledge held by an individual is converted into a form that can be understood, absorbed, and used by other individuals (Ipe, 2003). This sharing process requires two behaviours: providing one's knowledge to others and acquiring and understanding knowledge from others (Bircham-Connolly, 2005). However, it is an under-investigated feature of knowledge-sharing that its success requires the involvement of at least two parties (Tangaraja et al., 2015). Despite this, the recipient is an important component to the success of knowledge sharing interactions, as the successful outcome of sharing knowledge is that the recipient acquires that knowledge. Providers who share knowledge may either 'donate' knowledge proactively or responsively share knowledge when asked for help (Zhang & Jiang, 2015). Likewise, recipients of knowledge take a proactive or responsive role in the knowledge sharing process. The former role involves identifying a need for knowledge which leads to proactively seeking knowledge from others (i.e. Hansen, Mors, & Løvås, 2005), while the latter role refers to the recipient acquiring knowledge responsively and unsolicited from others. Seeking knowledge describes an individual's effort to locate and access others' expertise, experience, insights, and opinions by engaging in dialogue with individual employees. (Gray & Meister, 2006). However, seeking or sharing knowledge does not ensure that the knowledge received is useful or fully acquired (Tangaraja et al., 2016). Knowledge acquisition refers to the extent to which an individual acquires relevant experiences and know-how from co-workers (Yang & Farn, 2010). Effective knowledge acquisition must entail the recipient understanding knowledge acquired. Authors have further suggested that to understand the knowledge sharing process more completely, and the factors which influence it, researchers must also investigate the recipient role in prior "phases" of knowledge

sharing, such as the search for knowledge. To do so will help to identify the differing enablers and barriers which influence each phase of the knowledge sharing process (Hansen, Mors, & Løvås, 2005). In summary, research has thus far under-investigated the recipient role in knowledge sharing, and calls have been made to better understand the factors which influence knowledge seeking specifically as one phase of knowledge (Hansen, Mors & Løvås, 2005; Kim, Song, & Jones, 2011) and those factors which influence recipient's strategies to acquire the knowledge needed to do their work (Kim, Song & Jones, 2011).

Prior research has suggested that there are three factors to consider as pertinent to knowledge sharing; the relationship between provider and recipient, the individual characteristics of the provider, and the individual characteristics of the recipient (Cross & Borgatti, 2004). While prior research has shown that a variety of these factors effect knowledge sharing, it is not clear that the same factors are equally important in the recipient phases of knowledge seeking and knowledge acquisition, or important to exchanges of more *tacit* knowledge rather than information exchanges of more explicit knowledge. Despite this, Minbaeva, (2007) advises that the characteristics of knowledge, such as the tacitness of knowledge, are pertinent to considering what factors effect knowledge sharing. However as much of the research has either assumed knowledge sharing is uni-directional (Tangaraja et al., 2015), or assumed knowledge sharing and acquisition are influenced by the same factors, little is known regarding what factors lead to successful knowledge seeking and acquisition, or how these factors differentiate from those that lead to successful knowledge sharing. Therefore, this chapter explores how the individual factors pertaining to the seeker and sharer, as well as the social factors which influence their relationship influence tacit knowledge seeking, acquisition and sharing when exchanging highly tacit knowledge. To do so, this study draws upon the analysis of thirty-three semi-structured interviews with technicians and engineers from three manufacturing plants in Ireland. In summary, this research study addresses the need for a greater focus on tacit knowledge and acknowledges the bi-directional nature of knowledge sharing by investigating the recipient roles of knowledge seeking and acquisition, as well as provider role of knowledge sharing. As these are distinct but related phases within the knowledge sharing process, understanding how individual and social factors influence these phases differently can provide clarity and insight into the factors necessary to successful knowledge sharing.

This study proceeds as follows; first the theoretical underpinnings of this study are explored by describing tacit knowledge and the relevant literature regarding the roles of the provider and recipient within the knowledge sharing process. Following this, an examination of the research gap pertaining to the literature on antecedents of knowledge seeking is presented, and the research questions guiding the study are outlined. Next, the research methodology and design of the study is presented, followed by the findings and discussion sections. The paper ends with conclusions and implications for future research.

3.3 3.3 Theoretical framework

3.3.1 Tacit Knowledge

Tacit knowledge is tied to people's senses, skills, personal experiences, intuition, or implicit rules of thumb (Nonaka & von Krogh, 2009). It is described as both personal knowledge rooted in commitment, ideals, values and emotions, and as practical knowledge demonstrated in "know how", action, procedures and routines (Ambrosini & Bowman, 2001). It is usually situation or context specific, typically acquired on and relevant to the job (Ambrosini & Bowman, 2001). However, while tacit knowledge is difficult to ariticulate, notable researchers contend that tacit knowledge exists along a continuum and some parts may be explicated (Nonaka & Takeuchi 1995; Nonaka & von Krogh 2009; Subashini 2010). This is supported by Ambrosini and Bowman (2001) who claim that there are degrees of tacitness, some of which may be deeply ingrained skills, be imperfectly atriculable, or easily articulated. Literature has suggested tacit knowledge is best exchanged through significant personal interactions between individuals (Nonaka, 1994; Nonaka & Takeuchi, 1995), specifically through 'socialization' and 'externalization' processes where tacit experiences are conveyed via verbal and nonverbal cues (Brown & Duguid, 2001) such as a sequential use of metaphor, analogy and models (Nonaka, 1991). As these processes are based on the premise that social interaction is a succesful method to sharing and learning tacit knowledge, it is most appropriate to consider knowledge seeking and sharing from others, and the knowledge acquired from these interpersonal interactions among people.

3.2.2 Knowledge Sharing: the provider perspective

Knowledge sharing can be defined as the interpersonal interactions involving the provision and receipt of task knowledge, know how, and feedback on a product or a procedure (Argote & Ingram, 2000; Foss, Minbaeva, Pedersen, & Reinholt, 2009; Hansen, 1999). Similarly, Davenport and Prusak (1998) propose that knowledge sharing is concerned with providing others with one's knowledge and receiving knowledge from others. Van den Hooff and van Weenen (2004) describe knowledge sharing as the voluntary communication of one's knowledge to another, and in reverse, the collection of shared knowledge. These definitions signify that every knowledge sharing action comprises two essential components: the donating of knowledge and the collection or receipt it.

Donating knowledge refers to the proactive sharing of knowledge to others, while collecting knowledge is as active process of searching for knowledge by consulting with others in order that they share their intellectual capital (van den Hooff & de Ridder, 2004). Donating or sharing knowledge with others can take many forms. For example, Bartol and Srivastava (2002) suggest that people may contribute to organisational databases, within formal interactions within or across teams, within informal interactions among individuals, or within communities of practice (p.65).

Antecedents of each of these types of sharing behaviours would be different. However, when examining tacit knowledge sharing it is most appropriate to focus on sharing which takes place among people. Much of the existing sharing research is based on the assumption that knowledge sharing occurs only when one knows that s/he possesses some knowledge needed by other colleagues or the organisation.

However, recent research investigating dyadic knowledge sharing has suggested that sharing may be either proactive or responsive (Zhang & Jiang, 2015). Responsive knowledge sharing refers to a person providing knowledge when asked for help, and the sharer has to decide whether or not and how to share with this specific person. Proactive knowledge sharing refers to a person proactively sharing new ideas or learned knowledge with another person, but may be motivated by the intent to seek further comments or suggestions. In this scenario the person sharing knowledge can choose the most appropriate knowledge recipients, and the behaviour is more closely related to advice-seeking behaviour than previous ideas of knowledge sharing (Zhang & Jiang, 2015). The proactive form of sharing is more closely related to proactive seeking behaviours discussed.

In summary, the knowledge sharing process is comprised of both provider and recipient behaviours, and these behaviours are differently motivated. However, the factors which influence proactive sharing as distinct from responsive sharing are unclear due to the inconsistent definitions and operationalisations of these key concepts (Tangaraja et al., 2015). Prior research has shown that sharing tacit knowledge is highly relational and "sticky" due to the cognitive and social constraints that require both an understanding of the context and the individuals involved. As tacit knowledge is highly dependent on the individual, and if tacit knowledge sharing is to occur, the relationship between provider and recipient must facilitate the successful exchange of tacit knowledge such that the provider willingly discloses their insights to others (Thompson & Heron, 2006) and that recipients can willingly disclose their ignorance and need for knowledge.

3.2.3 Knowledge Sharing: the recipient perspective

Recipients of knowledge may behave proactively or responsively within the knowledge sharing process. Proactive behaviour by the recipient involves identifying a need for knowledge which leads to proactively seeking knowledge from others (i.e. Hansen, Mors, & Løvås, 2005), while responsive recipient behaviour relates only to acquiring and learning knowledge from others.

3.2.3.1 Knowledge Seeking

Seeking knowledge is an example of proactive recipient behaviour and is described as an individual's effort to locate and access others' expertise, experience, insights, and opinions by engaging in dialogue with individual employees (Gray & Meister, 2006). Seeking knowledge has

several benefits as evidenced by prior research. The willingness of individuals to seek may overcome some of the barriers of sharing knowledge to others. For example, research shows that providers are more willing to share knowledge when directly requested for that knowledge (Zhang et al., 2015). By contrast, when individuals avoid seeking knowledge from each other, the available knowledge that providers hold may not be shared (Stasser, 1992). For employees who must solve complex problems within short timeframes, those better able to seek the knowledge they need should be better performers. This is supported by prior research investigating learning and socialization by newcomers which suggests people resolve problems more easily by seeking knowledge in the form of help or feedback. Gaining knowledge from experts enables knowledge seekers to accomplish more complex tasks and make decisions more effectively (Gray & Meister, 2004; Gray & Durcikova, 2005).

Although knowledge seeking is related to information seeking, there are differences with important implications. Information seeking is a broad concept that can describe both active and passive acquisition of facts from others (e.g., Borgatti & Cross 2003) or from one's environment (e.g., Johnson 1996). In contrast, knowledge seeking describes an individual's proactive efforts to search out and access knowledge produced by individuals, and thus not available elsewhere. The difference between obtaining facts (available through multiple sources) and knowledge (only available from a person with experience and insight) is critical to understanding the unique role played by knowledge in organisations (Gray & Meister, 2004), as well as understanding the antecedents of such knowledge seeking behaviour. As knowledge seeking is an example of indirect learning, from the experience of others (Levitt & March, 1988), individuals gain access to others' understanding of the work environment through language-based interactions (Gray & Meister, 2004). Knowledge sought from others is thus one level removed from the work environment, having already been interpreted by at least one other individual (e.g., Daft & Weick, 1984). However, much of the existing research on seeking does not distinguish between information seeking and knowledge seeking (e.g. Borgatti & Cross, 2003; 2004) or examines seeking through various online repositories and communities (e.g. Gray & Meister, 2004, Kankanhalli et al., 2011). However, this is problematic for research interested in understanding what influences seeking tacit knowledge in particular, as learning tacit knowledge requires socialization and face-to-face interaction (Nonaka and Takeuchi, 1995) not possible through online or published resources. Research focused on tacit knowledge seeking must examine knowledge seeking between people as tacit knowledge cannot be interpreted or observed without these face-to-face interactions (Hislop, 2013).

Knowledge seeking can be simply defined as the search for knowledge sources that may be useful, culminating in locating and accessing needed knowledge to complete certain tasks (Yuan, Rickard, Xia, & Scherer, 2011). However, this does not describe why and how people seek knowledge. Therefore, some authors have suggested examining the decision to seek as an important

facet of knowledge seeking (Hansen, Mors, & Løvås, 2005; He & Wei, 2009) in order to illuminate why people seek knowledge. This can be informed by prior research which has suggested seeking can be motivated by an actual demand or need for knowledge (Gray & Meister, 2004; Zhang, 2008; He & Wei, 2009). As such, research that focuses on work situations in which individuals require knowledge may better demonstrate factors which explain how people make decisions to seek. In addition, how people seek may relate to the choices people make about whom to seek from. In order to locate useful knowledge individuals must interact with others to recognise what knowledge and expertise is available and where it resides, as well as have a willingness to jointly exchange the knowledge in order to solve work problems (Cross, Parker, Prusak, & Borgatti, 2001; Kim & Mauborgne, 1997; Nonaka & Takeuchi, 1995). Therefore, the seeker must evaluate the knowledge resident in the source (Hansen, Mors, & Løvås, 2005; He and Wei, 2009) and assess that source (Carlile & Rebentisch, 2003). As yet, the factors which influence how individuals seek and select their knowledge sources, especially at the individual level, have not received much attention (Borgatti & Cross, 2003). Additionally, as tacit knowledge is sought through social interaction with the provider, social aspects of the relationship between seeker and provider are pertinent. However, the few studies that do research interpersonal knowledge seeking and its individual and social antecedents (e.g. Gray & Meister, 2006; Hansen, Mors & Løvås, 2005; Haas & Cummings; 2015), do not illuminate how individual and social factors influencing knowledge seeking may differ in highly tacit contexts. Therefore, we do not fully understand how those individual and social factors may effect seeking for tacit knowledge specifically.

3.2.3.2 Knowledge Acquisition

Locating and receiving knowledge sought is not the only challenge. Even if knowledge is available and easily found, knowledge recipients then need to learn or acquire the knowledge that they seek (Argote & Ingram, 2000; Quigley, Tesluk, Locke, & Bartol, 2007) in order to apply this knowledge to solve their problem. Crossan, Lane and White (1999) argue that making knowledge explicit does not necessarily mean that the understanding is shared. Therefore, the extent to which individuals effectively understand knowledge acquired from others is an important process to consider when determining if seeking and sharing has been successful.

Responsive acquisition of knowledge is a necessary outcome of both knowledge seeking and sharing as seeking knowledge from others does not ensure that the knowledge received is useful or fully acquired (Tangaraja et al., 2016). In addition, sharing knowledge to others does not ensure that it is understood by the recipient. Knowledge acquisition refers to the extent to which an individual acquires experiences and know-how from co-workers (Yang & Farn, 2010). It occurs in the minds of recipient via sense-making over time (Tangaraja et al., 2016), and is therefore outside the behaviour of knowledge seeking. Sense-making occurs when the recipient acquiring knowledge from

the provider integrates their new knowledge into existing knowledge (Wilkesmann & Wilkesmann, 2011). As a result, knowledge cannot be shared intact because acquisition is an active process of constructing knowledge in the receivers' mind (Savery & Duffy, 1995; Duffy & Cunningham, 1996; Oliver, 2001).

Despite the importance of acquiring knowledge to both knowledge seeking and sharing, few studies have distinguished acquisition as an important or separate process when examining either sharing or seeking. However, to examine seeking, research must also examine acquring knowledge sought in order to appreciate the distinguishing individual and social factors which influence tacit knowledge acquisition in the context of knowledge sharing interactions.

3.2.4 Individual and Social Factors Influencing Seeking, Acquisition and Sharing

Research has suggested there are three important factors influencing a dyadic exchange of knowledge: attributes of the seeker, attributes of the relationship between the seeker and the source, and attributes of the source (Cross & Borgatti, 2004; Minbaeva, 2007). However, prior research has largely ignored the individual attributes of the seeker and have neglected to examine how the relationship between seeker and source may inform knowledge seeking rather than knowledge sharing or contribution.

Research which has focused on individual attributes of the seeker are scarce. Much of the prior research examines individual motivations to seek in an online community (e.g. Wasko & Faraj, 2000). Individual characteristics such as learning orientation (Gray & Meister, 2004) and knowledge self-efficacy may effect seeking (Gray & Meister, 2004; Lin, 2007), although the latter study does not operationalise seeking and sharing distinctly. Therefore, there is a need for more research to focus on individual characteristics which motivate knowledge seeking, especially as there are calls for a stronger focus at the individual level within knowledge-based work (Minbaeva, 2013) and tacit knowledge is best exchanged at the individual level, through face-to-face interactions (Nonaka & Takeuchi, 1995).

Prior research on knowledge seeking has tended to focus on the structural elements describing the relationship between seeker and provider (e.g., Hansen, 1999; Morrison, 1993), while less research has focused on the relational elements with few exceptions (e.g. Zhang & Chen, 2018). For example, prior studies on knowledge seeking from peers or supervisors has focused on the strength of network ties. A network tie is considered strong when communication is frequent and emotionally close (Granovetter, 1983). Strong ties are more useful for sharing tacit knowledge that are difficult to articulate, whereas weak ties are more useful for searching for explicit, codified knowledge (Hansen,1999). However, Reagans and McEvily (2003) found only weak support of Hansen’s proposition. Specifically, while weak ties might have some value for knowledge seeking,

strong ties were preferred for both knowledge seeking and transfer. Relationship strength has also been investigated at the team level, and positively effects knowledge seeking from teams (Hansen, Mors & Løvås, 2005). This inconsistency in findings could relate to how seeking is conceptualised in these studies, the first two of which focus on knowledge transfer rather than conceptualising seeking has a one-sided behaviour in which individuals attempt to locate knowledge from another. Therefore, while these results indicate that structural elements of a relationship are important in determining knowledge seeking behaviours, investigating and comparing the factors which effect different phases of the knowledge transfer could provide insight into how these behaviours are differently influenced by social factors.

Additionally, social capital theories have also suggested that relational aspects which describe the relationship between provider and recipient may effect knowledge sharing (Nahapiet & Ghosal, 1998). However, these factors have not been investigated with respect to knowledge seeking, excepting one recent study which suggests cognition-based trust and affect-based trust positively effect knowledge seeking (Zhang & Chen, 2018). Research has also shown that various forms of trust have different effects on sharing and acquisition of knowledge. For example, while affect-based trust has a greater influence on willingness to share, cognition-based trust has a greater influence on use of knowledge (Holste & Fields, 2010). Therefore, it is evident that factors which effect on phase of sharing, such as seeking, may differently effect acquisition or sharing.

In summary, there is limited research which investigates interpersonal knowledge seeking specifically, less research which focuses on tacit knowledge, and no known studies comparing the factors which influencing seeking, acquisition and sharing to provide clarity on the distinct nature of these processes and elucidate how they are differently motivated.

3.4 3.4 Research Questions

Following the above literature review, and the previous chapter, this research seeks to investigate the entirety of the knowledge sharing process from recipient to provider. Indeed, as knowledge seeking as not been extensively examined as a separate and distinctly motivated behaviour to knowledge sharing, it is unclear how individual and social antecedents effect these behaviours distinctly. In addition, as both knowledge seeking and sharing are not successful unless the recipient acquires the knowledge they seek, research must also investigate the antecedents of knowledge acquisition to fully understand how successful knowledge sharing may be motivated. Following the recommendation by Cross and Borgatti (2004), this research explores how the individual attributes of the seeker, attributes of the relationship between the seeker and the source, and attributes of the source may influence knowledge seeking, acquisition and sharing. Therefore, two research questions guided this study:

RQ1: How do individual and social factors influence knowledge seeking when trying to solve non-routine problems?

RQ2: How do these individual and social factors differ from those which influence acquisition and sharing when trying to solve non-routine problems?

3.5 3.5 Methodology

This research employed a qualitative, case-study research design. Several authors describe a qualitative methodology as more likely to yield insights into complex social phenomena (Eisenhardt & Graebner, 2007; Patton, 2002). Qualitative researchers are interested in understanding the meaning people have constructed, in other words how people make sense of their work and the experiences they have in the world' (Merriam 1998: 6). For this reason, qualitative research is useful to understand the experiences of participants, the context in which they act, the influences on their behaviour and the processes surrounding their behaviour (Maxwell, 2012). Stake (1995) described qualitative case study research as an appropriate design for acquiring in-depth understanding of the complex interactions and functions of people in the context of a specific situation. Also, Yin (2003) described case-study designs as relevant strategies for research questions of *how* and *why*, as well as relevant strategies for research focused on contemporary events within a real-life context and in which the researcher had little or no control over events. Thus, the characteristics of this research (examining a complex social phenomenon in context) seemed most appropriate to a qualitative case-study research design.

This research is part of a wider research project of tacit knowledge. As case study literature suggests that twenty to fifty participants are an acceptable number (Larsson, 1993), this research reports on interviews with a sample of thirty-three employees from three manufacturing companies. In order to select the interview participants, the following criteria were applied: to ensure a cross-section of views were obtained and ensure participants work included non-routine tasks which demand the use of tacit knowledge. Then, a snowball sampling approach (Noy, 2008) was utilised to identify further populations whom were important to the focal individual's tacit knowledge sharing requirements. The research participants chosen were identified by the organisations as knowledge workers required to regularly solve non-routine problems as part of their role, and therefore are likely to require tacit knowledge to complete these tasks. This sample included eight technicians from Company 1, thirteen engineers/technicians from Company 2, and twelve technicians from Company 3, details of these participants can be found in table 3.1. The sample population was predominantly male.

Table 3-1: Participant Characteristics

Code	Company	Occupation	Sex	Tenure in role	Expertise
MT1	Company 1	Maintenance Technician	Male	10 - 19 years	Expert
MT2	Company 1	Maintenance Technician	Male	5 - 9 years	Journeyman
MT3	Company 1	Maintenance Technician	Male	3 - 4 years	Apprentice
MT4	Company 1	Maintenance Technician	Male	20 years +	Expert
MT5	Company 1	Maintenance Technician	Male	3 - 4 years	Apprentice
MT6	Company 1	Maintenance Technician	Male	10 - 19 years	Expert
MT7	Company 1	Maintenance Technician	Male	10 - 19 years	Expert
MT8	Company 1	Maintenance Technician	Male	1 - 2 years	Apprentice
PS1	Company 2	Production Supervisor	Male	5 - 9 years	Journeyman
PS3	Company 2	Production Supervisor	Male	5 - 9 years	Journeyman
PS4	Company 2	Production Supervisor	Male	5 - 9 years	Journeyman
PS5	Company 2	Production Supervisor	Male	3 - 4 years	Apprentice
PS6	Company 2	Production Supervisor	Male	1 - 2 years	Apprentice
PS7	Company 2	Production Supervisor	Male	5 - 9 years	Journeyman
PS8	Company 2	Production Supervisor	Female	5 - 9 years	Journeyman
PS9	Company 2	Production Supervisor	Female	5 - 9 years	Journeyman
PTSE1	Company 2	Maintenance Technician	Male	3 - 4 years	Apprentice
PTSE2	Company 2	Process Tech Support Engineer	Female	3 - 4 years	Apprentice
PTSE3	Company 2	Process Tech Support Engineer	Female	3 - 4 years	Apprentice
PTSE4	Company 2	Process Tech Support Engineer	Female	3 - 4 years	Apprentice
PTSE5	Company 2	Process Tech Support Engineer	Male	1 - 2 years	Apprentice
Tech2	Company 3	Plating Technician	Male	10 - 19 years	Expert
Tech3	Company 3	Test Technician	Male	3 - 4 years	Apprentice
Tech4	Company 3	Technician	Male	3 - 4 years	Apprentice
Tech5	Company 3	Equipment Support Technician	Male	2 - 3 years	Apprentice
Tech6	Company 3	Equipment Specialist	Male	5 - 9 years	Journeyman
Tech7	Company 3	Equipment Support Technician	Female	3 - 4 years	Apprentice
Tech8	Company 3	Equipment Technician	Male	10 - 19 years	Expert
Tech9	Company 3	Equipment Technician	Female	3 - 4 years	Apprentice
Tech10	Company 3	Equipment Technician	Male	3 - 4 years	Apprentice
Tech11	Company 3	Equipment Technician	Male	10 - 19 years	Expert
Tech12	Company 3	Equipment Technician	Male	10 - 19 years	Expert
Tech13	Company 3	Equipment Technician	Male	10 - 19 years	Expert

3.6

3.7 3.6 Data Collection and Analysis

Participant data was collected from semi-structured interviews (Miles & Huberman, 1994; Streb, 2009) conducted and recorded by the interviewer. Interviews used a written script of questions and probes, but could stray from the script in order to investigate further responses. Interviewing is appropriate when interested in 'past events that are impossible to replicate' (Merriam 1998: 72). In this case the interviews provide a means of exploring the past and current knowledge seeking, acquisition and sharing behaviour of knowledge-workers sampled. This method also provides a means of exploring the topics broadly while still retaining a structure that enables a better frame of comparison when analysing the responses. To remain focused on non-routine problems, the interviews followed the Critical Incidents Technique (Ellinger & Watkins, 1998; Flanagan, 1954; Gremler, 2004). Questions prompted participants to recall a specific event or incident in which they had to solve a non-routine problem or task. For example, several participants discussed incidents such as a machine breakdown in which production was stopped until the issue was solved. These issues relied on experiential knowledge, as there was no procedure which could identify the problem other than the engineer's prior knowledge and experience. In addition, problems were complex as they could relate to a number of disciplines outside any one engineer's expertise, such as electrical engineer issues, computer engineering issues, or mechanical engineer issues. Once one to three examples were cited, subsequent questions probed for specifics and maintained a focus on seeking, acquisition, and sharing events. In some cases, participants said there was not a specific incident and recounted a series of smaller experiences that occurred over time. A professional transcriber converted the recordings to text, and the researcher checked the transcriptions for accuracy with the original recordings.

Before analysing the interview transcripts, participants were divided into groups determined by their level of expertise as prior research suggests this may influence the likelihood of seeking and acquiring knowledge from others. For example, young workers show a strong desire to learn with the aim of achieving a certain level of professional autonomy (Ebrahimi et al., 2008), while experienced employees might seek less knowledge because they already knew much of what they needed to know to perform well (Tesluk & Jacobs 1998). Three groups were created comprising of apprentices, journeymen, and experts (see table 3.2 below), these definitions and our categorisation of employees were guided by a proficiency scale outlining the various stages throughout the Novice-Expert trajectory (Chi, 2006). This was relevant as tacit knowledge is considered more dominant among experts (Sternberg et al., 1995) and therefore the tacit knowledge seeking and sharing behaviours are likely to be different between levels of expertise. For example, novice workers may seek more tacit knowledge, but share less tacit knowledge as they possess less. Whereas, more expert workers are less likely to require knowledge from others, but may have more tacit knowledge to

share. As all employees interviewed were past the "probationary" stage and beyond basic instruction, the novice and initiate categories were not used.

Table 3-2: Proficiency Scale of Tenure (adapted from Chi, 2006)

Plateau	Description	Research context
Novice	Someone who is new – a probationary member. There has been some minimal exposure to the domain.	Not investigated
Initiate	A novice who has been through an initiation ceremony and has begun introductory instruction.	Not investigated
Apprentice	Someone who is learning – a student undergoing a program of instruction beyond the introductory level. Traditionally, the apprentice is immersed in the domain by living with and assisting someone at a higher level.	Engineers with less than 4 years' experience.
Journeyman	A person who can perform a day's labour unsupervised, although working under orders. An experienced and reliable worker, or one who has achieved a level of competence. Despite high levels of motivation, it is possible to remain at this proficiency level for life.	Engineers with 5 to 9 years' experience
Expert	The distinguished or brilliant journeyman, highly regarded by peers, whose judgments are uncommonly accurate and reliable, whose performance shows consummate skill and economy of effort, and who can deal effectively with certain types of rare or "tough" cases. Also, an expert is one who has special skills or knowledge derived from extensive experience with sub-domains	Engineers with more than 10 years' experience

Chi (2006) suggests that when comparing experts to novices, we can assume expertise is a level of proficiency that novices can achieve. In this context, the more knowledgeable group can be considered the "expert" and the less knowledgeable groups the "apprentice" and "journeymen" – both considered non-expert groups. Proficiency level can be grossly assessed by measures such as academic qualifications, seniority or years performing the task. Research has suggested that developing expertise can take up to 10 years of experience (Fadde, 2009; Feltovich et al., 1997; Hoffman, 1998; Horn & Masunaga, 2006; Klein & Hoffman, 1993; Sleeman & Brown, 1982).

In this context, we used a combination of years in the role to determine categories as well as taking into consideration an engineer's "grade" given by their organisation if available and paid attention to how they categorised themselves in the interview. For example, the sixteen apprentices were categorised as those who were in their role for less than four years as they were still learning significant skills on a regular basis. They tended to refer to themselves as "young", "newcomers", and still learning. The eight journeymen were those who had been with the organisation between five to nine years. They distinguished themselves from newcomers and experts, and also recognised that they were still learning. The nine experts were those performing their role for over ten years and were comfortable completing their tasks and without any instruction. They were often the longest in

the role or most experienced person on their teams. This is relevant as an expert is "someone who has attained a high level of performance in the domain as a result of years of experience" (Foley & Hart, 1992). Their expertise-by-experience (Mieg, 2001) is relied upon by many of their co-workers. This is supported by theorists who assert to the "10-Year Rule" as the minimum time span required to reach expertise in any given domain (Fadde, 2009; Horn & Masunaga, 2006). The population as split by expertise can be found in table 3.3 below.

Table 3-3: Participants by Expertise

Participants by Expertise		
	No.	Percent
Total N.	33	100%
Apprentices	16	48%
Journeymen	8	24%
Experts	9	27%

Analysis of the interview transcripts followed qualitative analysis procedures recommended by Miles & Huberman (1994) and Strauss & Corbin (1998). Four steps constituted the qualitative analysis process. The researcher (1) categorised each participant into one of three groups; apprentice, journeymen, or expert, then carefully read the transcripts and attached codes to specific statements that described the knowledge seeking, acquisition and sharing processes identified in the literature. For example, in describing critical incidents of problem solving, sections which described the participants seeking out help, advise or specific knowledge related to solving problems were coded as "knowledge seeking". Sections which described how participants attempted to understand the knowledge received from interactions with a provider were coded as "knowledge acquisition". Sections which described participants giving their help to others or providing knowledge with recipients were coded as "knowledge sharing", (2) retrieved all statements coded within these categories and carefully reread the retrieved statements and proceeded to open-code (Strauss & Corbin, 1998) the statements at a finer level of detail, staying close to the participants' language. This step identified two separate decisions participants made when seeking knowledge – the decision or motivation to seek in the first place, and the decisions of who specifically to seek from, (3) sorted the open codes into categories; and (4) identified and described the categorical themes emerging from these data. The use of predetermined codes initially helped identify and categorise the experiences reported by apprentice, journeymen and expert engineers into knowledge seeking, acquisition and sharing behaviours of themselves and observed others. From these categories, common themes emerged that indicated there were distinct individual and social factors which influenced how engineers were motivated to seek, decided whom to seek from, acquired and shared their knowledge with others. The themes influencing these behaviours were divided into three broad categories of factors (1) individual factors related to the recipient, (2) individual factors related to the provider, and (3) social factors that describe the relationship between the recipient and provider. This follows

from the suggestion by Borgatti and Cross (2003) that seeking is influenced by individual seeker, provider and social characteristics.

Following Seale's recommendation (1999) to triangulate research methods as a means to increase the quality of research into a phenomenon, the researcher developed a ranking of the emergent research themes based on the number of research participants who discussed each theme (depicted in table 3.4 below). This was intended to measure the relative importance of each theme to knowledge seeking, acquisition and sharing. For example, from the thematic analysis of factors reported by participants, it is evident that 11 factors emerged which influenced knowledge seeking, four of these factors include the motivation to seek and seven influence the decision to seek from a specific other. These factors emerged from the thematic analysis as important to participants when discussing their knowledge seeking behaviours, and the potential generalisability of each factor is indicated by the number of participants who were influenced by each theme is reported. These numbers are indicated in the figures 3.1, 3.2, and 3.3. Findings are described in the following section.

Table 3-4: Emergent Research Themes

Behaviour	Emergent Theme Categories		
	Seeker Themes	**Provider Themes**	**Social Themes**
Knowledge Seeking: ***Motivation to seek***	Outcome Expectations		Collaborative norms
	Self-efficacy		Close ties
Knowledge Seeking: ***Decision to seek from a specific other***	Recognising Expertise	Time	Professional Trust
		Attitude	Personal Trust
		Willingness to share	Access
Knowledge Acquisition	Seeking	Ability to share	Close ties
	Interpreting	Willingness to share	Reciprocal Norms
	Learning attitude	Knowledge	Collaborative norms
		Personality	
		Proactive sharing	
Knowledge Sharing	Ability & Experience	Willingness to Share	Sharing norms
	Proactive Seeking	Sharing self-efficacy	Reciprocal Norms
	Personality & Attitude	Hierarchy	Close ties

** Emergent research themes are listed by frequency, from themes influencing the biggest percentage of participants to themes influencing the smallest percentage of participants for each behaviour.*

3.7 Findings and Discussion

The results of the thematic analysis are presented and discussed in three sections. The sections discuss the individual and social factors influencing (1) knowledge seeking (2) knowledge acquisition (3) knowledge sharing. Themes relevant to each behaviour listed in Table 3.4 have been categorised by the individual theme related to seeker and provider, and social themes influencing the behaviours. These themes are illustrated in figures depicted throughout the chapter (see figure 3.1, figure 3.2, and figure 3.3) which graph the individual recipient, provider and the social themes influencing knowledge seeking, acquisition and sharing, and ranks each theme by number of research participants who identify the theme. These findings are reported and discussed below.

3.7.1. Themes Influencing Tacit Knowledge Seeking

Analysis of the themes revealed that seeking knowledge was influenced by two steps within the seeking process, the motivation to seek and the decision of whom to seek from. The motivation to seek was informed by both the need for knowledge and the attitude the seeker had toward knowledge seeking. The decision of whom to seek from was an evaluative process as it involved both an awareness of the people who have the right knowledge and the identification of who may be most useful depending on the problem at hand. These two steps were motivated by differing factors and are separately discussed below with relevance to their individual and social themes. As the individual factors pertaining to the provider which influence seeking (experience, attitude and hoarding behaviour) were insignificant in frequency, these themes are omitted from this discussion. Figure 3.1, on page 64, graphically depicts the themes influencing various aspects of seeking behaviours.

3.7.1.1 The Motivation to Seek

Respondents encountering a non-routine workplace problem predominantly sought knowledge on a need basis. As respondents were questioned about specific incidents in which they encountered a problem, most discussed seeking in the context of requiring knowledge from others in order to solve a problem or needing direct help to solve a problem. However, there were also respondents who suggested that they opportunistically sought knowledge outside these scenarios in order to learn. Within this context, the individual and social factors which informed the motivation to seek determined the seeker's perceived ability to seek, value of seeking and attitudes toward seeking and self-efficacy to seek knowledge. Specifically, cognitive factors of both positive outcome expectations of seeking knowledge, as well as the social factor of collaborative norms are discussed below.

Outcome expectations of seeking: this theme represented forty-five percent of total respondents. Those who were motivated to seek knowledge from others tended to have positive outcome expectations of knowledge seeking generally. Their outcome expectations aligned seeking behaviours with meeting valuable performance goals such as solving problems quickly, avoiding mistakes, or better learning and understanding. Therefore, performance goals were both organisational and personal. For example, solving problems quickly was important to organisational performance as it limited the cost to the organisation of having a machine or production line problem, which reduces productivity. Respondents who perceived that seeking knowledge from others would result in solving problems or completing their tasks more quickly were more motivated to seek help from others. Equally, respondents who discussed the value of seeking for collaborating and understanding knowledge required were also more motivated to seek knowledge from others.

For apprentices specifically, sixty-four percent discussed their outcome expectations of seeking knowledge. Of those, fifty percent expressed positive outcome expectations for seeking knowledge. One expectation was that seeking knowledge could prevent mistakes because they could check that they were "on the right track" and have more certainty that they were not going to make a mistake that would cost the organisation time. Therefore, positive outcome expectations arose from the combination of performance goals regarding high quality, low risk problem solving and expectations that seeking knowledge results in less mistakes and better solutions. However, there was an inherent conflict between the organisational benefits to seeking knowledge and the personal risk of admitting lack of knowledge or the opportunity lost to learn through personal experience. One apprentice expressed this as a preference to prioritise production over personal pride.

> *I see it as production is worth more with the downtime rather than the pride of getting the machine going. If it takes you twelve hours, you ask someone and you might have it fixed in five minutes, I think that's…I have no problem asking questions. (MT8, apprentice)*

This quote illustrates that seeking for the purpose of improving performance was aligned with production. However, it also alludes to an observed attitude that asking for knowledge will admit a lack of knowledge.

The attitude toward learning represented a conflict for respondents. All valued learning, but some felt that seeking knowledge would undermine personal goals of learning. This was expressed by fourteen percent of apprentices and eleven percent of experts who were reluctant to seek knowledge as they preferred to 'learn the hard way'. These respondents were less likely to seek knowledge from others until they had exhausted other options. They tended to first look up manuals or online systems before seeking from specific others. One apprentice suggests that seeking may lead to an answer because *"the easiest is to ask someone"* but that this is "*kind of an escape route…if everyone asked everyone without having to learn the hard way and you fix more problems more often, then none of us would do anything you know."* Three of the expert engineers who subscribed to the "*they have to learn the hard way*" approach suggested that it is good to let younger co-workers "*become independent*" as "*it's a better way to learn*". Indicating that this attitude toward learning the hard way may be one directed from some experts to the apprentices. This is alluded to by one expert who suggests that "*generally if you have a guy, he will learn a lot by himself if he's allowed to or asked to".* However, this attitude was not shared by all respondents. Twenty-one percent of apprentices, seventeen percent of journeymen and eleven percent of experts suggested that seeking knowledge aligns with learning as it is easier to understand knowledge from others. As one apprentice suggests "*you can't ask a manual a question*". This indicates that the value of seeking lies in the ability to question the knowledge provider and this is easier than learning from other documented sources. Journeymen also illustrated the value of learning from seeking knowledge, one in particular discusses seeking during a difficult problem and suggested that:

"it is really when one of the problems come up that is when you learn the most and that is where you need help really and advice" (PS4, journeyman)

This quote illustrates the expectation that seeking help when experiencing a problem is expected to lead to better learning outcomes, a sentiment shared between apprentices, journeymen and experts.

In summary, positive outcome expectations of knowledge seeking resulted from scenarios in which performance goals aligned with knowledge seeking. Those that prioritised organisational goals of quickly solving problems were more motivated to seek. In addition, those that expected to better learn through seeking knowledge were also more motivated to seek. However, the expectations toward the outcome of seeking to learn varied as some expressed the attitude that seeking would undermine the goal of learning the hard way which was perceived as preferable by a minority of apprentices and experts.

Self-efficacy: Themes of self-efficacy regarding seeking knowledge represented twenty-eight percent of respondents. In this context, self-efficacy manifested in two ways; seeking-related self-efficacy which refers to perceived ability to ask questions and interact with others (28% respondents), and task-related self-efficacy which refers to the perceived ability to solve a work-related problem and perform the task at hand (10% respondents). Findings suggest that respondents who had higher seeking self-efficacy expressed confidence in asking questions and were more motivated to seek from others. In addition, those who had lower task self-efficacy, and were therefore less confident in their ability to solve a problem, were more motivated to seek from others.

High seeking self-efficacy was expressed by seven percent of apprentices. One apprentice suggests that "*I have no problem asking questions*" (MT8), particularly in the context where he was under pressure to fix a problem quickly. Another apprentice suggests that he will ask for knowledge regardless of whether it is a stupid question.

I'll ask anyone for anything. I have no bounds. Even if it might be a stupid question with a stupid answer, I'll still want to know it. If I don't know the answer, it's only stupid to me. (Tech 2, apprentice)

The above quote suggests the motivation to seek knowledge is underpinned by the ability to ask questions, and disregard fears over appearing stupid. However, twenty-one percent of apprentices acknowledged that asking questions was perceived by some as a risk because it may lead to appearing stupid or incompetent. This low seeking-self efficacy manifested as the fear of asking embarrassing questions, not wanting to look stupid, and not wanting to ask too many questions. These beliefs were more prevalent than higher feelings of self-efficacy toward seeking, and were evident in 21% of apprentices and 22% of experts.

I'm terribly proud and if I thought somebody was say 'ah for goodness sake, she came asking me for such a thing, that's so stupid and basic'.....there were only two people that I would say

look I need a hand, anybody else would have asked for a hand earlier but I was terribly proud. (Tech 10, apprentice)

The above quote highlights the fear that others will perceive her as less competent and stupid for asking questions. This fear delays seeking behaviours, and equally illustrates the selective nature of seeking knowledge from others as she identifies only two people whom she would approach.

Experts' high seeking self-efficacy manifested in their confidence to admit when they needed help. This was evidenced by the acknowledgement that they did not know everything or were aware of the limits of their own knowledge. One expert illustrates this by describing when he would approach someone for help: "*I have no problem admitting the fact that I wouldn't know everything. There are some things I need help on*" (MT4, expert). However, equally evident was the awareness that seeking knowledge from others presents a risk of appearing less competent or able to fix something. One expert suggests that this scenario is embarrassing and he would avoid it by first trying to understand the problem, rather than seeking advice early on.

Some fixes could be very easy to fix. It might be embarrassingly easy. What would happen to us many times is that we could be looking at something for an hour and all of a sudden then, you'd call in some guy and he'd say "look it's that there?" and you say "how could you miss that?' So, you try and avoid that as well by making a good effort to find what it could be. (MT6, expert)

This quote demonstrates the risk inherent in seeking, and while most respondents do seek knowledge those who are positive about deciding to seek are more confident in admitting their lack of knowledge and in asking questions of others in this context.

Additionally, findings also suggest that for twenty-one percent of apprentices, low task self-efficacy also motivated people to seek. Low task self-efficacy manifested in the expectation that they could be going in the wrong direction on their own or in uncertainty about their abilities. This belief was evident in apprentices but not found in journeymen or experts. These apprentices sought from others for advice so they could avoid mistakes, or to avoid the risk of making an issue worse when they were unaware of what the problem was.

These guys would have a knowledge where they would remember each specific tool number and go 'oh yeah that always has a problem with, what you do is'. That would be kind of my first port of all because a lot of times you could be going completely in the wrong direction and maybe following a manual or following a procedure when they could turn around and say look that there solves it, what are you doing that for you only need to do this. (Tech 5, apprentice)

The above quote illustrates that the fear of going wrong also can motivate apprentices to seek. In some engineers this fear overcame low seeking self-efficacy. For example, Technician 10 expressed their pride and a desire not to look stupid; however, this person also acknowledged that they would not "guess" how to solve a problem if they didn't know, as the problem could get worse.

In summary, high seeking self-efficacy corresponded with positive attitudes toward knowledge seeking and enabled decisions to seek knowledge in both apprentice and experts, while low seeking self-efficacy had the opposite effect. For some apprentices, seeking was also motivated by low task self-efficacy.

Collaborative Norms: Thirty-four percent of respondents commented on the observed behaviours and attitudes of others within their team or department which guided their personal attitude toward knowledge seeking. Collaborative norms related to both perceived provider and recipient behaviours. Positive collaborative norms manifested as the perception that a provider would help if they were asked, and related to the perception that it was acceptable to ask questions or seek knowledge. Different perceptions of norms toward seeking and helping were divided between apprentice, journeyman and expert groups.

Experts perceived a positive collaborative environment. One expert suggested that there was an environment of open communication which indicated that people will help each other.

> *Communication in here is quite open. Everyone would normally go out of their way to help you. (Tech12, expert)*

Journeyman supported this sentiment, with one suggesting that there were always people nearby and "*you will find someone who will help you anyway"* (PS4, journeymen). Perceptions of others behaviours were influenced by the teams they worked in and networks they had formed, and more experienced employees such as journeymen and experts tended to have more positive views of their collaborative environment. This is likely due to their established relationships with others. However, not all perceived norms were positive, especially among apprentices. One apprentice engineer suggested that was a "*sink or swim*" attitude toward learning and it was expected that employees work on their own. This was reflected as both an attitude identified and observed in others, as well as a personal belief that seeking would not lead to learning outcomes.

There was similar variance in the perceptions of seeking norms. Expert engineers suggested that there was no problem asking for help within their units, and that managers would tell engineers told not to be afraid to ask.

> *Well what was instilled in me when I started was if in doubt ask and that was it and if you don't know something don't be afraid to say you don't know. (MT5, expert)*

However, some observed that actual behaviour and attitudes toward seeking varied amongst their co-workers, as many were afraid to ask questions, regardless of whether or not the respondent themselves were afraid. One journeyman suggests that some people are afraid to look stupid, a sentiment supported by apprentices.

> *A lot of people I think are afraid of asking because they feel they look stupid. (PS2, journeyman)*

Some guys might be more stubborn and won't ask and feel that if they ask that means they don't know anything or they should know it. (MT8, apprentice)

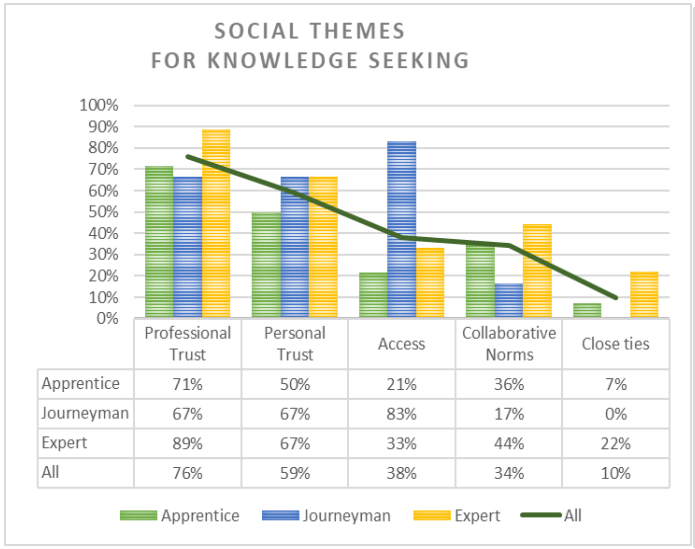
In addition, there was an attitude among apprentices specifically that experts would also not ask apprentice employees any questions, regardless of whether they had a higher level of expertise in certain machines or training indicating that the norm is to seek hierarchically.

Some of the older school lads would find it hard asking me something, even though I might know the machine more than the older guys maybe because it's a new machine and it came in when I came in and they didn't want to go near it because it was different to what they were used to. So, they find it hard asking me because they see me as younger and what should he know or whatever. So, you would find that. (MT8, apprentice)

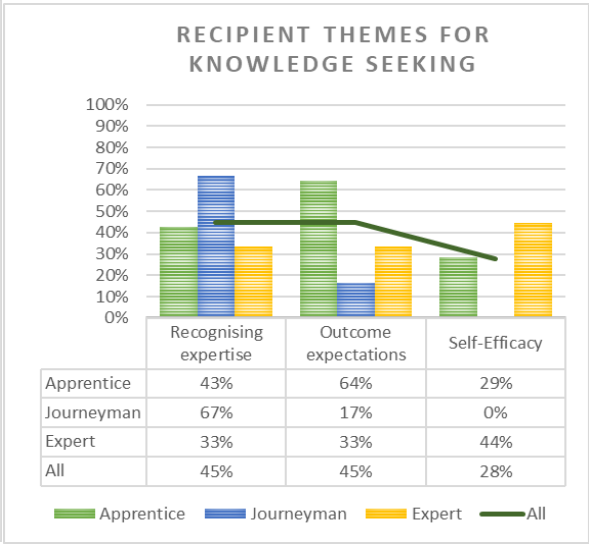
Therefore, the norms of seeking were different between levels of expertise. Newer, apprentice employees were more likely to observe other apprentice and journeymen behaviours to inform their perception of collaborative norms. On the otherhand, experts generally perceived more positive collaborative norms, but this was not informed by observations of others in the present. Instead, these beliefs were informed by their past experiences as apprentices and observation of managers expectations. To summarise, perceptions of the collaboration and seeking norms allowed respondents to benchmark their behaviour against observed others and it guided their outcome expectations of seeking.

In summary, the motivation to seek knowledge was enabled by positive outcome expectations of seeking and high self-efficacy to seek, while perceived norms of collaboration and seeking differed by expertise but informed personal attitudes to seeking.

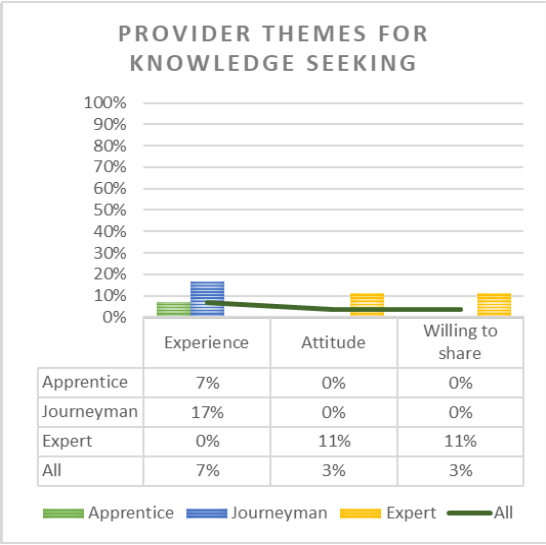
Figure 3-1: Themes influencing knowledge seeking



	Professional Trust	Personal Trust	Access	Collaborative Norms	Close ties
Apprentice	71%	50%	21%	36%	7%
Journeyman	67%	67%	83%	17%	0%
Expert	89%	67%	33%	44%	22%
All	76%	59%	38%	34%	10%



	Recognising expertise	Outcome expectations	Self-Efficacy
Apprentice	43%	64%	29%
Journeyman	67%	17%	0%
Expert	33%	33%	44%
All	45%	45%	28%



	Experience	Attitude	Willing to share
Apprentice	7%	0%	0%
Journeyman	17%	0%	0%
Expert	0%	11%	11%
All	7%	3%	3%

3.7.1.2 Deciding to Seek from a Specific Other

The decision to seek from a specific person was determined by a number of individual and social factors, see figure 3.1 for a graphical depiction with themes ranked by frequency. Individual recipient factors, such as the ability to recognise expertise, were necessary for the seeker to know who may have the knowledge required. Additionally, the provider's experience, attitude and willingness to share informed who to seek from. Most pertinent were the relational factors of professional and personal trust, access to the provider and the closeness of the relationship between seeker and provider. These themes are discussed below.

Professional Trust: professional trust was expressed as confidence in and reliance on the provider's knowledge, expertise and competence. Seventy-six percent of all interviewees discuss the providers' competence when deciding who to approach for knowledge. Knowledge sought in this context included knowledge of specific tasks, experiential knowledge of certain issues, or more expert knowledge of a procedure or machine. These are all examples of more tacit knowledge that is difficult to attain through reading manuals or looking online. As a result, seekers demonstrated trust in the provider when choosing to rely on them to provide useful and accurate knowledge. This was similar across all groups of expertise.

Professional trust was an important theme for seventy-one percent of apprentices when deciding who to seek knowledge from. These decisions were person specific, effected the decision to approach a person as well as the decision to accept their knowledge when given. Two apprentices quoted below illustrate these points:

> *If it's something that I'm pretty sure they're not confident in or I have no confidence in their ability then I'll find someone else and I just won't go near them. (PTSE5, apprentice)*
>
> *So if somebody tells you, I know it sounds terrible to say, but you're always not covering yourself but there's certain people who you would take their word for granted as such and you would check back and there are other guys who if they told you something you would turn around and think I'm going to check that before I do anything. (Tech 5, apprentice)*

These quotes demonstrate that the decision to seek is influenced by the seeker's confidence in the providers' capability. Conversely, a lack of professional trust may deter an apprentice from approaching someone altogether. Additionally, as the second quote illustrates, professional trust also effects the seekers willingness to apply the knowledge received. When the provider's knowledge is less trusted, the seeker will not rely on that knowledge without first checking if it's correct. Therefore, apprentices were selective when choosing knowledge providers because the quality of knowledge acquired from others varied. Some found their evaluation of the provider difficult to explain and said simply as "*you know out there who to ask*" and "*you pick up who knows more than others*".

However, others suggest that trust is formed over time through interactions with the provider which allows the seeker to form both an awareness of who knows what and evaluate how trustworthy they are. Positive interactions include situations in which the provider helped the seeker fix a problem, which demonstrates both their expertise and their helpfulness. These two characteristics were the most important when determining who to seek from. When trust is developed, apprentices suggest they are more likely to go to these people again for knowledge. This indicates that professional trust is a determinant of future seeking behaviour as well as an explanation for past seeking behaviour, as one apprentice expresses below:

> *I might ask someone that has actually fixed something with me and another time and another time. And he obviously knows what he is doing, so you try and rely on guys that are very good that way. (MT8, apprentice)*

Therefore, repeated positive interactions with a specific person are necessary to developing the trust to rely on their expertise.

By contrast, a lack of professional trust in the provider deterred apprentices from seeking knowledge from those providers. Negative interactions with the provider developed mistrust in a specific other and informed future seeking behaviour. In these situations, negative interactions dissuaded apprentices of seeking from that provider in the future. Apprentices who described this referred to providers "bluffing" their knowledge or receiving "drivel" rather than "gems".

> *Again, if you ask certain individuals about a certain problem maybe two or three times and you realise it was only all a bluff and you were going nowhere and you wasted a whole day on a machine and it was only something small, you are not going to ask that same person, well I don't find. (MT8, apprentice)*

As the above quote illustrates, seeking knowledge from specific others is informed by the level of trust in that person's ability to provide useful knowledge, and that this is not simply a function of how much expertise they have but also of their trustworthiness in accurately representing that knowledge to others.

Sixty-seven percent of journeymen similarly seek others they perceive as having "better knowledge" or "stronger" knowledge when making decisions of who to approach, and this is equally developed through "*bitter experience"*. This experience of others allows these journeymen to build a network of people, as one journeyman describes:

> *I suppose I built up a lot of informal relations with kind of all of the various different people on site or all the various departments. (PS1, journeyman)*

These networks are based on trusted co-workers with specific knowledge for different tasks. This indicates the importance of professional trust for building networks of potential providers. Built by repeated positive interactions with others, these trusted networks allowed seekers to access the knowledge they need when they need it. Professional trust is important as people's knowledge and

experiences are relied upon and valued over other sources of knowledge. This is exemplified by one journeyman who suggests of specific people that "*you are relying on their knowledge then and their experience*" which is pertinent to getting relevant knowledge because *"you are relying on people and not on a document to tell you about their observations*" (PS4, journeyman). This illustrates the reliance on seeking others tacit knowledge, rather than explicit forms of knowledge such as documents, for which professional trust is a necessary condition that must be met.

Eighty-nine percent of experts cite the importance of the providers knowledge and their reliance on others knowledge. Experts in particular had already formed networks of knowledge providers that were useful due to their task-specific domains. Therefore, they relied on others when encountering a problem that required knowledge that they were less familiar with. In this way, they tended to evaluate the providers knowledge relative to their own, and this allowed them to "weight" its value. In this context, awareness of what others know as well as trust in their knowledge was a necessary component of seeking this knowledge from someone, as one expert discusses below:

> *Before I go to the engineers, I would have a fair idea of which engineer is going to be able to provide the information that I need…they may have a better knowledge of it working with it themselves or it might actually be just more knowledgeable engineers. (Tech 12, expert)*

In summary, professional trust in the provider informed seeking behaviour across all groups of expertise. Apprentices in particular were selective about whom to approach for knowledge due to prior negative experiences of receiving misleading knowledge or less useful knowledge. In response, trust was only formed and built over a series of positive prior interactions with specific others who could demonstrate their competence. This indicates the importance of early positive interactions in forming a trusting relationship for the purpose of knowledge seeking. It also illustrates how these interactions form the basis by which the knowledge seekers network evolves, and informs who will become part of the network that they trust and rely on. Furthermore, there was also some evidence that apprentices' distrust in a provider could result in the decision not to apply knowledge received to the task at hand, after it was sought. Journeymen were equally reliant on past experiences to form trust in others but had already build up informal networks of trusted colleagues they could approach. Similarly, experts discussed the importance of their existing network of trusted experts in areas outside their expertise and the relative "weight" they attach to their advice.

Personal Trust: personal trust in a provider was expressed as confidence that the provider would be helpful, and confidence that the seeker could disclose their lack of knowledge safely to them. Fifty nine percent of respondents evaluated personal trust by the provider's willingness to help, or demonstrated personal trust in others by their willingness to ask a person for knowledge without fear of ridicule. Selecting a provider based on personal trust was developed based on prior behaviour of

the provider, and trustworthy providers were described as “good”, helpful, or willing to help, while providers who were mistrustful were those who may “ridicule” or avoid helping when asked.

Similar to developing professional trust, apprentices developed personal trust with providers over several interactions in which the provider demonstrates their helpfulness. Those who had already received help from someone before were more likely to seek from them in the future. This element of time is illustrated by one apprentice who suggests that;

> *“As time goes on you know who will help you and who won’t. It’s the same anywhere.” (MT3, apprentice)*

Personal trust in the provider is particularly valued, but only once competence is established. Once professional trust is established, personal trust becomes the differentiating factor when choosing between several potential providers. For example, one apprentice suggests he approaches a specific person as “*he is an expert on one or two of the things I would need, both for information and because on a personal level he is very helpful” (PTSE4, apprentice).* This illustrates the importance of personal trust when seeking knowledge. Professional trust in the provider is the first step in establishing a potential provider to approach, but personal trust comes next. Another apprentice suggests that they evaluate a provider as one “*who will be able to point you in the right direction even before you start”.* This was notable as trustworthy providers were helpful without being asked, and therefore perceived as particularly ‘good’ because they looked out for the apprentice. Another apprentice suggests that high personal trust overcame her perceived risk in appearing stupid when seeking, but that “*there were only two people that I would say ‘look I need a hand’” (Tech 10, apprentice)*, and that these people are “*very good to give me a hand*” and “*quite happy to share*” which influenced this apprentices decision to seek from them specifically. In summary, personal trust is established when providers demonstrate their willingness to help and this can overcome the risk of appearing incompetent or stupid when seeking knowledge.

Conversely, those who had a negative experience with a provider in the past were unlikely to ask them for help again. Negative experiences varied between providers who are reluctant to help them to someone “ridiculing” them. One apprentice suggested that some engineers “bluff” or don’t help even if they see you struggling.

> *Some guys don't help if they see you struggling, some people say they don't know how to do it and then you catch them doing it a week later. Knowledge is power.*

This cements the idea of helpfulness as a core component on which personal trust is based. Another apprentice suggests that they would be wary of asking specific providers “*in case they were going to ridicule you. If I had the hint that I’d get that sort of response I might not ask” (Tech 8, apprentice).* In this context, the apprentice suggests that they “*might mean it in a joking way but when you’re asking for help that’s not what you want to hear*”. This illustrates the risk associated with seeking

knowledge, and that it is the expectation of a negative response which may reduce or decrease seeking behaviour toward providers.

Sixty-seven percent of journeymen and experts also used evaluations of personal trust to inform seeking decision. Similarly to apprentices, these two groups suggested that the personal trust as demonstrated by the providers willingness to help would enable their seeking. One journeyman suggested that some of his trusting decisions were based on "*hearing that guys have been going to these guys, like I always go to that guy" (MT2, journeyman).* Experts also formed impressions of who could help, primarily from experience. Several experts suggest that they prioritise approaching providers who are willing to help, while in some cases specifically avoiding unreceptive providers who are not trusted to be helpful.

> *If there were two people with the same level of experience, I would go to the person I knew was most likely to help me. There are maybe two or three people in Testing who have the same level of experience but only one of them will pass the information onto you so you're wasting your time going to the other guys, you might as well go to that person first. (Tech 8, expert)*

These quotes exemplify that seeking behaviour is conditional on the seekers personal trust in the provider. That is, professional trust alone is not enough to predict decisions of whom to seek or future seeking behaviour. Even when professional trust is present, personal trust must be present to encourage the seeker to approach a provider. This is particularly evident in examples of mistrust, in which the lack of personal trust deterred seekers from approaching providers. Another expert suggests that it is not about the provider being unapproachable but "*less inclined to impart*" knowledge which serves as a deterrent to seek. He follows this with an example which illustrates the issue.

> *I once heard someone say "I'll tell you what you know not what I know" It's just kind of like, I am not going to tell you anything really. (MT4, expert)*

By contrast, approaching people who were trusted to disclose their knowledge avoided negative outcomes of knowledge seeking such as wasting time searching for knowledge without receiving it, or receiving misleading or "basic" knowledge that adds time to completing their task.

In summary, respondent groups across expertise levels were consistent regarding the development of personal trust in others and their evaluations of providers. In general, respondents were selective in choosing providers to approach, and these decisions were informed by both professional trust and personal trust. The personal trust they had in certain providers allowed them to overcome some of the risk associated with seeking knowledge, such as disclosing a lack of knowledge. Personal trust was formed based on prior interactions in which the provider displayed helpful behaviour. While high personal trust enabled decisions to seek from specific others, low personal trust formed from negative experiences of the provider contributed to a sense of mistrust

and deterred seeking from those specific others. Therefore, while professional trust was a pre-requisite when deciding to seek from others, this decision was conditional on a high level of personal trust also.

Access: this refers to structure of relationships which existed between seekers and potential providers. Access refers to the availability of the "right" providers when the seeker requires knowledge and was discussed by thirty-eight percent of respondents. Seventeen percent of total respondents suggested that access was generally not a problem, and therefore it was easy to find the people needed when seeking knowledge. This sentiment was shared by seven percent of apprentices, fifty percent of journeymen and eleven percent of experts. These respondents suggested that there was "*always someone close by*" and "*plenty of people to ask*".

Journeymen in particular identify the access to others, and several mention their 'mentor' as someone close at hand to help.

> *They don't like take your mentor away from you so. He would have been sitting near me on the plant as well. So, if I did have any questions there are plenty of people around that you just ask. (PS8, journeyman)*

Another respondent also suggests that he can ask questions of the person nearest him, and that *"though you have an assigned mentor; most people are around and you will find someone who will help you anyway" (PS4, journeyman)*. Another journeyman echoes this sentiment of general availability of people onsite to help out

> *There is always somebody who has a strong knowledge of the system I suppose on site that you can always call on. (PS3, journeyman)*

Experts also identified the availability of others, but were more specific about who is available and refer to their networks of trusted providers. However, several suggest that even if a person is not onsite that it is possible to call providers for knowledge "*you could phone him any time; it's no problem" (Tech 2, expert).* This suggests that expertise needed was generally available.

However, while there was access to providers within the organisation to satisfy most requests for knowledge, timely access to that expertise was a barrier to seeking knowledge at times. Those that discussed access as a barrier to seeking suggest that there was a lack of availability on site at times, particularly on late shifts which meant that it was too late to call potential providers as they were at home. These problems were identified by twenty one percent of respondents (14% apprentices, 33% journeymen, and 22% experts). Access was limited in specific scenarios such as late-night shifts as more people are offsite, in particularly busy scenarios in which decisions take a long time, or for particularly difficult problems where the access to the "right" people is limited as there is a lack of expertise onsite. One journeyman illustrates a lack of access when decisions take a long time *"sometimes what will happen is that decisions will take a long time to get made for that*

very reason or you won't have the right people there to make the decisions" (PS7, journeyman). And an expert describes a situation where there is a lack of expertise onsite;

> *Sometimes there is no one else on the crew who has experience, and if you've taken it as far as you can you'd have to wait for the next shift to come in to ask them. (Tech 8, expert)*

This quote demonstrates that lack of access can delay or inhibit the ability to seek from others when expertise is off-site. This was particularly an issue when seekers were experiencing time-sensitive problems.

In summary, this theme illustrates the importance of availability and access to the "right" people, especially during specific scenarios requiring more expert knowledge or a difficult problem. These people are generally those that the respondents work in proximity too. When respondents have closer relationships or a network of trusted providers, they are more likely to access those people off-site such phoning them at home. However, for some, timely access to people at specific times was a barrier to knowledge seeking. This theme illustrates that structural social capital, which is the size of person's available network, as well as the relationships between seeker and provider influence how easy it is to seek from specific others.

***Recognising expertise*:** this theme refers to the awareness of who knows what, which enables recipients to identify who to seek from. As the only individual recipient theme to effect decisions to seek from a specific other, awareness of the expertise of others was discussed by forty five percent of respondents.

Forty three percent of apprentices discussed their awareness of others knowledge, and suggest that this awareness is developed through observing who others ask for knowledge and asking colleagues who knows what. One apprentice acknowledges that *"some guys are stronger than other at various things; they seem to have better knowledge"* and suggests that he has gained this awareness through "*hearing that guys have been going to these guys".*

Journeymen were particularly cognizant of the neccesity to recognise expertise and also gained much of this awareness through co-workers or managers who introduced them to "networks". One journeyman suggests that his mentor gave him probably "60 – 70%" of the knowledge he has about others, and "*he was the one saying "and you need to talk to this person" and do it that way" (PS1, journeyman).* In addition, training events can form an awareness of who has knowledge in specific tasks. This awareness translates into seeking behaviours as respondents become aware of who they might approach for knowledge regarding specific problems or tasks which allow them to perform the job better. One journeyman suggests that awareness of others expertise can mitigate the cost in time it takes to "*get the right people involved"* as a frustrating part of his job is "*trying to get the right information and get the right people involved to make the correct decision" (PS7,*

journeyman). This elucidates the value of recognising expertise as it can overcome costs of seeking knowledge when experiencing time sensitive problems.

Likewise, thirty-three percent of experts express the importance of recognising expertise and additionally knowing who will share knowledge. One expert illustrates this:

> *You've got to know who to go to get the information from or who's the most likely to give it to you. (MT7, expert)*

In summary, the awareness of others' expertise is formed through observation and asking others about who knows what. Journeymen and experts in particular discussed the value of recognising expertise through forming networks as it enables knowledge seeking and aids respondents in their ability to find knowledge more quickly.

Close ties: this theme refers to friendship relationships with providers which inform decisions of who to seek from. Twenty-one percent of apprentices and thirty-three percent of experts discussed seeking from friends. While these discussions sometimes overlapped with the utilization of close ties to enabling learning, this discussion will be limited to the boundaries of this theme – knowledge seeking. Close ties were often referred to as "bonds" with providers, or providers were identified as friends, and these relationships enabled recipients to seek from people they felt close to.

One apprentice suggested that he would "*seek from friends who help you" (PTSE1, apprentice)* within the workplace, identifying friendship with personal trust (discussed above). In this context, personal trust is one basis upon which seekers develop friendships with specific others over time. Another apprentice suggests that forming "bonds" with his team allows him to seek and subsequently learn from them more easily.

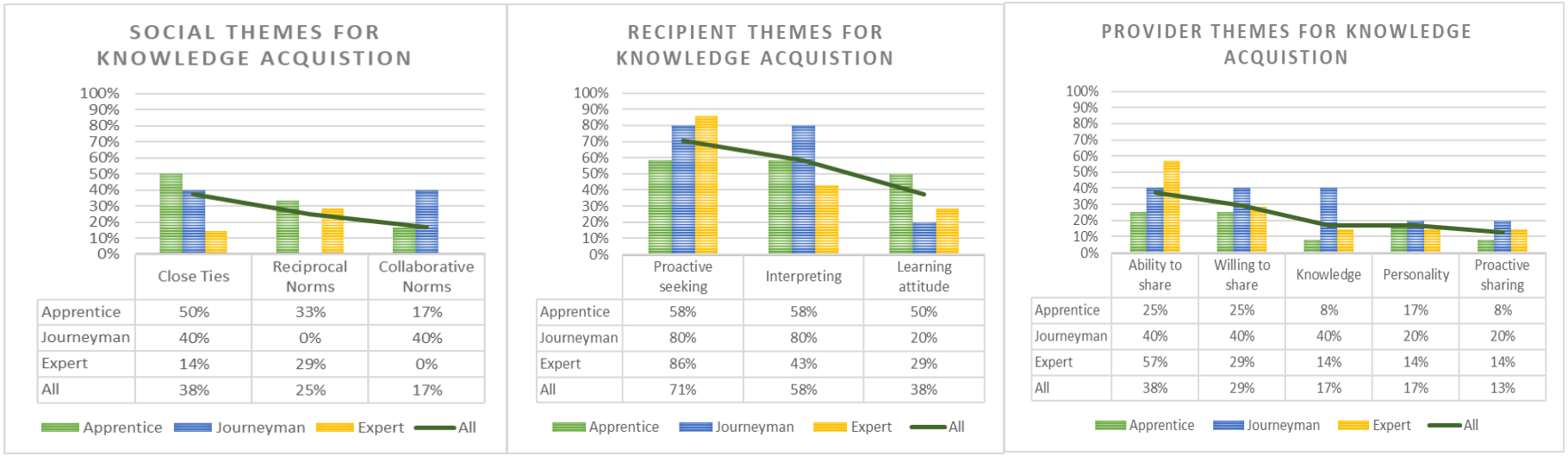
> *You can't have two guys walking around doing the one job but if you were quiet and you kind of create a bond with the guys on the shift you might ring them and say 'are you busy' or 'are you up the walls' and you'd go down and you'd fall in with them and you might pick up stuff off of them. (MT8, apprentice)*

This quote overlaps with acquisition and learning, but also demonstrates that purposively creating strong ties with others can be a specific strategy to enable access to others and seek from others; and that seekers utilise networks and form relationships with others to seek and to learn.

In summary, the level of professional and personal trust in specific providers were the most frequently mentioned factors when deciding whom to seek from and underpinned other influencing factors. Additionally, deciding who to seek from was enabled by the awareness and recognition of available expertise, which was developed by observation of which providers were trusted both professionally and personally by others. Access to this expertise was also an important component to assessing the availability of others when deciding to seek. The lack of access was perceived as a

barrier to timely knowledge seeking by many. Finally, close ties enabled both seeking and learning, and these were developed through personal trust in others which developed bonds and friendships.

Figure 3-2: Themes influencing knowledge acquisition



3.7.2 Themes Influencing Knowledge Acquisition

Within this context, knowledge acquisition refers to understanding the knowledge acquired from others and therefore is focused on useful acquisition of knowledge, rather than simply receiving an answer to a question. As understanding knowledge from others is a cognitive rather than behavioural process, it was particularly influenced by the individual recipient themes; namely proactive seeking, interpreting, and learning preferences/attitudes. In addition, some social themes played an important role in developing an environment in which to learn. Other than the providers' ability and willingness to share, other provider themes were relatively infrequent and therefore not discussed. Therefore, the providers' ability and willingness are discussed under the knowledge sharing themes, as they pertain to both behaviours. Themes influencing knowledge acquisition are graphically depicted in figure 3.2, page 74.

Proactive seeking: this theme refers to instances of an individual initiating contact with the provider and directly asking for knowledge, this behaviour can result in better acquisition and understanding. Seventy-one percent of all respondents mentioned knowledge seeking most frequently as an important factor in acquiring and understanding knowledge sought.

Fifty eight percent of apprentices acknowledge proactive seeking as an important part of the problem-solving process and can involve seeking knowledge from multiple roles. One apprentice discusses proactive seeking as a method to "*find out as much as you can*" (MT3, apprentice) and as a strategy to acquire more and better knowledge. Most discuss the necessity of acquiring knowledge proactively, with an onus on the seeker to find and understand knowledge they need. This sentiment is expressed when describing knowledge seeking as "*my business to go and ask*" (MT8, apprentice) or "*you take it upon yourself to ask*" (PTSE3, apprentice). Proactive seeking is perceived to encourage providers to share more knowledge and help solve problems on the machines. One apprentice illustrates this benefit, and suggests one particular provider "*loves helping me, because I ask challenging questions*" (PTSE1, apprentice). Therefore, apprentices perceive proactive seeking as a deliberate strategy to acquire superior knowledge from providers.

Eighty percent of journeymen discuss the benefits of interpersonal knowledge seeking to understand and acquire knowledge. One journeyman illustrates the importance of face-to-face seeking specifically, as it "*gives me a better understanding" (PS3, journeyman).* Other benefits of seeking knowledge face-to-face is that the provider may be more likely to run through a problem or sit down and help which can enable understanding, rather than giving a simple answer over the phone. Another journeyman suggests that seeking knowledge in which they *"pull them to one side and tease it out" (PS5, journeyman)* enables better understanding when trying to solve a problem as it begins

an interactive learning process in which the provider will more thoroughly show and explain the issue.

Forty eight percent of experts also identify knowledge seeking as a strategy to learn. They mainly focus on the benefits of seeking, which mirror the benefits identified by apprentices and journeymen. These include the increased likelihood that prompting providers will incentivise them to help and recipients can acquire "*a lot more information sometimes because you ask*" *(MT7, expert).* One expert also discusses the importance of asking "*a lot of questions*", but warns that seekers must have a certain level of understanding when seeking from different disciplines before approaching a provider;

> *We have to learn the processes ourselves first, and then the machine before we can ask. (MT6, expert)*

This exemplifies the level of shared understanding required to seek knowledge effectively, and as the above quote indicates, this may be particularly difficult across roles.

In summary, proactive seeking is used as a strategy for increasing the providers' willingness to explain their knowledge more thoroughly. This allows recipients to gain more and better knowledge from providers, and is underpinned by the expectation that providers are more willing to help those who ask face-to-face and that this will enable recipients to better understand knowledge acquired.

Interpreting: Fifty eight percent of research participants described effective knowledge acquisition as achieved through a process of questioning the provider to understand their actions or knowledge and actively seeking out possible learning opportunities. This 'interpreting' process (Crossan et al., 1999) describes how individuals learn through verbalizing or explaining their insights to themselves and others. Within this context, interpreting through questioning others went beyond seeking knowledge needed until the provider helps, but instead involves questioning the provider until cognitive understanding is reached.

Fifty eight percent of apprentices used active questioning throughout their interaction with the provider as a method to better understand knowledge sought. This process of questioning was distinguished by apprentices from letting the expert "fix" a problem without trying to understand how and why it occurred. The process of understanding was therefore an active effort rather than a passive one, and requires the recipient's engagement with the provider. Two apprentices discuss the attitude and effort it takes to understand the provider.

> *Once you kind of take it upon yourself to ask the questions and to get stuck in, you know it could be easy to sit back and let the PTSE with all the experience take on any problems or*

issues. You have to push yourself forward a bit to take things on I find otherwise you just kind of get left sitting there. (PTSE3, apprentice)

I'm like a dog with a bone like right so like if, if I'll try and understand 100% exactly what I'm being told like you know... as you said try and extract as much information as you can from your Tech Service Chemist, not that they are holding back anything or they are not explaining it correctly like right, it's just maybe that you get it right in your head yourself like you know. (PS6, apprentice)

Apprentices suggest that it is a proactive effort to understand knowledge given, but by engaging in this effort it is possible to better understand others and avoid being left '*sitting there'*. This "sense-making" activity allows knowledge recipients to reach a level of understanding through language and questioning. Another apprentice illustrates the reflective nature of the interpreting process, as understanding requires questioning oneself as well as the provider.

People get kind of bogged down on how to do things and when someone like me wants to look back and see why you did that, they describe that they did it this way, that way, that way, but they forget to say why. So… OK the why? I need the why to just keep me going a little bit more. If I didn't ask myself why I hadn't - I wouldn't have anything to confirm that and I would still keep hunting on for the information. (PTSE1, apprentice)

This further illustrates the process of understanding knowledge as an active one, engaging the provider to enable them to better explain their actions.

Both journeyman and expert respondents support the assertion that interpreting is recipient-led. Journeymen (64%) also suggested that the burden of responsibility with understanding the knowledge they sought lay with the seeker and involved asking "*the right question*s" to get the knowledge "out of" the source or solving problems through working together to collaborate on a solution. One journeyman illustrates this role of the recipient in guiding the process of understanding;

It is up to us then to ask the right questions or, you know, to get the information out of them as it is for them to impart or to tell us exactly what they want to try and get us to do what they want as well, so it is not an easy one. (PS4, journeyman)

Effective acquisition requires an interactive engagement with the provider to best understand knowledge throughout the sharing process. The recipient must take responsibility for understanding the knowledge they have been given. The example quotes also allude to the difficulty in understanding others, as it is necessary to ask the "right" questions, rather than generally questioning the provider to explain themselves. Therefore, interpreting requires a level of skill to be effective. For journeymen, this was exemplified through descriptions of asking the "right" questions, "teasing" out answers, or observing others while they solve problems.

Equally, experts attempt to understand the provider and describe asking the source to "break it down" more simply or draw a diagram. This is supported by an expert who suggests that they direct the provider to explain their knowledge in a format that they can best understand:

> *If you just ask them, they will break it down simpler and draw it out, exactly what happens for you. If you don't ask you don't get either. (Tech 11, expert)*

Additionally, experts discussed the interpreting as a more transactional process in which knowledge was extracted through negotiation and compromise (i.e. negotiating the best help they could get under time-constraints or other access issues) as well as the necessity at times of interacting with people off-shift in order to gain the knowledge they needed.

> *Ask them if they were busy and seeing if they could come help you at the toolset. If they were busy, I'd tell them what the problem was, tell them what you'd already tried and ask if they could think of anything that would point you in the right direction. (Tech8, expert)*

In summary, interpreting through questioning and attempting to understand the provider enabled better acquisition. The outcomes of interpreting included fulfilling task requirements, better development of respondent's expertise, better understanding of their role and successful outcomes of problem-solving.

***Close ties*:** knowledge acquisition was also influenced by the ties between co-workers, specifically close ties. This theme is specifically concerned with the *development* of relationships, rather than the existence of close/strong ties. It was evident that all groups of expertise used networks of trusted sources.

However, only apprentices (36%) and journeymen (33%) discussed forming relationships and ties with co-workers in order to best acquire knowledge. In this context, strong ties were described as 'bonding', 'gelling', or getting on well with someone. The formation of these ties was an important factor in enabling effective acquisition of knowledge. In general, apprentices formed these ties with their co-workers who worked in proximity.

> *You pick up most of the information from the people you are working with; even in the canteen talking through a problem you have is a great way to sort out a problem. (MT3, apprentice)*

Apprentices suggest that close working relationships speed-up problem solving, provide more opportunities to learn informally, and allow seekers to "*pick up a lot better understanding of how you deal with the job*". In addition, close ties enable seekers to complete tasks more quickly and learn about different thing as illustrated below:

> *If you get on well with someone and work with them, I think it works a lot better and you get things done a lot faster and you are not going down single road. (MT3, apprentice)*
>
> *If you were quiet and you kind of create a bond with the guys on the shift you might ring them and say 'are you busy' or 'are you up the walls' and you'd go down and you'd fall in*

with them and you might pick up stuff off of them that might have no relevance to your own area but you know you're learning still about electricity and you're learning about different things. (MT8, apprentice)

This describes how forming close ties can be a strategy for learning, and enables acquisition methods such as shadowing and observation on an informal basis. Another apprentice suggested that some people develop "shift favourites" which mean that seekers who have formed these bonds with knowledge sources are more likely to work together again. Forming these bonds require good communication skills and putting people "at their ease".

When I came first people were very reluctant to give information out and the reason being was a fear factor but now I have way of getting people to talk and I put people at their ease and I can talk very easily to people and I get an awful work done that way when I get people involved in it. (MT5, apprentice)

Journeymen further suggest that the outcomes of close working relationships are that knowledge sources share more knowledge than they would otherwise and that their work relationships make it easier to get knowledge "written down" and get the job done more easily.

It depends on how interested the person is as well and how well you get on with them to an extent as well how much they are willing to put down on paper. (PS4, journeyman)

It is building those relationships that gets the job done easily so if you deal with this wrong and have everyone hate you and because you depend on them your chances are you are fairly numbered and that is something I don't think; I could find I could tell people how to do it but it is something that; it is more of a sense than anything else. (PS1, journeyman)

Good relationships also prompted people to work together more informally and take joint responsibility in achieving shared goals, such as fixing a broken machine.

There is a good relationship there and so people are good at just talking to each other you know so I think it is very informal, very friendly way that people interact with each other in here and there is very much a joint responsibility towards it so you do work closely together.

In summary, apprentices' value strong ties as they provide more learning opportunities and enable seekers to complete tasks faster, whereas the journeymen focus on how close ties change the sources sharing behaviour. They claim that these relationships prompt the source to provide more knowledge. These findings inform prior research by providing possible explanations as to why strong ties lead to greater knowledge exchange (Ghoshal et al. 1994; Hansen, 1999, Levin and Cross, 2004) and predict the receipt of useful knowledge (Levin and Cross, 2004).

Learning attitude: learning attitudes manifested as an interest in learning and the opportunistic attempt to learn outside of a problem-solving scenario, in this sense those with a pro-learning attitude were more likely to take on extra-role behaviours such as working overtime to learn, observing outside-role employees work, or volunteering to shadow others. Those respondents most interested

in learning were attempting to generally learn from their environment. This theme represents thirty-eight percent of respondents, the highest proportion of who were apprentices (50%).

Apprentices with a high learning orientation, or pro-learning attitude, tended to scan their environment in order to pick up new knowledge. One apprentice suggested he was *"always picking up something new"* and therefore was *"always learning something" (MT3, apprentice),* while another suggested he always tried to "pick up [knowledge] off the other lads" (MT8, apprentice). These apprentices were in touch with their learning preferences "*I know what way I learn best; I learn best by watching and reading" (Tech3, apprentice)* and therefore sought opportunities to learn in a way that suited them. In order to learn, some apprentices mentioned seeking out opportunities to learn outside of their own discipline and normal work routine.

> *What I do find sometimes right is I do ask the Chemist to give me a shout when they are running a pilot in the lab so I can actually watch how they watch how every step actually behaves. I have done that now with a few. We have managed to solve a good few problems before while it was on Plant like you know. (PS6, apprentice)*

This shows how a pro-learning attitude enables better acquisition, as recipients are seeking opportunities to learn outside of their role.

Equally, twenty percent of journeymen had a pro-learning attitude and discussed the opportunities they took to learn. One journeyman suggested that he learned by "*tagging along with*" co-workers that had done his role. Twenty-nine percent of experts also take on extra-role opportunities to learn. One expert describes overtime he did so he could gain experience from more experienced employees outside of his shift.

> *I did a lot of overtime at that time because there was really no experience on my shift so I did a lot of overtime and picked up the experience then from experienced techs. (Tech13, expert)*

In summary, respondents with a pro-learning attitude were interested in learning generally, which manifested in behaviours such as seeking opportunities to learn by doing overtime, or observing how other employees do their work in order to learn. This enabled acquisition as they created more opportunities for learning.

***Close ties*:** close ties in the context of acquiring and learning knowledge related to the importance of forming strong relationships with co-workers. This was the highest ranked social theme for knowledge acquisition and a point of discussion in thirty eight percent of respondents. Developing close ties were described by respondents as "bonding", gelling, or getting on well with someone and was an important factor in enabling effective acquisition of knowledge.

Fifty percent of apprentices discussed close ties, and described forming the closest ties with co-workers who worked in proximity. They then used these informal networks to access knowledge and talk through a problem.

> *You pick up most of the information from the people you are working with; even in the canteen talking through a problem you have is a great way to sort out a problem. (MT3, apprentice)*

The above quote illustrates the value of strong ties with co-workers for acquisition, as interaction in informal contexts allows apprentices to engage in conversations which enable the interpreting of knowledge and can resolve workplace problems. The value of strong ties is also discussed by a number of apprentices who suggest that close working relationships speed-up problem solving by providing more opportunities to learn informally, which allow seekers to "*pick up a lot better understanding of how you deal with the job*". Additionally, seekers and providers who have close ties or a bond are more likely to work together again. The deliberate attempt to from 'bonds' with others or acknowledging a close relationship was explicitly described as a valuable method for acquiring knowledge from them.

> *If you get on well with someone and work with them, I think it works a lot better and you get things done a lot faster and you are not going down single road. (MT3, apprentice)*
>
> *If you were quiet and you kind of create a bond with the guys on the shift …. you'd go down and you'd fall in with them and you might pick up stuff off of them that might have no relevance to your own area but you know you're learning still about electricity and you're learning about different things. (MT8, apprentice)*

The second quote illustrates how forming close ties can be a specific strategy to learn, and therefore utilising networks and forming relationships with others can be a deliberate strategy to seek and to learn on the job. The ability to form these bonds is discussed by another apprentice; he suggests that it requires good communication skills and putting people "at their ease".

> *When I came first people were very reluctant to give information out and the reason being was a fear factor but now I have way of getting people to talk and I put people at their ease and I can talk very easily to people and I get an awful work done that way when I get people involved in it (MT5, apprentice)*

This quote illustrates the benefit of forming close ties, as this apprentice suggests he gets a lot of work done by involving others. Additionally, close ties engendered reciprocity**,** which manifested in the attitude that people are more likely to help you if you reciprocate by sharing your knowledge and experiences too. One apprentice describes this, saying "*it kind of works both ways*" and links this to creating bonds with individuals. He suggests that having a bond with someone made it more likely that the relationship was reciprocal. Reciprocity is especially effective to acquiring knowledge if the recipient and provider have different types of expertise, for example while "*Where they might be a little bit weaker with mechanical, they might call me to come down and ask 'what do you think of that?" (MT8, apprentice).*

Forty percent of journeymen further suggest that it is easier to get knowledge "written down" and get the job done more easily with close working relationships as providers share more knowledge than they would otherwise. Building these relationships therefore is important to acquiring knowledge from providers who may otherwise be reluctant to share.

> *It depends on how interested the person is as well and how well you get on with them to an extent as well how much they are willing to put down on paper. (PS4, journeyman)*
>
> *It is building those relationships that gets the job done easily so if you deal with this wrong and have everyone hate you and because you depend on them your chances are you are fairly numbered and that is something I don't think; I could find I could tell people how to do it but it is something that; it is more of a sense than anything else. (PS1, journeyman)*

As the two quotes above display, building good relationships can be seen as a strategy for enhancing the acquisition of better-quality knowledge from providers, and allows recipients to depend on people they need to get their job done. Good relationships also enable people to work together more informally and take joint responsibility in achieving shared goals, such as fixing a broken machine.

> *There is a good relationship there and so people are good at just talking to each other you know so I think it is very informal, very friendly way that people interact with each other in here and there is very much a joint responsibility towards it so you do work closely together. (PS3, journeyman)*

Therefore, like apprentices, journeymen use their close ties as a strategy to gain better knowledge.

Fourteen percent of experts refer to their network of trusted sources for acquiring knowledge and suggest that they rely on friends to acquire knowledge regarding specific machines or tasks. One expert suggests that if he is called to machine, he doesn't usually work at he would call a friend and ask "do you have anything on it?" One expert describes his network of close ties "*I've good friends; we all work together and we have each other's mobiles" (Tech 2, expert)* and suggests that their friendship enables him to call them off shift. Experts also refer to reciprocity in relationships with close ties, in which "*You have to have give and take and give ideas and be willing to listen" (MT3, expert*). This indicates that stronger ties are underpinned by reciprocal relationships, where both parties expect to gain knowledge.

In summary, creating bonds enabled respondents to know what others know, know who is likely to provide help, get more effective knowledge from others through either providing knowledge at the time they needed it or by spending more time helping them, and increases the provider's interest in helping the apprentice out.

Collaborative norms: similar to collaborative norms discussed in the seeking theme, these norms represented observed behaviours and attitudes of others within their team or department which guided their personal attitude toward knowledge acquisition. Perceived collaborative norms related

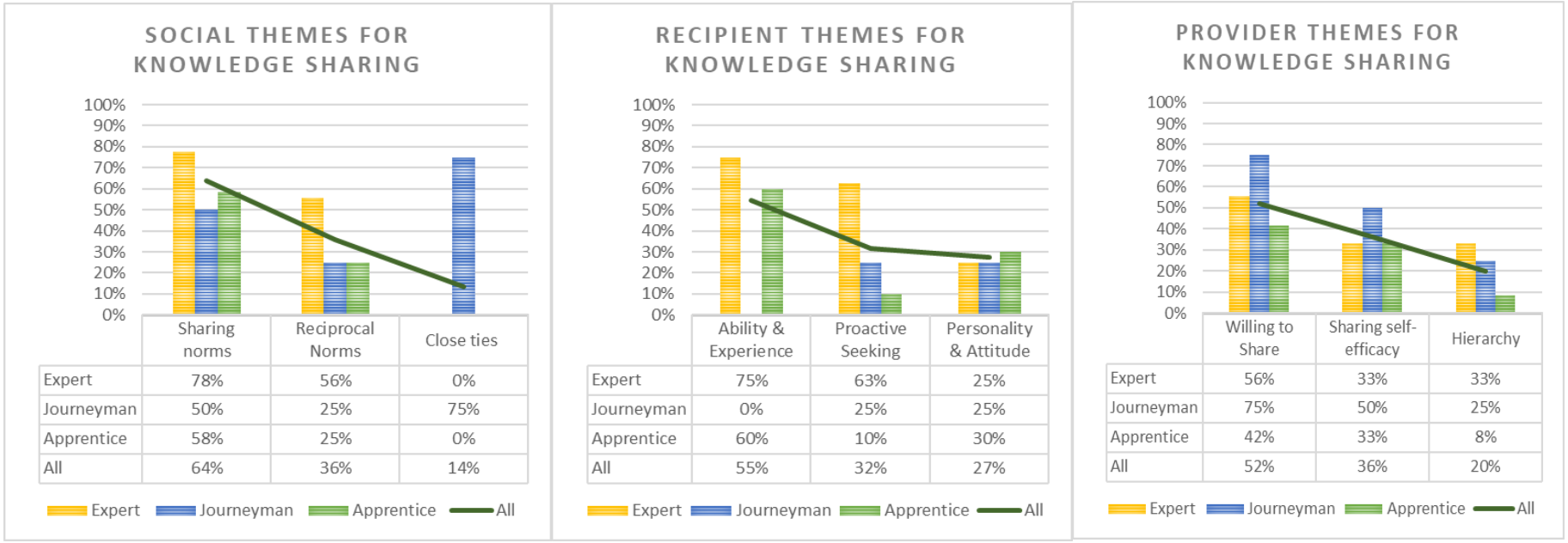
to both provider and recipient behaviours and accounted for seventeen percent of respondents, represented by seventeen percent apprentices and forty percent of journeymen. Positive collaborative norms manifested as the perception that a provider would help if they were asked. One apprentice elaborates:

> *If you involve the person running the machine, they are very helpful. They will always send you down in the right direction. If you don't involve them, they won't tell you anything. Get them involved and they'll help you along the way. They get interested then they'll help you out. (MT3, apprentice)*

This illustrates the perception that people are helpful, and if they are involved the recipient will be more likely to receive knowledge. This idea suggests that collaboration provokes the providers' interest in the problem. Similarly, journeymen suggest that there is "good relationships" and this encourages people to talk to each other.

In summary, knowledge acquisition was enabled by individual behaviours such as seeking and interpreting, in addition to a pro-learning attitude. These factors cumulatively enabled recipients to gain more and better knowledge. Knowledge acquisition was also aided by social factors such as close ties and collaborative norms. These enabled an environment where acquisition opportunities were better.

Figure 3-3: Themes influencing knowledge sharing



3.7.3 Factors Influencing Knowledge Sharing

Within this context, knowledge sharing refers to providing knowledge to others. The three most important themes to providing knowledge are sharing norms, the providers' willingness to share, and the recipient's ability and experience.

Sharing norms: perceptions were divided between those who observed norms of sharing, collaboration and co-operation, and those who observed norms of knowledge hoarding. These perceptions of others sharing activity influenced their own motivation to share. While sixty-four percent of respondents discussed sharing norms, only thirty-six percent suggested that there were pro-sharing norms in their workplace, while forty percent suggested there were anti-sharing norms within their workplace. Interestingly, apprentices were evenly split across the two groups (33% suggest pro-sharing, 33% suggest anti-sharing), while fifty percent of journeymen perceived positive norms in which people's behaviour was described as "open", "generous" and "forthcoming" and none identifying knowledge hoarding. On the other hand, sixty-seven percent of experts perceived a lack of sharing norms, with a general attitude toward "learning the hard way", while only thirty-three percent perceived pro-sharing norms.

Collaborative norms can be described as norms of teamwork (Starbuck, 1992) and cooperation (Goodman and Darr, 1998; Jarvenpaa and Staples, 2000; Orlikowski, 1993). Both apprentice and journeymen who discussed this suggested that people were happy to share and this informed their own sharing behaviours:

> *I would be a believer in an open-door kind of policy, try help people and I suppose the department runs very much along those lines. You know people tend to be very helpful in the department. (PTSE 4, apprentice)*

The above quote suggests that norms and organisational routines influence attitudes to seek. However, the remaining experts described sharing norms as lacking with a general attitude toward "learning the hard way". These anti-sharing norms were a historical way of thinking with the "old school" attitude of withholding knowledge from younger recruits so they would learn on the job themselves. One experts suggests that the "o*ld school way don't give anything, you keep it to yourself" (MT1, C1).* This was attributed to people wanting the "glory", "brownie points" or "getting the credit" of demonstrating their knowledge.

> *I don't know. It's always been there for as long as I've worked here. There are people who will pass the information on and others who will not and will leave you to muddle along for maybe 2 hours longer than if they had helped you out. It's a hard one. It's difficult to get people to change their philosophy. It's a way of thinking. (Tech8, expert)*

Reasons for this culture were suggested as increasing job competition, and an old institutionalised behaviour. "*I think he more or less wanted the glory of fixing it… there was a lot of competition at the time for jobs" (Tech2, C3).* Three of the expert engineers suggested that it is good to let younger

co-workers "*become independent*" as "*it's a better way to learn*", and that they personally would be reluctant to share too often, especially to the same person. This was how they had learned originally, which they thought should be carried into the next generation.

> *It's good to let them become independent too. It's a better way for them to learn. That's my own personal viewpoint. (MT6, C1)*
>
> *If I tell someone how to do something and a week later, they're calling me again and I've already shown them twice, I might show them twice but I won't show them a third time. (Tech2, expert)*

While the perception of pro-sharing, collaborative norms enabled both motivations to seek and share, a large percentage of expert respondents across all organisations perceived an anti-sharing culture that encouraged newer employees to learn independently. This is problematic, as it is the experts that most respondents would seek to learn from. As a result, the perception among apprentices was that experts would be more withholding of knowledge and reluctant to share. Experts' perceptions of hoarding activity suggest that this was either an accepted institutional behaviour, or selfishly motivated by those who valued power or advantage over others by demonstrating superior knowledge.

Reciprocal Norms: thirty-six percent of respondents suggested they were more likely to share if knowledge sharing was reciprocated. This perception is consistent with the norm of reciprocity which refers to knowledge exchanges that are mutual and perceived as fair by both parties. This represents fifty-six experts (56%) who discuss the increased likelihood of sharing knowledge to those who have either shared with them in the past and express the increased likelihood of sharing knowledge with more inexperienced co-workers.

> *I could be asking another guy; he could be asking me. Of course, some of the more inexperienced guys would be asking the older guys more. That's natural. They could ask me, or ask another four or five guys. It's kinda very open and there's no persistence, asking the same person we'll say (MT6, expert)*

This quote illustrates that reciprocity is typical especially among more experienced employees, while the expectation of reciprocity was reduced if there was a hierarchical difference between two people. However, not all employees did reciprocate as illustrated by several experts. One expert in particular discussed withholding knowledge when the seeker was "holding back" or withheld knowledge themselves.

> *If you thought someone was trying to get as much knowledge out of you as they could get but then they were holding back on you, trying to be crafty as we would put it, then that would influence me. (Tech13, expert).*

This indicates that if reciprocal expectations are violated it may influence inhibit future sharing behaviour.

Twenty-five percent of apprentices and journeymen also identify norms of reciprocity as an enabler to sharing. They focus more on the benefits to reciprocating your knowledge to others. For example, one journeyman suggests that he shares across and within roles as it is key to learning, "*that worked both ways, I would be going to them as well." (PS3, journeyman).* Likewise, one apprentice suggests that sharing knowledge is useful as it enables him to receive knowledge from others: *"they are more likely to help you if you share your information and experiences with people" (MT3, apprentice).* However, while the benefits of reciprocity are acknowledged, not all apprentices feel they can reciprocate. Another apprentice illustrates this point:

> *I want as much knowledge off people on systems that I don't know about and equally, `I'll do my best to get them into the stage now, but….some of it's going to be harder than others because, like say with that FDF, I'm learning so it's hard for me to teach others. (PTSE2, apprentice)*

While the benefits of sharing knowledge lie in the expectation that this will be reciprocated, the less experienced employees had more reservations about sharing due to their lack of knowledge. In summary, reciprocal relationships enabled the willingness to share with specific others, as respondents expected that sharing knowledge would increase the likelihood they would receive knowledge from others.

Outcome expectations: Fifty-two percent of respondents indicated their willingness to share was influenced by organisational commitment to getting the job done and helping others as well as personal goals of relieving job pressure and to be recognised as an expert.

Forty-two percent of apprentices discussed their willingness to share and indicated a general willingness to help. One apprentices who indicated a willingness to share due to a desire to help others "*I'm happy to help. I wouldn't like to see anyone stuck" (MT3, apprentice),* indicating a personally motivated goal to share. Another apprentice suggested that they would share when they are leaving for home, as "*there's no point in taking it [knowledge] with you*" *(PTSE3, apprentice).*

Likewise, journeymen indicated similar willingness to share on a personal basis. One journeyman simply suggested:

> *I wouldn't be holding back on the information really; I don't know why I would hold back on it. (PS8, journeyman)*

However, they also suggest that sharing ensures tasks get done well and correctly; "*you want to see things done well and right first time*", indicating an alignment with organisational goals.

Experts also tended to align their willingness to share with organisational goals and specified conditions under which they would share. For example, one expert suggested they share as it ensures they won't have to fix the problem themselves

> "*My philosophy is I won't be dragged half way across the Fab to do a 5-minute fix if I show somebody else how to do it" (Tech 8, expert)*

This suggests the willingness to share may be related to reducing one's own workload. Additionally, another expert suggests that sharing knowledge enables everyone to get their work completed more quickly. In summary, willingness to share was influenced by outcome expectations related to goals of to helping others, reducing workload, and helping to solving organisational problems faster.

Self-efficacy: thirty-six percent of respondents suggested that their perceived self-efficacy would influence their motivation to share. Fifty percent of journeymen suggested they were likely to share knowledge if they felt they had the competence and knowledge to provide useful knowledge. Therefore, in this context sharing self-efficacy related to the confidence in their ability to provide knowledge that is valuable to the recipient (supported by Constant et al. 1996; Kalman 1999). One journeyman suggests:

I've no problem passing on knowledge if I'm competent and I know what I'm going on about with that specific piece of equipment. (MT2, journeyman)

However, another journeyman also suggests that a barrier to sharing is an inability to communicate his knowledge *"I couldn't actually explain it out into words that someone would be able to understand what I was at" (PS1, journeyman).* Therefore, sharing self-efficacy also relates to being able to explain a problem in words or verbalising knowledge.

Additionally, thirty-eight percent of experts refer to their competency at specific tasks or knowledge of machines as an important pre-requisite to sharing knowledge. One expert succinctly put it: *"If I'm competent with that specific piece of equipment I'll share" (MT2, expert).* Similar to journeymen, an ability to explain and share that knowledge was also required to feel capable of sharing. Lower self-efficacy in this regard let to a relunctance to explain or share knowledge, even if the intention is to help or fix the machine. This is expressed by one expert below:

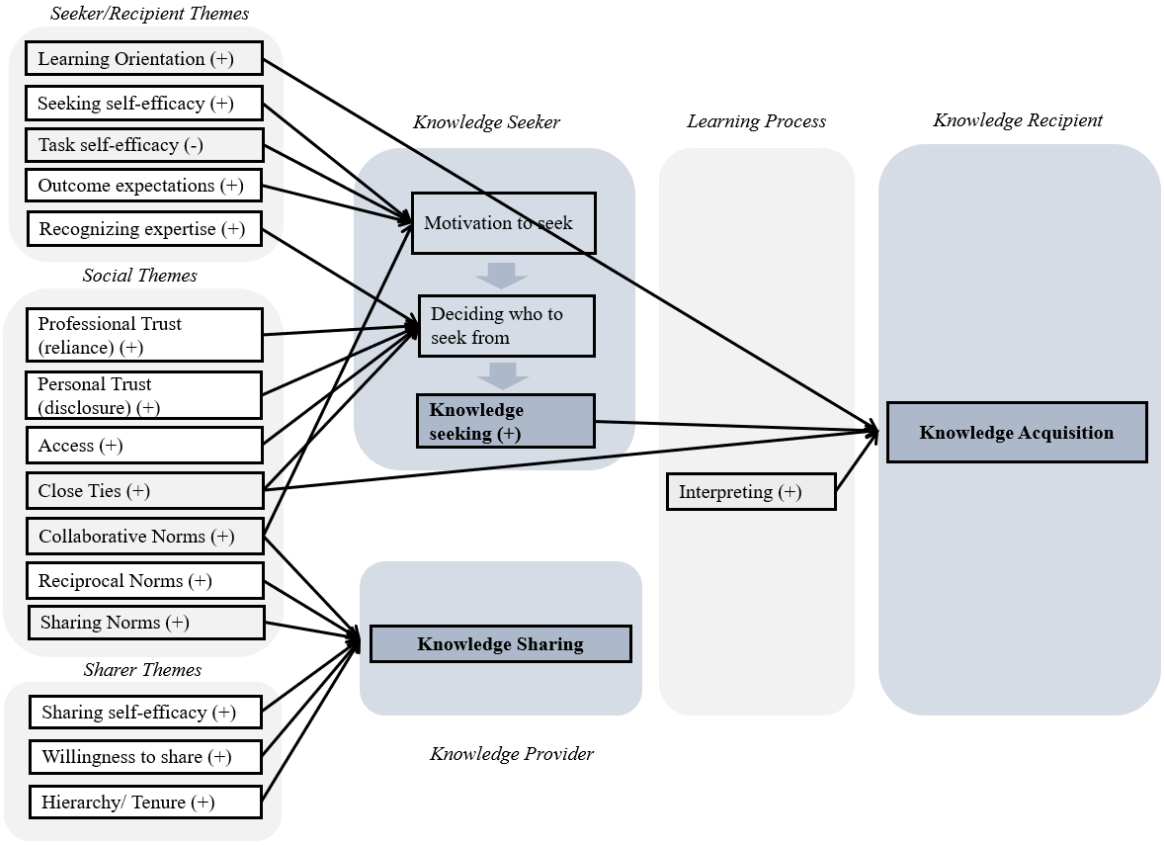
But I'm not very good at doing that; I'd just as easily go in and fix that and I'd be with them but I don't take the time to explain, because, again, the thing might be stopped and there's people shouting to try and get the thing going so it's hard to go and balance everything out. Other people are better at explaining stuff. (MT7, expert)

This lack of self-efficacy in the ability to explain led to a reluctance to try and share knowledge, but instead help by fixing the problem. This indicates that possessing the knowledge to complete the task is not enough to enable sharing, the provider must also feel competent at effectively communicating with others.

Fifty percent of apprentices discuss sharing self-efficacy, and many felt they did not possess the knowledge to share with others. One apprentice suggested that it is difficult to share knowledge while still learning, as his knowledge is not yet fully formed. *I'm learning so it's hard for me to teach others because I'm kind of figuring it out myself. (PTSE2, apprentice).* In general, apprentices had lower self-efficacy, as the ability to explain their knowledge was hampered by their lack of

expertise. In summary, knowledge sharing was influenced by social factors such as sharing norms, norms of reciprocity and close ties which enable an environment in which individuals are motivated to share their knowledge. Individual factors such as the providers willingness to share and self-efficacy also enable sharing.

Figure 3-4: Model depicting Qualitative Findings



3.8 Discussion and Conclusions

This research aimed to investigate the individual and social factors which influenced knowledge seeking, as distinct from acquisition and sharing. The findings confirm that knowledge seeking is differently motivated to knowledge acquisition and sharing. Knowledge seeking behaviours within this context was based on two broad factors, the motivation to seek and the decision of whom to seek from.

The first, motivation to seek, was influenced by individual cognitive factors consistent with Social Cognitive Theory (SCT); self-efficacy and outcome expectations (Bandura, 1986). SCT suggests that an individual's self-efficacy in their capability to perform a behaviour predicts that behaviour, especially if they have positive expectations regarding the outcome of doing so. These findings suggest that two forms of self-efficacy influence the motivation to seek knowledge, seeking self-efficacy and task self-efficacy. High seeking self-efficacy positively influenced the motivation to seek, and was found in both apprentice and expert groups. The knowledge sought by respondents was predominantly personal experiences, expertise or context-specific knowledge, and seekers had to feel both capable of admitting they needed help as well as capable of asking providers for their personal knowledge. By contrast, low task self-efficacy is associated with motivation to seek in apprentice groups, likely because they had less experience and knowledge to complete tasks. Low task self-efficacy can override low seeking self-efficacy when making decisions to seek. Therefore, apprentices are motivated to seek regardless of their self-efficacy toward seeking, when they feel less capable of completing tasks without guidance. However, as individuals gain more expertise and knowledge to do their job, seeking self-efficacy is likely to be the differentiating form of efficacy influencing motivations to seek across groups of expertise This expands on prior research which has not investigated the self-efficacy to seek, or invesetigated the importance of self-efficacy in explaining interpersonal knowledge seeking. While prior research has demonstrated that "knowledge" self-efficacy, referring to confidence in the ability to provide knowledge that is useful to the organization, enables knowledge 'collecting' (Lin, 2007), seeking and acquisition in virtual communities (Kim et al., 2011), no prior study has examined confidence in the ability to ask questions when examining seeking behaviours.

Additionally the outcome expectations of seeking positively influenced decisions to seek. These findings suggest that outcome expectations of seeking align to an individual's performance expectations, such as completing tasks quickly and to a higher standard, rather than personal expectations of learning from seeking. This extends prior research which has linked outcome expectations such as the perceived usefulness of seeking knowledge to using electronic repositories (He, Fang and Wei, 2009). These findings indicate that the perceived usefulness of seeking knowledge for specific tasks can motivate interpersonal knowledge seeking.

Finally, attitudes toward knowledge seeking were influenced by the perception of collaborative norms. In this context apprentice groups perceived anti-collaborative behaviours such as provider's "sink or swim" attitudes toward learning which informed their outcome expectations of seeking. This is consistent with research on norms generally, which suggest that the relationship between a pair of individuals is likely to be influenced by the relationship they have with others in the same network (Monge & Contractor, 2003). As such, an individual seeking or sharing behaviour is subject to the influence of other employees' knowledge-sharing and seeking behaviours. This supports and expands upon prior research (e.g. Taylor & Todd, 1995; Venkatesh et al., 2003; Gopalakrishnan & Santoro, 2004; Kankanhalli, Tan & Wei, 2005) which has found that collaborative norms influence knowledge seeking from an electronic knowledge repository (Bock, Kankanhalli & Sharma, 2006), although this relationship has not been previously investigated for tacit knowledge seeking. Therefore, these research findings add insight to existing research and shows that both perceived norms of collaboration and seeking can influence attitudes toward seeking knowledge from others and influence expectations regarding the outcomes from seeking.

The second component to knowledge seeking was deciding who to seek from. This was influenced predominantly by professional and personal trust, but was also informed by availability or access to others, the awareness of expertise and close ties with providers. Overall, these findings demonstrate the usefulness of the structural and relational aspects of Social Capital Theory (Nahapiet & Ghoshal, 1998; Woolcock & Narayan, 2000) in explaining how aspects of the relationship between provider and recipient inform decisions of whom to seek from, as well as the ease of knowledge acquisition and sharing. In particular, bonding social capital (Woolcock & Narayan, 2000) which refers to relationships with close social cohesion, such as friendships and high frequency of interaction, seem to inform decisions of whom to seek from. In this context, close ties between co-workers are relied upon when deciding who to seek from, but can also enable better knowledge acquisition through prolonged interactions, and promote a willingness to share. Additionally, access in terms of proximity and frequency of interaction influence decisions of whom to seek from. Individuals rely on those who they are geographically closer to and can access more easily when deciding who to seek from. However, the lack of timely access to the right people can inhibit or delay seeking behaviours. Linked to this is the awareness of expertise, individuals have a greater awareness of others expertise through observing whom others in their team or network approach for knowledge, and therefore access to others may inform the awareness of expertise. Findings support existing research which has suggested that close ties enable seeking tacit knowledge between teams (Hansen, 1999). This correlates with research which suggests that pleasant interpersonal relationships between knowledge seekers and providers contribute to effective knowledge retrieval because some providers may choose not to share their expertise unless there is a pre-established relationship with the recipient (Casciaro & Lobo, 2005). Additionally, prior research has shown that access and awareness of others

knowledge enables information seeking (Cross & Borgatti, 2003) and a more recent study confirms that individuals are more likely to engage in information exchanges with other members when they have developed a sense of "who knows what" within the team (Yuan, Fulk, Monge, & Contractor, 2010). These findings expand on this research to illustrate how these relationships interlink and how they influence seeking tacit knowledge in a problem-solving context. In addition to the awareness of others knowledge and expertise, an awareness of the providers' ability and willingness to share also enables seeking.

However, the most frequently discussed theme when discussing whom to seek from was trust, both professional and personal trust. Professional trust in others knowledge and competence was a necessary condition to seek from a specific person. This supports research which has consistently shown that individuals' have a tendency to seek information from colleagues they perceive to be knowledgeable in relevant knowledge domains (Contractor et al., 2004; Cross, Rice, Parker et al., 2001; Palazzolo, 2005). While professional trust seemed a necessary first step when determining a potential provider, personal trust differentiated providers when professional trust existed. Therefore, personal trust in the providers willingness to share and helpfulness was also an important determinant of seeking behaviour. This expands upon prior research which shows that when individuals perceive the knowledge provider to be more willing to give knowledge, they are more willing to listen and absorb the trustee's knowledge (Andrews & Delahaye, 2000; Tsai & Ghoshal, 1998). These findings additionally demonstrate that personal trust encourages individuals to seek out that knowledge in the first place. Both forms of trust were formed over positive interactions, and broken with negative interactions. Negative interactions included perceptions of the provider "bluffing" which damaged professional trust, while perceptions that the provider "ridiculed" the seeker damaged personal trust. After these experiences, seekers were deterred from approaching the same provider again. However, the opposite was also true as positive interactions developed both professional and personal trust, and encouraged seekers to approach the same provider again. Importantly, high levels of personal trust could also overcome the seekers unwillingness to demonstrate incompetence by seeking knowledge. This supports prior research which shows that trust can effect individual's behavioural intention as it serves to reduce the perception of risk associated with conducting transactions with the trustees (Mayer et al., 1995). Therefore while trust in providers and recipients has been established as an important factor in determining the willingness to share (Adler, 2002; De Long and Fahey, 2000; Locke, 1999; Lucas, 2005; McAllister, 1995; Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998), these findings provide evidence that the *seekers* personal trust in the provider can overcome mitigate the risk of appearing incompetent when deciding to seek, and determine whether seekers will approach the provider again in the future. It is also evident from the findings that professional trust may inhibit the seeker from applying knowledge sought, and therefore trust may act as a moderator to the link between knowledge seeking and acquisition or use.

Knowledge acquisition was enabled by several individual and social factors, but particularly enhanced by individual behaviours such as proactive seeking and interpreting. This suggests that recipients who take a more proactive role when trying to learn can acquire a higher quantity of better-quality knowledge which they are more likely to understand through the interpreting process. These two themes were related as those who directed their learning process through seeking were also more likely to engage in the active questioning related to interpreting. The findings suggest that recipient led learning, through seeking and interpreting, greatly influence outcomes of effective knowledge acquisition. These findings also illustrate the importance of examining learning outcomes of knowledge seeking in order to demonstrate whether knowledge seeking results in an effective acquisition, and therefore successful knowledge sharing outcomes. Pro-learning attitudes also enhanced knowledge acquisition as those who sought to learn were more likely to spot opportunities outside of normal work routines to do so, thereby increasing the available learning opportunities. These findings expand current research on knowledge acquisition. Prior research has theorised that interpreting leads to group learning outcomes (Crossan et al., 1999) but this has not been empirically tested. Additionally, while knowledge seeking has been linked with cognitive learning outcomes (Gray & Meister, 2004; 2006), no previous study has explicitly linked this with acquiring knowledge. Prior research has shown that learner control allows individuals to adjust the instruction to their own needs. However, individuals differ in their capability to take advantage of an environment in which they can structure their own learning (Dorner & Scholkopf, 1991; Etelapelto, 1993). These findings illustrate that seeking and interpreting lead to effective knowledge acquisition outcomes, while pro-learning attitudes can influence the recipients opportunistic learning behaviours and subsequent knowledge acquisition.

Additionally, knowledge acquisition was influenced by social capital themes such as close ties, reciprocal norms and collaborative norms. Individuals' value close ties as they provide more access to more learning opportunities and allow respondents to better understand knowledge, complete tasks faster, and access more knowledge. Journeymen focus on how close ties change the sources sharing behaviour. They claim that these relationships prompt the source to provide more knowledge. These findings add to prior research which has shown that strong ties can lead to greater knowledge exchange (Ghoshal et al. 1994; Hansen, 1999, Levin & Cross, 2004) and predict the receipt of useful knowledge (Levin & Cross, 2004). While knowledge seeking and acquisition are motivated by different cognitive factors, they are both influenced by collaborative norms and close ties in similar ways. Therefore, these two social factors can create an environment in which the motivation to seek and learn is higher, and access to trusted experts is better.

Finally, knowledge sharing was influenced by a variety of factors such as sharing norms, reciprocity and close ties. Sharing norms were divided between perceived hoarding behaviour and

collaborative norms. Prior research which highlighted the potential of individuals to strategically hoard knowledge to either maximise their own self-interest or comply with institutional norms (Haas and Park, 2010, Steinel et al., 2010). Therefore, research suggests that the effective transfer of knowledge within organisations requires not just the granting of requests for knowledge (Haas and Park, 2010) but also a proactive willingness and initiative on the part of individuals to share helpful knowledge they possess of which others in the organisation may be unaware (Evans et al., 2015). However, this research additionally shows that seekers have an important role in overcoming hoarding and have intentional strategies to do so. They do so through building "bonds" with providers and proactively seeking to overcome provider's reluctance to share. In addition, the norm of reciprocity influenced knowledge sharing in this context. Organisational research shows that, in general, people do not tend to altruistically serve the needs of others, but do only as they anticipate reciprocating behaviours (Tsui & Wang, 2002). Relationships build on a history of exchange between individuals, creating interdependencies based on interpersonal actions and the obligations they engender (Gouldner, 1960; Homans, 1958). Prior research on the norms of reciprocity within a knowledge sharing context has produced inconsistent results. Chiu et al. (2006) and Chang and Chang (2011) found the norm of reciprocity to be positively associated with individuals' sharing knowledge in virtual communities while Wasko and Faraj (2005) found a negative relationship. The inconsistent results suggest that the relationship may be contingent on other factors. Kankanhalli et al. (2005) found perceived reciprocity to be positively related to participants' likelihood to contribute knowledge to the community under weak rather than strong pro-sharing norms. This research suggests that reciprocity is linked with the strength of the relationship tie, which engenders a feeling of reciprocity to fulfil friendship requirements and benefit from the relationships.

Additionally, sharing attitudes were influenced by providers' willingness to share and their self-efficacy toward sharing knowledge as well as recipient's ability and knowledge, and proactive seeking behaviours. Prior research has shown that self-efficacy positively impacts attitudes toward knowledge sharing (Bock & Kim, 2002), willingness to share knowledge (Liu & Liu, 2011), intention to share knowledge, use of knowledge sharing mechanisms (Cho & Li, 2007), tacit knowledge sharing intention (Yang & Farn, 2010), and knowledge contribution or sharing behaviour both within and outside of electronic repositories (Cabrera et al., 2006; Kankanhalli, Tan, & Wei, 2005; Lu, Leung, & Koch, 2006). The findings in this study also suggest that self-efficacy in knowledge sharing requires capability in knowledge but also in ability to communicate. Knowledge self-efficacy alone is not enough, but must be complimented by confidence in the ability to explain difficult concepts.

While some themes influenced multiple behaviours, such as the link between self-efficacy and both knowledge seeking and sharing, the findings illustrate *how* these differ. For example, the self-efficacy required to seek required the ability to ask questions without fear, while the self-efficacy to share required the ability to verbalise knowledge or expertise. Therefore, while self-efficacy

influences both behaviours, the nature of self-efficacy was different for knowledge seeking and sharing behaviours. In addition, both behaviours were informed by task self-efficacy but in opposing directions.

Findings also illustrate how social factors can enable behaviours of both reicpient and provider within the sharing process. For example, the development and existence of close ties enabled seeking, acquisition and sharing knowledge. These findings indicates the importance of developing friendships and networks to enable the exchange of knowledge, particularly complex knowledge. Similarly, the perceptiion of collaborative norms or pro-sharing norms were linked with positive attitudes toward all three behaviours, and vice versa. Interestingly, reciprocal norms influenced both knowledge acquisition and sharing, but not knowledge seeking. While reciprocity was a condition which enabled the likliehood of sharing to others, the same expectation was a cost to acquiring knowledge as recipients acknowledged they were more likely to share so they could receive knowledge.

Overall, these findings support the contention that those factors which enable seeking, acquisition and sharing influence these behaviours in nuanced, distinct ways. The complexity of the interactions between these factors and the three behaviours investigated warrant further attention.

3.9 3.9 Research Limitations

One limitation of this research is the use of retrospective data. Retrospective bias is a potential problem in studies that rely on participants to recall past phenomena especially complex phenomena laden with informal and intangible characteristics, such as seeking knowledge or learning processes. This study employed interview techniques recommended in the literature to help minimise retrospective bias, among them focusing on specific examples rather than reflection on general concepts, asking for elaboration, and focusing on recent experiences (Merton, Fiske, & Kendall, 1990; Weiss, 1994). The overriding limitation of any technique relying on self-reported data is the accuracy of reporting by the respondent. Studies have identified biases and the fallibility of memory (Golden, 1997; Huber & Power, 1985). However, self-reported data is sometimes the only means of collecting data, and if it is kept to the recent past (one to two years), it is considered useful—accepting the limitations of bias and memory lapse (Huber & Power, 1985; Miller, Cardinal, & Glick, 1997). In this study, the retrospection was limited to the past 12–18 months.

3.10 3.10 Conclusions and Future Research

Knowledge sharing literature has tended to focus on the uni-directional exchange of knowledge from provider to recipient (Hansen, Mors, & Løvås, 2005; Kim, Song, & Jones, 2011). While prior studies have investigated factors which effect knowledge sharing, no prior study has compared

factors which effect knowledge seeking to those of acquisition and sharing. This study adds to the recipient perspective of the sharing process by investigating three important facets to the receiver's role in the knowledge sharing process; (1) the cognitive and social antecedents that influence why people seek (2) how the factors that influence knowledge seeking are distinct from those that influence sharing, and acquisition (3) the role knowledge seeking plays in influencing effective knowledge acquisition.

Although studies about knowledge seeking exist, most studies either tend to examine knowledge sharing as a provider-only behaviour or combine knowledge seeking and sharing into one measure (e.g. van den Hooff & van Weenen, 2004; Lin, 2007). This study illustrates the distinct nature and antecedents of interpersonal seeking from knowledge acquisition and sharing. Therefore, findings suggest the importance of a more nuanced understanding of recipient seeking and learning within the sharing process. This can help to explain inconsistencies in antecedents of sharing within existing literature. In addition, when considering antecedents that specifically effect interpersonal seeking, future research should treat knowledge seeking as a distinct process with its own antecedents.

This study provides an important contribution in explaining what decisions inform knowledge seeking behaviour, namely the motivation to seek and decisions of whom to seek from. Additionally, findings illustrate that those factors which influence decisions of why to seek are not those which influence decisions of whom to seek from. Support for Social Cognitive Theory as an explanatory framework for knowledge seeking is evidenced by themes of self-efficacy and outcome expectations which inform the motivation to seek. In particular, these findings demonstrate how self-efficacy to seek and the perceived outcome expectations of seeking enable the motivation to seek across different groups of expertise. Additionally, these factors are informed by collaborative norms which can improve attitudes toward seeking as well as informing individual's expected outcomes of seeking.

Findings also demonstrate the capacity of Social Capital Theory to explain how structural and relational aspects of the relationship between provider and recipient inform decisions of whom to seek from specifically. Themes such as close ties and access, as well as the requirement for seekers to be aware of other's expertise, demonstrate the importance of useful, trusted and accessible networks of experts in determining who to seek from. This supports prior research which has investigated structural elements of social capital (i.e. Borgatti & Cross, 2004; Hansen et al., 2005). In particular, trust played an important role across groups of expertise in decisions of whom to seek from. Both professional and personal trust is informed over time from interactions with others and can predict future decisions of who to seek from specifically, while a lack of trust in others may inhibit future seeking from that person. Findings also demonstrate how low levels of professional trust demonstrated by provider's inadequate responses or competence may inhibit the decision to

acquire knowledge once sought. This could indicate that trust may moderate the relationship between knowledge seeking and acquisition, which has not yet been empirically tested. Future research should explore these relationships further to confirm their salience.

Taken together, these findings expand on prior findings related to the factors which influence knowledge seeking and provide evidence that seeking decisions are differently informed from acquisition and sharing decisions. To further explore the topic of knowledge seeking, the next study will examine basic and higher specialist junior doctors seeking and acquisition behaviours to test the relationships proposed in Chapter 2. Between leaving medical school and finishing specialist training, a junior doctor must make the transition from novice to a consultant or physician capable of making diagnostic and treatment decisions independently (Weber, 2017). This study will examine the seeking of junior doctors from their more senior counterparts, in a context in which norms of learning from superiors are institutionalized in practice. This study has highlighted that junior employees (apprentice and journeymen) are enabled to seek when they have high levels of seeking self-efficacy and positive outcome expectations related to performance goals. Additionally, both professional and personal trust inform seeking decisions. These relationships will be tested in the next study. In addition, this research has also highlighted the role access and awareness of expertise play in deciding who to seek from, and therefore will be included as control variables to account for this relationship. The next chapter will introduce the hypothesis, methods, analysis and findings of this study.

CHAPTER 4: DETERMINANTS AND OUTCOMES OF KNOWLEDGE SEEKING BY JUNIOR DOCTORS IN IRELAND

4.1 Abstract

Knowledge seeking is an important, but under-researched, phase of knowledge sharing which can provide explanatory power for why some people learn better from others. Seeking knowledge is a proactive behaviour that can aid self-directed learning of tacit tasks specifically, and allows the individual to choose what knowledge, when and who to seek from. Seeking knowledge one-to-one and one-to-many capture two different strategies to learn, and this study seeks to investigate the learning outcomes of such behaviour. Specifically, the study investigates how seeking behaviours can improve useful knowledge acquisition through the mediating learning process of interpreting. In addition, as seeking knowledge is differently motivated to sharing knowledge, this study seeks to understand the role cognitive and social factors play in predicting seeking. Seeking is a social learning behaviour, and learning theories such as Social Cognitive Theory suggest certain cognitive and social factors are important facets of learning behaviour. Social Capital Theory can provide explanations as to what facets of the social relationship may effect such behaviour. Therefore, self-efficacy, perceived usefulness of sought knowledge and trust are investigated. Structural equation modelling was used to test the hypotheses in a sample of 238 junior doctors across hospitals in Ireland. Findings suggest that seeking predicts knowledge acquisition, and this relationship is partially mediated by interpreting. Interpreting also predicts knowledge sharing. The relationship between collective seeking and interpreting is moderated by tacit knowledge; however, the relationship between dyadic seeking and interpreting is moderated by disclosing trust behaviours. In addition, collective seeking is predicted by seeking-self efficacy and disclosure-based trust, while dyadic seeking is predicted by cognitive factors of seeking self-efficacy and perceived usefulness of knowledge. This research contributes to organisational learning literature by illuminating the role recipient behaviours have in the knowledge sharing process, and links the individual learning process, interpreting, to the overall knowledge sharing process. It is evident that interpersonal knowledge seeking can aid the interpreting process in the context of tacit knowledge exchange, and improve knowledge acquisition. Seeking is informed by Social Cognitive and Social Capital theories, which display how self-efficacy and outcome expectations play a differing role in predicting the frequency of dyadic seeking and collective, as well as the nuanced role trust plays as both a predictor of collective seeking and a moderator in the interaction between seeking and interpreting.

4.2 Introduction

Sharing tacit knowledge can create a sustained competitive advantage for organisations as knowledge is rare, difficult to substitute, imitate and transfer (Grant, 1996; Nonaka, 1991). In particular, an organisation's valuable knowledge is embodied in the tacit knowledge of individuals and groups (Bertels & Savage, 1998). As tacit knowledge is hard to articulate (Kogut & Zander, 1992), it can only be acquired through face-to-face interaction which promotes shared experiences, values, perceptions, and mental models (Nelson & Winter, 1982). Therefore, sharing of tacit knowledge becomes a challenging but essential task for developing organisational knowledge. As tacit knowledge is possessed by individuals and not the organisation (Grant, 1996), individuals need to be motivated to share this type of knowledge with their peers (Hansen, Mors, & Løvås, 2005; Szulanski, 1996) and recipients need to be motivated to learn from this knowledge (Hurley, 2002). However, despite the recognition of the particular value of tacit knowledge and the complexity of the tacit knowledge sharing process, extant knowledge sharing literature has tended to focus on a concept of knowledge which does not distinguish between explicit and tacit knowledge.

In addition, knowledge sharing literature has tended to focus on the uni-directional exchange of knowledge from the provider to the recipient (Hansen, Mors, & Løvås, 2005; Kim, Song, & Jones, 2011) and research on knowledge recipients is very scarce (Zhang & Jiang, 2015). The knowledge "provider", "supply" or "push" perspective (Hendriks, 2004; Kim et al., 2011; Lin, Geng, & Whinston, 2005; McElroy, 2003) focuses on how to increase an individual's exposure to knowledge and expects that learning will take place. However, knowledge which is "pushed" or "shared" will not necessarily be successfully transferred or learned if the "recipient" cannot or does not locate, access, and learn that which they require. Therefore, understanding the role recipients play in learning knowledge shared would help to extend the existing theory (Hendriks, 2004).

Some research has taken a bi-directional perspective of knowledge sharing and examines providers "donating" knowledge and receivers "collecting" knowledge (e.g. Tangaraja et al., 2015; 2016). Collecting knowledge has been defined as active process of searching for knowledge by "consulting with colleagues in order to get them to share their intellectual capital (van den Hooff & de Ridder, 2004). However, different operationalizations of similar constructs and concepts in knowledge sharing research have led to have led to confusion of relevant antecedents and outcomes and difficulty creating cumulative understanding of the concept (Tangajara et al., 2016). This applies to 'collecting' specifically, as despite similarities in how studies define collecting; operationalisations of this concept have been different and contrary to how it has been defined. For example, while some studies operationalise collecting as a behaviour in which individuals both provide knowledge when asked and receive knowledge by asking (e.g. van den Hooff & van Weenen, 2004; Lin, 2007), other studies measure collecting as receiving knowledge from colleagues by asking and distinct from providing knowledge when asked (e.g. van den Hooff & de Ridder 2004; De Vries et al., 2006). Therefore, much of this existing literature does not differentiate the antecedents which effect sharing to others and those which effect the prior phase of seeking or 'collecting' for knowledge they need (Hansen, Mors, & Løvås, 2005).

While some literature has recognised knowledge search or seeking specifically as an important prior phase within the knowledge sharing process (Gray & Meister, 2004; 2006, Hansen, Mors & Løvås, 2005; Wang, Gray & Meister, 2014), they acknowledge that knowledge seeking is under-researched (Gray & Meister, 2004; Hansen, Mors & Løvås, 2005; Hansen, Nohria & Tierney, 1999). Seeking knowledge has been described as looking for and identifying knowledge (Hansen, 1999) which illustrates the extent to which individuals access other employees' expertise, experience, insights, and opinions (Gray & Meister, 2004). Despite this definition, much of existing research focused on seeking does not distinguish between information seeking and knowledge seeking (e.g. Borgatti & Cross, 2003; 2004). In addition, when considering that tacit knowledge is best learned through socialization and face-to-face interaction (Nonaka & Takeuchi, 1995), research interested in

tacit knowledge seeking should therefore examine interpersonal knowledge seeking to best capture this socialization process. Interpersonal seeking can take the form of dyadic, one-to-one seeking or collective, one-to-many seeking in order to learn (Gray & Meister, 2004). However, many studies do not distinguish between interpersonal seeking and seeking from explicit sources such as documents, online repositories, or virtual communities of practice (e.g. Gray & Meister, 2004, Kankanhalli et al., 2011). These explicit sources of knowledge cannot capture the social complexity required to exchange tacit knowledge, and are not the methods advised for sharing tacit knowledge (Hislop, 2013) as they separate knowledge from the used context and social system (Lave & Wenger, 1991). Therefore we do not fully understand the factors which may effect seeking for tacit knowledge specifically. The few studies that research interpersonal knowledge seeking (e.g. Gray & Meister, 2006; Hansen, Mors & Løvås, 2005; Haas & Cummings, 2015) do not illuminate (1) how antecedents and outcomes of seeking may differ in highly tacit contexts (2) or distinguish between different methods of interpersonal seeking, such as dyadic and collective seeking, or how antecedents and outcomes may be different for each.

Seeking knowledge from others does not ensure that the knowledge received is useful or fully acquired (Tangaraja et al., 2016). Knowledge acquisition is an important outcome of knowledge seeking and sharing, as knowledge acquisition expands a person's knowledge and enables the application of knowledge (Alavi & Leidner, 2001). Therefore, in order to investigate successful knowledge seeking and sharing, research must assess learning outcomes such as useful knowledge acquired (Levitt & March, 1988; Wasko & Faraj, 2000; Lai & Graham, 2009). However, most studies to date have neglected the recipient perspective of knowledge acquisition instead targeting the knowledge provider perspective of sharing (Kim et al., 2011). It is critical for research to understand how individuals acquire the knowledge they need, and what strategies recipient's select to acquire that knowledge (Kim et al, 2011). Knowledge seeking is one strategy to acquire knowledge, however no prior research has investigated how seeking may enable better understanding of knowledge acquired. Prior research suggests that learning processes represent a major source of differences between the tacit knowledge accumulated by different people (Armstrong & Mahmud, 2008). To investigate whether seeking knowledge can be successfully acquired by the recipient, this research draws on the 4i organisational learning framework (Crossan et al., 1999). This framework proposes the individual learning processes relevant to sharing knowledge to and from individuals, groups and institutions. It suggests that individual learning requires interpreting insights from others through verbalisation, which leads to shared understandings between people. This interpreting process can address a theoretical gap in the knowledge seeking literature by helping to articulate how individuals who seek knowledge can best acquire knowledge sought.

Finally, in order to investigate which antecedents may explain interpersonal knowledge seeking and its interpretation and acquisition, this study draws on Social Cognitive Theory (Bandura, 1986).

Social Cognitive Theory (SCT) suggests that both individual cognition and environmental or social factors are predictors of individuals' behaviour (Bandura, 1986, 1997) (in this case knowledge seeking). As knowledge seeking is an individual learning behaviour within a social context, is likely to be predicted by both cognitive factors which effect behavioural motivations such as seeking, as well as facets of the social relationship between seeker and provider. Self-efficacy and outcome expectations are both components of cognition, which suggest that expectations are major factors in determining affective and behavioural reactions in numerous situations, including behaviour (Bandura, 1986; Martinko, Henry, & Zmud, 1996) and may effect interpersonal knowledge seeking. However, while SCT identifies social interaction as one element relevant to the environment that are predictive of individuals behaviour, research to-date has not investigated this component of SCT (Chiu, Hsu, & Wang, 2006) or explored which social factors are pertinent when explaining behaviour.

To address this, Social Capital Theory can help to understand which characteristics of social relationships and the resources embedded within these relationships can be used to acquire knowledge (Nahapiet & Ghoshal, 1998**).** The relational dimension of Social Capital Theory describes the kind of personal relationships people have developed with each other through a history of interactions, and refers to trust, norms, obligations and identification as relevant social characteristics which may effect the exchange of knowledge. However, the relational dimension has received much less attention than the structural and cognitive dimensions of social capital (Makela & Brewster, 2009). Trust may be particularly pertinent to interpersonal knowledge seeking and its related outcomes as prior research shows that interpersonal trust can make knowledge seekers more forthcoming about their lack of knowledge (Borgatti & Cross, 2003), can enhance the extent to which people listen to and absorb others' knowledge (Levin & Cross, 2004; Mayer, Davis, & Schoorman, 1995), and is associated with the receipt of useful knowledge by the knowledge recipient (Alexopolous & Buckley, 2013). However, whether and how trust influences the motivation to seek knowledge from others has received scant research attention (He et al., 2009; Wan et al., 2015). Combined, the two theoretical lens of Social Cognitive Theory and Social Capital Theory can be used to inform the pertinent cognitive and social interaction factors impacting tacit knowledge seeking and sharing processes.

This study contributes to existing literature in three ways. Firstly, it examines a more nuanced look at the recipient role in the sharing process, by examining knowledge seeking, acquisition and sharing as conceptually distinct behaviours. Investigating these behaviours distinctly allows for more clarity regarding the specific antecedents of interpersonal knowledge seeking, differentiated from their effect on knowledge acquisition and sharing. This addresses confusion in the literature regarding the relevant antecedents to interpersonal seeking as a result of discrepancies in the definition and operationalization of knowledge seeking. Specifically, using the lens of Social

Cognitive Theory and Social Capital Theory to examine why people seek, this study considers self-efficacy toward seeking and sharing, the perceived usefulness of seeking, and reliance and disclosure-based trust to explain knowledge seeking, as well as related processes of knowledge acquisition and sharing. Secondly, this study examines how individual's knowledge seeking can enable knowledge acquisition through the learning process of interpreting, providing further insight into how recipients acquire the knowledge they need. This allows us to examine whether interpersonal seeking aids the development of shared understandings which may ultimately lead to better acquisition of useful knowledge. Finally, to provide further insight to these relationships and to address the lack of research on tacit knowledge, and tacit knowledge seeking and acquisition specifically, this study also examines the moderating effect of tacit knowledge. To do so, the study investigates whether tacit knowledge changes the relationship between knowledge seeking behaviours and its learning outcomes of interpreting and acquisition.

This chapter reviews prior research on knowledge seeking and therefore proposes a conceptual model in which both the learning outcomes, and individual and social factors which effect knowledge seeking are hypothesised. These hypotheses are underpinned by social cognitive theory and social capital theory which are briefly reviewed. Next, the research design and methodology are detailed, and the findings are presented. Finally, these findings are discussed in light of the existing literature and the research limitations as well as suggestions for future study are offered.

4.3 Theoretical Background and Hypotheses Development

4.3.1 Knowledge Seeking

Seeking knowledge refers to the process of looking for and identifying knowledge (Hansen, 1999). This measures the extent to which an individual accesses other employees' expertise, experience, insights, and opinions. Although knowledge seeking is related to information seeking, there are differences with important implications. Information seeking is a broad concept that can describe both active and passive acquisition of facts from others (e.g., Borgatti & Cross 2003) or from one's environment (e.g., Johnson 1996). Knowledge seeking describes an individual's efforts to search out and access knowledge produced by individuals, and thus not available elsewhere. The difference between obtaining facts (available through multiple sources) and knowledge (only available from a person with experience and insight) is critical to understanding the unique role played by knowledge in organisations (Gray & Meister, 2004). Seeking knowledge is first enacted in the decision to seek knowledge, which may result in an attempt to seek useful knowledge (Hansen, Mors, & Løvås, 2005) and if successful, culminates in locating and retrieving needed information and expertise to complete certain tasks (Yuan, Rickard, Xia, & Scherer, 2011). Interpersonal knowledge seeking can take two forms; dyadic and collective seeking (Gray & Meister, 2004; 2006). Dyadic knowledge seeking refers to a single knowledge seeker engaging in dialogue with an

individual source, and is part of the knowledge management strategy which promotes person-to-person contacts (Hansen et al., 1999). Collective knowledge seeking involves knowledge exchange in a setting containing multiple individuals. This type of knowledge seeking is described both in the literatures on communities of practice (e.g., Brown & Duguid 1991).

While knowledge seeking is a behaviour in which the individual actively attempts to learn from the experiences of others (Lottering & Dick, 2012) it does not ensure that knowledge is learned. In order to investigate successful knowledge sharing and knowledge seeking, research must assess learning of useful knowledge acquired (Levitt & March, 1988; Wasko & Faraj, 2000; Lai & Graham, 2009). Learning occurs in the minds of the recipient (Tangaraja et al., 2016). As Minbaeva and colleagues (2003) point out, "the key element in knowledge transfer is [. . .] the extent to which the receiver acquires potentially useful knowledge" (p. 587). Therefore, to assess the success of the seeking and sharing process, it is necessary to measure the extent of useful knowledge acquired by the seeker.

The following sections build the evidence for and introduce the hypotheses concerning the learning outcomes of interpreting and acquisition as well as the cognitive and social factors effecting knowledge seeking.

4.3.2 Learning Outcomes of Knowledge Seeking

Knowledge acquisition refers to the extent to which an individual acquires experiences and know-how from co-workers (Yang & Farn, 2010). Successful acquisition results in an individual expanding their knowledge or applying the knowledge they acquired (Alavi & Leidner, 2001) Acquiring tacit knowledge in particular requires social interaction and shared experiences (Nonaka & Von Krogh, 2009). It is a form of learning indirectly from the experiences of others and happens in the minds of recipient via sense-making over time (Tangaraja et al., 2016). This sense-making occurs when the recipient integrates their new acquired knowledge into their existing knowledge (Wilkesmann & Wilkesmann, 2011). Therefore, as individual's existing knowledge is personal and specific, knowledge cannot be shared intact as learning is an active process of constructing knowledge in the receivers' mind (Savery & Duffy, 1995; Duffy & Cunningham, 1996; Oliver, 2001). However, there is a paucity of research investigating how individuals best acquire knowledge they need, and what strategies recipients select to acquire that knowledge (Kim et al., 2011).

Knowledge seeking is one strategy that recipients can use to acquire knowledge. Seeking knowledge should enable its acquisition (Huber, 1991, p. 125; Wilkesmann, Wilkesmann & Virgillito, 2009). People are motivated to seek when they have a need for knowledge (Brandon & Hollingshead, 2004; Hollingshead, 1998). It is also likely they are motivated (compare to those who passively acquire knowledge) and seek when they have an opportunity to acquire knowledge. The

need, motivation and opportunity to learn are key predictors of effective workplace learning (Marsick & Watkins, 1997). Prior research has found some support that seeking leads to cognitive change and learning effectiveness (Gray & Meister, 2004; 2006; Wang et al., 2014; Kankanhalli et al., 2011). Specifically, collective seeking can improve cognitive replication, adaptation, and innovation, while dyadic seeking supports cognitive adoption (Gray & Meister, 2006) – forms of cognitive change resulting from learning. However, this research does not elucidate how knowledge seeking can lead to useful tacit knowledge acquisition. This study draws on the 4i organisational learning framework suggest that the learning process 'interpreting' mediates the relationship between knowledge seeking and effective acquisition of tacit knowledge. Interpreting is an individual learning process which describes the act of verbalizing or explaining insights learned through interactions within the work group. For example, describing one's insights of a work problem to others or verbalising one's understanding of advice received. This interpreting process facilitates the development of shared understandings between people (Crossan, Lane, & White, 1999). Reaching shared understanding though a verbal, face-to-face interaction with a knowledge provider is an important precursor to the useful acquisition of tacit knowledge. Tacit knowledge in particular is best acquired through face-to-face interaction as it allows immediate feedback so that understanding can be checked and interpretations corrected. This also allows simultaneous interaction of multiple cues, including body language, facial expression, and tone of voice, which convey tacit knowledge beyond the spoken message (Koskinen et al., 2003). This better creates shared understandings which then become preserved in language, embedded in shared cognitive maps, and enacted (Crossan, Lane, & White, 1999). Therefore, interpreting should lead to tacit knowledge acquisition. However, individual's attempting to seek knowledge might be more likely to interpret knowledge received in order to reach their acquisition goals, and best acquire this knowledge for use. Interpreting may therefore be enabled by knowledge seeking, when seekers verbalise and decipher the knowledge shared with them and thereby reaching a shared understanding with the knowledge provider. The interaction which occurs when seeking knowledge allows the seeker to pose questions, probe, and clarify the relevance of knowledge shared to the situation (Gray & Meister, 2004). Prior research has shown that individuals who actively seek and attempt to understand divergent views from others are more likely to engage in the feed-forward learning processes of intuiting and interpreting (Zietsma et al., 2002). Therefore, both dyadic and collective seeking is likely to engage the interpreting process, which may lead to better knowledge acquisition.

H1: Dyadic knowledge seeking (H1a) and collective knowledge seeking (H1b) will positively effect knowledge acquisition through interpreting.

Additionally, the 4i framework suggests that sharing one's knowledge is a necessary component of interpreting (Crossan et al., 1999). Successful seeking and acquisition require the engagement of both seeker and provider, and the provider must engage with the interpreting process for both parties to reach shared understanding. Therefore, individuals who are willing to provide their knowledge to

others may be more likely to engage in the interpreting process of verbalising their insights and knowledge in order that the recipient may understand that knowledge. Astacit knowledge in particular is best acquired through shared language, norms and routines (Cross & Cummings, 2004), knowledge sharing is likely to effect the interpretation of tacit knowledge in particular (Koskinen et al., 2003). Therefore,

H2: Individual's knowledge sharing will positively effect the interpreting process.

4.3.3 Moderating Effects of Tacit Knowledge

Notable authors suggest that some tacit knowledge is articulable (Nonaka & Takeuchi, 1995; Nonaka & von Krogh, 2009; Subashini, 2010), and can be viewed as existing along a continuum from most explicit to most tacit (Alavi & Leidner, 2001; Nonaka & von Krogh, 2009). Tacit knowledge is primarily transferred among people through face-to-face interaction (Nonaka & Takeuchi, 1995; Spender & Grant, 1996; Teece, 2000; Teece et al., 1997), learned through observation and imitation, and converted through analogies, metaphors and stories (Choo, 2000).

Szulanski (1996) observes that the success of knowledge sharing is effected by the explicitness of the knowledge to be shared. Knowledge providers find it difficult to explain the content and subtle nuances of their tacit knowledge. Knowledge receivers, in turn, struggle to comprehend what they are being told (Hansen, Mors, & Løvås, 2005) and pass along their newly acquired knowledge. Therefore, we can surmise that tacit knowledge is more difficult to interpret and acquire from others. However, one method for overcoming the difficulty in sharing tacit knowledge is through socialization (Brown & Duguid, 1991; Eisenhardt, 1989; Nonaka, 1994). Learning tacit knowledge requires socialization through the interpersonal interactions between individuals (Nonaka & Takeuchi, 1995) which can occur though the interpreting process. Tacit knowledge can also be 'converted' through externalising this knowledge in a way which increases comprehension by other individuals. The satisfactory conversion of tacit into explicit knowledge depends on a sequential use of metaphor, analogy and models (Nonaka, 1991). These processes are conceptually similar to interpreting which facilitates the development of shared understandings through verbalization and actions (Crossan, 1995). As both dyadic and collective seeking are learning behaviours and seekers attempt to reach shared understanding with providers through interpreting, these forms of interpersonal seeking are likely to be an effective means to interpret knowledge. Therefore,

H3: Tacit knowledge will moderate the relationship between dyadic (H3a) and collective seeking (H3b) and interpreting

4.3.3 Cognitive Factors

Prior research has shown that cognitive factors such as seekers learning orientation (Gray & Meister, 2004; Gray & Durickova, 2005), self-efficacy (Bock et al., 2006) and risk aversion (Gray & Durcikova, 2005) effect knowledge seeking, although much of this research has examined seeking through online sources (Bock et al., 2006; Gray & Durickova, 2005) or not distinguished between interpersonal and online sources (Gray & Meister, 2004).

Learning theories such as Social Cognitive Theory can help to explain which cognitive factors may effect interpersonal seeking. Cognition relates to the individuals' thought processes which contribute to human motivation and attitudes, particularly determined by self-efficacy and outcome expectations (Hsu et al., 2007). Self-efficacy is the belief that one possesses the skills and abilities to successfully accomplish a specific task (Ormrod, 2006). According to SCT, an individual's sense of self-efficacy can be influenced through four processes: (a) enactive mastery, (b) role modelling and vicarious experience, (c) social persuasion, and (d) judgments of one's own physiological states, such as arousal and anxiety (Bandura, 1986). These processes determine the individual's level of persistence in learning a task and influence their perception of future outcomes. Perceived self-efficacy plays an important role in influencing individual motivation and behaviour (Bandura, 1982, 1986; Igbaria & Iivari, 1995). The degree of self-efficacy an individual possesses can depend on their expectation of the outcomes. An outcome expectation is "*a judgment of the likely consequences (one's own) behaviour will produce*" (Bandura, 1986, p. 391). Individuals are more likely to undertake behaviours they believe will result in valued outcomes rather than those they see as having unfavourable consequences (Bandura, 1986, p.21). Therefore, the stronger an individual's self-efficacy, the more active their efforts will be. Outcome expectations consist of three major forms: physical effects (e.g., pleasure, pain, and discomfort), social effects (e.g., social recognition, monetary rewards, power, and applause) and self-evaluation effects (e.g., self-satisfaction, self-devaluation) (Bandura, 1997). This suggests employees engaging in seeking behaviour are influenced by cognitive factors, such as the self-efficacy of their ability to seek knowledge and positive outcome expectations of their seeking knowledge.

4.3.4.1 Self-Efficacy

Self-efficacy determines the individual's level of persistence in learning a task and influences their perception of future outcomes. Perceived self-efficacy plays an important role in influencing individual motivation and behaviour (Bandura, 1982, 1986; Igbaria and Iivari, 1995). Therefore, individuals who have high self-efficacy will be more likely to perform related behaviours such as seeking or sharing than those with low self-efficacy. In this context, individuals with high levels of self-efficacy to seek would perceive that they have the ability to engage in dialogue with others in order to seek knowledge, and have the ability to understand knowledge gained from others (Kim, Song, & Jones, 2011). Therefore, high levels of seeking self-efficacy would motivate seekers to actively seek for knowledge and promote interpreting.

There is scant research to date investigating self-efficacy in terms of its relationship with knowledge seeking behaviours, such as dyadic and collective seeking. Existing empirical research differs in its definition of knowledge seeking, focuses on information or explicit knowledge and is largely focused on information technology, systems or online information sharing media. However, one such information technology study showed that knowledge seeking and sharing in virtual communities is facilitated by self-efficacy (Kim et al., 2011). That is individuals with higher self-efficacy are more likely to pursue their cognitive goals such as knowledge seeking (Kim et al., 2011).

The sef-efficacy to seek is also likely to effect an individuals engagement in the interpreting process. As interpreting is a process requring active engagement with a provider, including the verbalisation of both insights and questions. Therefore, the self-efficacy to seek which requires a capability to engage in dialogue is a pertinent factor to effectively verbalising insights with a provider. Related research has found that informal learning requires self-efficacy (Beckett & Hager, 2002). Therefore, individuals with higher self-efficacy to seek are more likely to engage in informal learning processes such as interpreting;

H4a: Self-efficacy to seek will have a direct positive effect on dyadic knowledge seeking (H4a) and collective knowledge seeking (H4b) and interpreting (H4c)

As this study aims to investigate the role interpersonal knowledge seeking plays within the wider knowledge sharing process, it is also relevant to assess the self-efficacy toward knowledge sharing. Prior research shows that self-efficacy positively impacts attitudes toward knowledge sharing (Bock & Kim, 2002), willingness to share knowledge (Liu & Liu, 2011), intention to share knowledge, use of knowledge sharing mechanisms (Cho & Li, 2007), tacit knowledge sharing intention (Yang & Farn, 2010), and knowledge contribution or sharing behaviour both within and outside of electronic repositories (Cabrera et al., 2006; Kankanhalli, Tan, & Wei, 2005; Lu, Leung, & Koch, 2006). Therefore,

H5: Self-efficacy to share will have a direct positive effect on knowledge sharing

4.3.4.2 Outcome Expectations: Perceived Usefulness of Seeking Knowledge

Outcome expectations are an important construct that can be used to explain and predict human behaviour (Bandura, 1986), particularly intentional behaviour (Schunk, 2001, p.106). When examining workplace behaviour, the outcome expectations based on the self-evaluation effects of a behaviour are pertinent. Outcome expectations (OE) such as the usefulness or perceived usefulness of an action have been investigated by multiple studies (e.g. Albion, 2001; Davis, 1989; Delcourt & Kinzie, 1993, Niederhauser & Perkmen, 2010). According to Lent and his colleagues (1994), these

outcome expectations involve the anticipated outcomes of an action (If I do X, Y will happen). In this context, “if I seek knowledge to solve a problem, I will perform better in the task”. When examining knowledge seeking behaviours, individuals' expectation about the usefulness of seeking knowledge to complete a task is one probable outcome expectation when seeking knowledge from others.

Research shows that people seek when a work task requires knowledge beyond their areas of expertise (Brandon & Hollingshead, 2004; Hollingshead, 1998b), thus useful outcomes of seeking may be increased task efficiency or improved performance. As a result, the outcome expectations investigated here focus on perceptions that seeking knowledge is useful for work performance, as in prior studies (e.g. He & Wei, 2009). Prior research has shown a positive link between perceived usefulness of seeking and seeking behaviour in online repositories, virtual communities and other technological means (Bock, Kankanhalli & Sharma, 2006; Desouza, Awazu, & Wan, 2006; He & Wei, 2009; Kankanhalli, Tan & Wei, 2005). In the context of seeking knowledge from others (both dyadically and collectively) it is anticipated that individuals are more likely to decide to seek knowledge if they perceive seeking to lead to positive performance outcomes.

In addition, as performance outcomes of seeking can only be realised through learning knowledge sought, it is likely that interpreting will also be motivated by the perceived usefulness of seeking. Therefore,

H6: Perceived usefulness of seeking will have a direct positive effect on dyadic knowledge seeking (H6a) and collective knowledge seeking (H6b) and interpreting (H6c)

4.3.4 Relational Factors

Prior research has shown that knowledge seeking is informed by evaluations of others (Gray & Meister, 2004; Borgatti & Cross, 2003) and that individuals best acquire tacit knowledge from those with whom they have a good relationship (Wasko & Faraj, 2005). Therefore, the relationship between the seeker and provider of knowledge is particularly pertinent to individuals’ decision to seek and acquire knowledge. The relational component of social capital describes the kinds of personal relationships people have developed with each other, such as respect and friendship, which influence behaviour (Nahapiet & Ghoshal, 1998). This element of Social Capital Theory explains how the set of resources embedded within, available through and derived from the network that can be used to acquire knowledge (Adler & Kwon, 2002; Gabbay & Leenders, 1999; Nahapiet & Ghoshal, 1998).

Knowledge seeking research has investigated elements of structural social capital and found that relationship strength (Hansen, Mors, & Løvås, 2005) effects within team decisions to seek. Other

seeking research has shown that relational factors such as collaborative norms, (Bock et al., 2006), norms of reciprocity, interpersonal trust, (Chen & Hung, 2010), and cognition and affect-based trust (Nebus, 2004; Zhang & Chen, 2018) effect seeking. However, most of these studies examine seeking from online repositories or at the team level. However, this research focuses on trust as one facet of relational social capital which is particularly relevant to interpersonal seeking and acquisition, as further described below.

4.3.4.1 Reliance and Disclosure-based Trust

Trust is defined as "the willingness to be vulnerable to the actions of another party" (Gillespie, 2012), and is a core component of relational social capital (Moran, 2005; Nahapiet & Ghohal, 1998). Trust can be operationalised through measuring what people trust (cognition, helpfulness etc), or through trusting behaviours. The distinction between willingness to rely on another and willingness to disclose to another are two types of behavioural intentions to trust on a professional and personal basis, respectively (Gillespie, 2003) and the focus of this research. Reliance is defined as an individual's willingness to rely on another's skills, knowledge, judgements or actions, including delegating and giving autonomy (Gillespie, 2003). Disclosure is defined as an individual's willingness to share work-related or personal information of a sensitive nature to another (Gillespie, 2003). The two dimensions of trusting behaviours is consistent with the view that people choose to trust in some ways but not in others (e.g. Gabarro, 1978; Lewis & Weigert, 1985). The process of relinquishing control and accepting the influence of a colleague in professional judgement issues may differ significantly from the process underpinning a decision to disclosure sensitive information (Lee, Gillespie, Mann, & Wearing, 2010; Tanis & Postmes, 2005). For example, an individual may be willing to discuss personal difficulties effecting their work with a sympathetic peer, but unwilling to rely on this peer to complete a job on their behalf (Gillespie, 2003). This captures the vulnerability and risk that is inherent to trust (see Lewis & Weigert, 1985; Rousseau et al., 1998; Zand, 1972).

However, whether and how trust influences the motivation to seek knowledge from others has received scant research attention (He et al., 2009; Wan et al, 2015). Two exceptions are a study by Nebus (2004) and another by Zhang and Chen (2018) who found affect-based and cognition-based trust had an indirect influence on knowledge seeking through the perceived value of knowledge being sought (Nebus, 2004) and a direct relationship with dyadic tacit knowledge seeking (Zhang & Chen, 2018). Other relevant research has demonstrated the positive impact of trust in supervisors, managers, top management and organisational leadership on individual in-role and extra-role performance (Dirks & Ferrin, 2002; Mayer & Gavin, 2005), of which seeking and acquisition could be an example. In particular, high levels of trust have been shown to foster more risk-taking behaviour (Colquitt et al., 2007; Mayer et al., 1995). Interpersonal knowledge seeking could be seen

as a risk-taking behaviour as seeking assistance from others admits incompetence, ignorance, inferiority, and dependence, and can result in embarrassments and loss of face (Ashford, 1986; Lee, 1997, Lee, 2002, Nadler et al., 2003). To overcome these barriers to seeking, seekers must trust others and be vulnerable, particularly when seeking from more senior colleagues or managers. Interpersonal trust can make knowledge seekers more forthcoming about their lack of knowledge (Brogatti & Cross, 2003), and it is likely that the knowledge seeker's willingness to disclose their lack of knowledge or need for help may predict their interpersonal seeking behaviours. Therefore, disclosure-based trust is likely to influence both dyadic and collective seeking, as both require trusting others when disclosing a need for knowledge.

In addition, to select a knowledge source is an evaluative process in which the decision to seek is dependent on evaluating the knowledge of the source or provider (Hansen, Mors, & Løvås, 2005; He & Wei, 2009). Therefore, reliance on others knowledge and expertise is also pertinent to interpersonal seeking. Prior research has shown that provider's knowledge and competence are crucial factors in deciding to seek. For example, decisions to seek are influenced by the quality of the knowledge source (Xu et al., 2006). Trust in the source's knowledge and competence is an important predictor of knowledge seeking, and this is displayed in reliance-based behaviours. Therefore, reliance-based trust is likely to influence both dyadic and collective seeking, as the seeker must rely on the providers' skills and expertise to approach them for knowledge and learn it.

Finally, trust is also likely to effect both the interpreting and acquisition of knowledge. Prior research suggests the willingness of organisational members to learn and acquire tacit knowledge depends on the extent that co-workers are trusted recipients and sources (Adler, 2002; De Long & Fahey, 2000; Locke, 1999; Lucas, 2005; McAllister, 1995; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). A positive personal relationship with the knowledge source can facilitate the receipt of complete information (Holste & Fields, 2010) and enhance the extent to which people listen to and absorb others' knowledge (Levin & Cross, 2004; Mayer, Davis, & Schoorman, 1995). Trust has been shown to promote knowledge acquisition specifically (Inkpen and Tsang 2005), because it fosters norms of reciprocity (Nahapiet & Ghoshal, 1998) and escalates the commitment of parties to a cooperative relationship (Inkpen & Beamish 1997). Reliance and disclosure-based trust particularly have been associated with the receipt of useful knowledge by the knowledge recipient (Alexopolous & Buckley, 2013). Therefore, it is likely that reliance-based trust will enhance the likelihood of knowledge seekers reaching shared understanding through interpreting and acquiring knowledge provided. In addition, the willingness of the knowledge seeker to disclose personal information is a necessity if the seeker is to share their insights as a result of seeking (i.e. interpreting) and acquire knowledge received and interpreted. Therefore, in summary;

H7: Disclosure-based trust will have a direct positive effect on dyadic and collective knowledge seeking (H7a and b), interpreting (H7c) and knowledge acquisition (H7d)

H8: Reliance-based trust will have a direct positive effect on tacit knowledge seeking (H8a and b), interpreting (H8c) and knowledge acquisition (H8d)

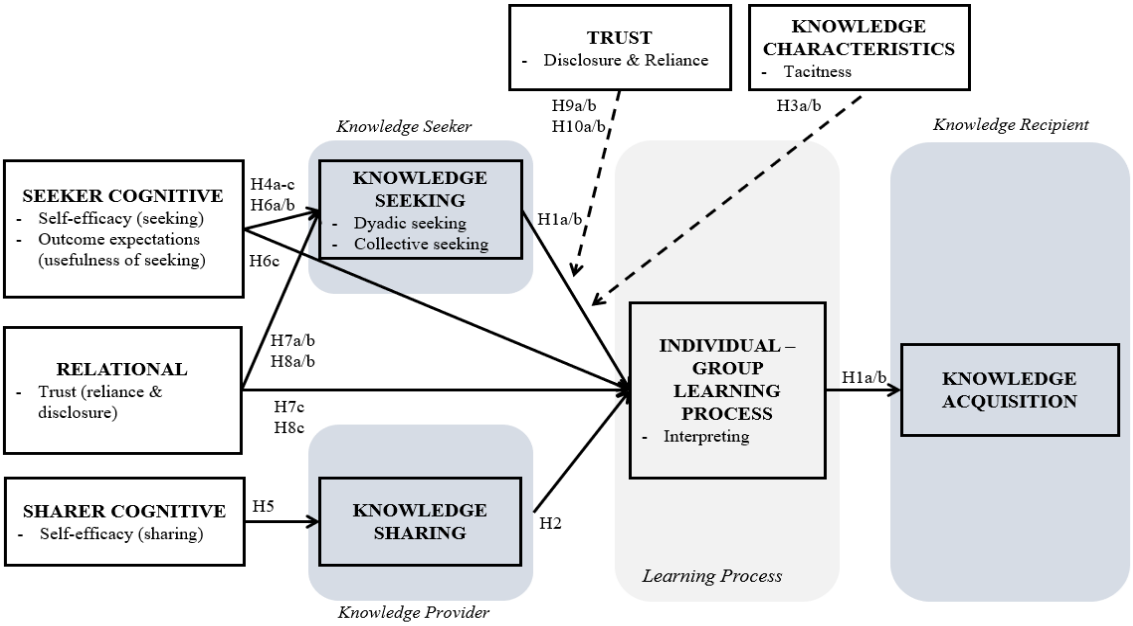
As a moderator, trust may provide the conditions under which co-operative behaviours, performance or positive attitudes may occur (Dirks & Ferrin, 2001). As trust represents an individual's understanding of a relationship, it can foster or inhibit positive outcomes by effecting how an individual assesses the past and future behaviour of the trustee (Dirks, 2006). While knowledge seeking and learning is likely to be informed by trust, it is also possible that conditions of high or low trust may produce different learning outcomes from knowledge seeking. Interpreting is a cooperative behaviour requiring interaction between two parties in order to produce understanding and insights through knowledge sharing. In the event of high levels of trusting behaviours, seeking knowledge may result in better learning as both parties are more willing to engage in the interpreting process. By contrast, in the context of low trust, knowledge seeking may not lead to learning if both or either party choose not to engage within the interpreting process. Prior research suggests that knowledge sharing is reduced when there is a low level of affect-based trust. This research suggests that the same may be true of the opposite 'direction' of sharing from seeker to provider, and that research could measure the impact of trust on knowledge interpreting and acquisition (Rutten, Blaas-Franken & Martin, 2016). In particular, disclosure-based trust may effect how an individual engages with the interpreting process after seeking knowledge, in which case their level of disclosure-based trust would elicit a different interpreting outcome. In other words, if there is low disclosure-based trust, the seeker may not interpret the knowledge shared and vice versa. Therefore, this research hypothesizes that:

H9: Disclosure-based trust will moderate the relationship between dyadic (H9a) and collective (H9b) seeking and interpreting

H10: Reliance-based trust will moderate the relationship between dyadic (H10a) and collective (H10b) seeking and interpreting

The conceptual framework and hypotheses outlined above are illustrated in Figure 4.1 below.

Figure 4-1: Conceptual Model with Hypotheses



Additional hypotheses, lines omitted from above model for simplicity:
H7d = Trust (reliance-based) on Knowledge Acquisition
H8d = Trust (disclosure-based) on Knowledge Acquisition

4.4 Methodology

4.4.1 Research Context

News articles have highlighted how junior doctors provide the bulk of the day-to day routine patient care in public hospitals (Hunter et al., 2014). They are therefore an important element of a successful health system and patients are reliant on their expertise to both prescribe effective solutions to problems and refer relevant cases to more specialist care. Between leaving medical school and finishing specialist training, a junior doctor must make the transition from novice to a consultant or physician capable of making diagnostic and treatment decisions independently (Weber, 2017). However, academic research has raised the concern that many prescribing errors are commonly made by junior doctors and are partly due to inadequate knowledge or application of knowledge (Lewis et al., 2014; Ross, Ryan, Duncan et al., 2013). Junior doctors in emergency medicine are more risk adverse and rely heavily on guidelines and second opinions compared to experienced physicians (Bowen et al., 2017). Increasingly, researchers have suggested paying more attention to the transition from novice to expert within the context of junior doctors and to understanding how they learn from others (Roland, 2017). This study explores Non-Consultant Hospital Doctors undergoing basic specialist training (BST) or higher specialist training (HST) in hospitals around Ireland. BST prepares doctors for higher specialist training and consists of a rotating post every three to six months to learn about different sub-specialties within their chosen field and enables doctors to work with different clinical teams. In order to pass the ongoing exams and courses,

basic specialist trainees must seek opportunities to learn within each post from their consultant trainer and other senior doctors working in the team. During HST, doctors are expected to develop advanced skills and knowledge required for practicing independently as a specialist, leading a clinician team, and managing the everyday challenges of the health service (RCPI).

4.4.2 Participants

The cross-sectional survey data for this study were collected from a sample of junior doctors (NCHDs) working in hospitals across Ireland. Data was collected at two sites, one at a hospital in Dublin and the other at compulsory training events run for BSTs and HSTs by the Royal College of Physicians in Ireland (RCPI). In the case of the former, with agreement of the Operational HR manager of the hospital, NCHD's were invited to participate in the survey in person at a training event and by email later. At the latter site, questionnaires were distributed manually by the researcher at training events. The questionnaire was pre-tested by consultant doctors and research staff at the RCPI to ensure that respondents would clearly understand all the items and that those items were contextualised. In total, 241 usable questionnaires were returned which represents a response of 41% of the NCHD's approached. Questionnaires with over 10% missing data (n=3; 1.24%) were removed to allow analyses of the remaining 238 cases through AMOS. In this sample, 39.1% were men and 53.4% were women, the average age was between 26 and 30 years, 47% were undergoing basic specialist training and 53% were undergoing higher specialist training. See Table 4.1 below for details of demographics collected.

Table 4-1: Demographic Characteristics (N = 238)

Demographic	Category	Number	Percent
Gender	Male	93	39.1%
	Female	127	53.4%
	Missing	18	7.6%
Age	21 – 25	24	10.1%
	26 – 30	124	52.1%
	31 – 35	70	29.4%
	36 – 45	19	8.0%
	46+	1	0.4%
Nationality	Irish	181	76.1%
	Other	52	21.8%
	Missing	5	2.1%
Speciality	Cardiology	4	1.7%
	Endocrinology	1	0.4%
	General Medicine	102	42.9%
	General Paediatrics	28	11.8%
	Haematology	5	2.1%
	Histopathology	15	6.3%
	Immunology	1	0.4%
	Micro	1	0.4%
	Neurology	3	1.3%

	Obstetrics & Gynaecology	14	5.9%
	Occupational Medicine	2	0.8%
	Oncology	2	0.8%
	Public Health	1	0.4%
	Other	20	8.4%
	Missing	39	16.4%
Job Title	Senior House Officer	113	47.5%
	Registrar	16	6.7%
	Specialist Registrar	91	38.2%
	Senior Registrar	8	3.4%
	Other	10	4.2%
No. of Rotations		Range = 0 - 30	Mean = 3.98
Time in Org (months)		Range = 1 - 20	Mean = 4.00

4.4.3 Measures

All measures used in this study were adapted from existing scales, with some item additions and minor wording changes tailored to the NCHD's context. The survey was pilot tested to establish face validity with several consultant doctors in the Royal College of Physicians and the head of research who were knowledgeable in the area. According to their suggestions, several items were adapted to better suit the medical context. Because "tacit knowledge" can be an ambiguous term, we asked respondents to answer the questionnaire in relation to a specific common scenario requiring high levels of complex tacit knowledge. This scenario was developed with the consultant doctors on the research board in the RCPI to determine appropriate tasks to prompt the survey respondents; for the basic specialist trainees this was taking blood and for the higher specialist trainees this was making a differential diagnosis. These tasks were deemed relevant as the knowledge required for these tasks had to be context-specific, difficult to articulate, and require observation, demonstration, and experience to be understood (Nonaka & Takeuchi, 1995). The survey was checked by several consultant doctors and research staff to ensure good readability and in order to confirm that these scenarios reflect tasks which require tacit, complex, and experiential knowledge. As a job requirement of junior doctors is to learn from their consultant trainer and other senior doctors, respondents were therefore asked to consider knowledge sought and acquired from hierarchical sources. These sources were either consultant doctors or doctors at a higher specialist level to the respondent, therefore assessing these roles reflect their training requirements to learn from more senior doctors.

Most scales were measured using a seven-point Likert scale ranging from "strongly disagree" to "strongly agree". However, the seeking and acquisition scales were measured using a seven-point frequency scale from "never" to "more than once a day". This was chosen as a more appropriate alternative to an agreement scale because the job description of the junior doctors requires them to

seek and learn as part of their specialist training, and an agreement scale might over-inflate levels of seeking in this context. A frequency scale overcame the possibility of inflated responses as they were prompted to specifically rate how often they sought and acquired knowledge. Previous knowledge seeking studies also used frequency measures; (i.e. Hansen, Mors, & Løvås, 2005 measured frequency of requesting information using a yes/no question). Having scales varied in terms of anchor response terms is also a procedural remedy suggested for alleviating common method bias (Podsakoff, MacKenzie & Podsakoff, 2012).

We measured three elements of the "receiver" perspective of knowledge sharing: dyadic and collective knowledge sourcing (Gray & Meister, 2004), interpreting (Crossan, Lane & White, 1999), and knowledge acquisition (Wilkesmann et al., 2009). Reliability indicators (Cronbach's alpha) for all scales are available in table 4.2, page 120.

Knowledge seeking: Dyadic and collective seeking were measured using two items each from a three factor, six item scale assessing dyadic, collective, and published seeking by Gray and Meister (2004). Rated on a seven-point Likert-type frequency scale (1 = "never" to 7 = "more than once a day"), the referent source for knowledge seeking was consultants or doctors in a higher expertise grade within the respondent's workplace. In previous research, this scale has shown sound psychometric properties with reliabilities well above the commonly accepted threshold of .70. The dyadic seeking items assessed how regularly doctors used one-to-one conversations and personal communication to access knowledge. The collective seeking items assessed how regularly doctors consulted and conversed with groups in order to improve knowledge. A sample item for dyadic seeking is "I use targeted one-on-one conversations with other doctors to acquire knowledge of complex tasks."

Knowledge acquisition: Knowledge acquisition was measured with Wilkesmann et al.'s (2009) three-item scale. Rated on a seven-point Likert scale by frequency of interaction ranging from "never" to "more than once a day", items assessed the frequency with which recipients learned from consultants by observation, through consultants advice, and the frequency consultants support learning, A sample item is "[higher doctor grade] in my organisation support my efforts to gain work experience."

Interpreting: Interpreting was measured with a four-item interpreting scale (Gubbins, 2015). Rated on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree", these four items assessed whether it was easy for doctors to interpret and decipher knowledge shared and received based on personal insight, shared knowledge amongst doctors, common language amongst doctors, and amongst the doctors they work closest with. A sample item is "the [respondent junior doctor] and NCHDs share their own common language".

Knowledge sharing: Knowledge sharing was measured with a four-item scale from Lin (2007). Rated on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree", the referent group for sharing were peers or doctors at a junior level, as it was anticipated that junior doctors were unlikely to provide knowledge to enable their consultants to solve problems. Items assessed whether doctors shared their job experience, expertise on request, thoughts on cases and tasks and tips with other doctors. A sample item is "I share my job experience with [lower doctor grade]".

Tacit Knowledge: Tacit knowledge was measured using a six-item scale by Hansen, Mors, & Løvås (2005). Rated on a seven-point Likert difficulty scale from "complex" to "simple" or from "easy" to "difficult" depending on the item. A sample item is "The knowledge you acquired was easy to identify without personal experience in the task". The responses were reverse-coded in SPSS so that an increase in the scale would indicate an increase in tacit knowledge.

Self-efficacy: Seeking self-efficacy was measured using a five-item scale adapted from Kim, Song, and Jones (2011). Rated on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree", three items assessed whether doctors were confident seeking out consultants' ideas, experiences, insights through discussions and conversations, and two items assessed how confident doctors were repeating and paraphrasing knowledge received and maintaining a conversation to arrive at a clear understanding of knowledge received. A sample item is "I am confident seeking out other [higher doctor grade] know-how, experiences, insights, ideas tips or expertise." Sharing Self-efficacy was measured using a three-item measure by Kankanhalli et al. (2005). Rated on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree", two items assessed the doctor's confidence in their ability and expertise and to provide valuable knowledge. The last item was reverse coded and assessed whether other NCHDs provided more valuable knowledge. A sample item is "I have confidence in my ability to provide knowledge that others in my workplace consider valuable." However, item 3 had mixed responses which resulted in a low factor loading, and this item was dropped during the EFA.

Perceived usefulness of seeking knowledge: Perceived usefulness of seeking was measured with a four-item scale adapted from He, Fang and Wei (2009). Rated on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree", items assessed whether seeking knowledge is useful for their work, improves performance, productivity and enables doctors to accomplish tasks more quickly. A sample item is "Seeking knowledge enables me to accomplish tasks more quickly." One item was removed during the CFA due to its low factor loading.

Trust: Trust was measured using the Behavioural Trust Inventory (BTI; Gillespie, 2003) which captures reliance and disclosure-based trust. As with the seeking and acquisition scales, the trust referents were the consultant doctors or other doctors at a higher organisational grade than the

respondent. Each trust dimension contains five items asking respondents to indicate on a 7-point Likert-type scale (1 = not at all willing to 7 = completely willing) the extent to which they were willing to rely on and disclose sensitive information to their knowledge sources. A sample item for professional trust is "how willing to rely on [higher doctor grade]'s task-related skills and abilities." A sample item for personal trust is "how willing to discuss work-related problems with [higher doctor grade] that could potentially be used to disadvantage me?".

Control variables

The literature highlights a vast number of demographic variables which can also influence knowledge seeking, interpreting, acquisition and sharing behaviours. This study controls for gender, age, and tenure. Prior studies have found that gender may effect help seeking as women are more willing to seek help than men (Tulgan, 1995), and men might be less willing to seek knowledge from team members in situations in which their traditional gender roles may be threatened, for example, when it concerns the feedback about their performance (Miller & Karakowsky, 2005). Experienced employees might seek less knowledge because they already knew much of what they needed to know to perform well (Tesluk & Jacobs, 1998). Therefore, age and tenure are expected to reflect the respondents need to seek knowledge, and may inversely relate to knowledge seeking. Prior research suggests that an employee's tenure with an organisation reduces the tendency to seek knowledge from co-workers (Holste & Fields, 2010). As NCHD's job roles are hierarchical and indicate seniority and time spent training, we used job role as a proxy for tenure. On this basis, we controlled for age, gender, and job role on the structural model.

We also controlled for some known costs and predictors of seeking. Borgatti and Cross (2003) suggest that obligations resulting from an exchange can be considered a form of cost. Due to norms of reciprocity, asking contacts for significant amounts of help may place a person in their debt (Blau 1986; Coleman 1988, 1990; Fiske 1991). This cost may also influence the level or effectiveness of learning in the interaction regardless of the frequency of seeking (Borgatti & Cross, 2003). Reciprocal norms were measured with a four-item scale by Chen and Hung (2010). Participants were asked to express their level of agreement with each statement on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree". A sample item is "I know that other [higher junior scale grade] will help me, so it's only fair to help other NCHDs".

Access may also dictate the frequency of seeking, as accessibility is, in part, a question of timeliness (Borgatti & Cross, 2003). If the seeker cannot access the knowledge provider's expertise in a timely fashion than the provider's knowledge is not of benefit. This may be particularly relevant to the context of junior doctors, who need to give patient's relevant procedures and make diagnoses within a time-constraint, therefore access alone may dictate whether and how frequently knowledgeable others are asked for help. Access was measured using the Borgatti and Cross (2003)

method of asking respondents to express their level of agreement when asked "how would you rate your overall ability to access a [higher junior doctor grade]'s thinking and knowledge in time to solve problems?", on a seven-point Likert scale ranging for "strongly disagree" to "strongly agree".

Seeking can also be effected by one's perception of another person's expertise (Borgatti & Cross, 2003). This was measured using the Borgatti and Cross (2003) "knowing" scale which asks respondents to express their level of agreement when asked "I understand the consultants' knowledge and skills. This does not necessarily mean that I have these skills or am knowledgeable in these domains, but that I understand what skills this person has and domains they are knowledgeable in.", on a seven-point Likert scale ranging for "strongly disagree" to "strongly agree".

Finally, it is also important that a knowledge seeker positively evaluate the knowledge and skills of the person sought out in relation to the problem the seeker is attempting to solve. Value of the knowledge received was measured using the Borgatti and Cross (2003) "value" scale which asks respondents to express their level of agreement when asked "This person has expertise in areas that are important in the kind of work I do." on a seven-point Likert scale ranging for "strongly disagree" to "strongly agree".

4.5 Analysis and Results

4.5.1 Analytical Strategy

To test the hypotheses, we conducted structural equation modelling (SEM) in AMOS version 24 with Maximum Likelihood (ML) estimation. SEM is appropriate when theoretically derived paths among multiple exogenous and endogenous variables are estimated (Bollen, 1989). AMOS produces measures of overall model fit, generates estimates of the hypothesised relationships (unstandardised and standardised coefficients, standard errors and t-tests), calculates total effects, and provides measures of the proportions of variance explained. We followed Bollen's (1990) recommendation to rely on multiple indices to evaluate goodness of fit, which included the $\chi 2$ value, the comparative fit index (CFI), the goodness-of-fit index (GFI), the Tucker Lewis index (TLI), and the root mean square error of approximation (RMSEA), which is an indication of the residuals of the predicted parameters from the observed parameters. CFI and TLI values larger than .90 indicate good fit, whereas values larger than 0.95 indicate excellent fit (Bentler, 1990). RMSEA and SRMR with values of .05 or less indicate a good fit, values .06 –.08 an adequate fit, and values close to .10 a mediocre fit (Schermelleh-Engel, Moosbrugger and Muller, 2003).

4.5.2 Missing Data and Screening

The surveys responses were entered into Microsoft Excel where the datasets were screened for completeness. A number of respondents began the survey or marginally attempted it, but did not

fully complete. As a result, cases missing in excess of 50% data were omitted during the screening process as invalid responses. Cases missing over 10% were scrutinised, considered MCAR (Missing Completely at Random), and were removed via listwise deletion as described earlier. Several items had missing values of less the 5%, which were imputed with the median value as the variables in question were ordinal variables.

4.5.3 Exploratory Factor Analysis

An EFA was conducted using Maximum Likelihood with Promax rotation to see if the observed variables loaded together as expected, were adequately correlated, and met criteria of reliability and validity. The results of this can be found in appendix D. Eleven factors emerged representing the expected constructs (dyadic seeking, collective seeking, knowledge acquisition, interpreting, knowledge sharing, seeking and sharing self-efficacy, perceived usefulness of seeking knowledge, reliance- and disclosure-based trust, and tacit knowledge), thus providing evidence of discriminant validity. The KMO and Bartlett's test for sampling adequacy was significant, however as some of the commonalities for each variable were below .200, we removed item TK1 from the tacit knowledge scale, item SEshare3 from the sharing self-efficacy scale and item RBT2 from the reliance-based trust scale. Following this the communalities for each variable were sufficiently high (all above 0.300 and most above 0.600), thus indicating the chosen variables were adequately correlated for a factor analysis. Additionally, the reproduced matrix had 5% non-redundant residuals greater than 0.05, further confirming the adequacy of the variables and 11-factor model. The Cronbach's alphas for the extracted factors are in Table 4.2, along with their labels and specification. All alphas were above .70. The factors are all reflective because their indicators are highly correlated and are largely interchangeable (Jarvis et al., 2003).

Table 4-2: Scale Measure Reliability

Factor Label	Cronbach's Alpha	Specification
Dyadic seeking	0.855	Reflective
Collective seeking	0.895	Reflective
Interpreting	0.754	Reflective
Knowledge Acquisition	0.844	Reflective
Knowledge Sharing	0.932	Reflective
Tacit Knowledge	0.756	Reflective
Seeking Self-efficacy	0.917	Reflective
Sharing Self-efficacy	0.873	Reflective
Perceived Usefulness	0.839	Reflective
Reliance-Based Trust	0.848	Reflective
Disclosure-Based Trust	0.901	Reflective

The factors demonstrate sufficient convergent validity, as their loadings were all above the recommended minimum threshold of .400 for a sample size of 200 (Hair et al., 2010). The factors also demonstrate sufficient discriminant validity, as the correlation

matrix shows no correlations above .700, and there are no problematic cross-loadings. This eleven-factor model had a total variance explained of 64.4%, with all extracted factors having eigenvalues above 1.0. In order to confirm the eleven-factor structure for the measurement model, a confirmatory factor analysis using latent variables was carried out. The theoretical model with structural paths was tested in the second step.

4.5.4 Confirmatory Factor Analysis

To establish the discriminant validity of the latent factors, a full measurement model was estimated comprising independent variables (seeking and sharing self-efficacy, perceived usefulness of knowledge seeking, reliance- and disclosure-based trust and tacit knowledge) and the dependent variables (dyadic and collective knowledge seeking, knowledge acquisition, interpreting, and knowledge sharing). A number of items with low standardised regression weights were removed to improve the model fit statistics. Items 1 and 5 were removed from the tacit knowledge scale. These two items had clear differences in wording when compared to the remaining items as they focused the level of personal experience required to identify knowledge and the complexity of this knowledge. The other three questions related to the difficulty in communicating, understanding and documenting knowledge through writing, manuals or reports. These remaining questions therefore reflect the ability of knowledge to be "converted" and understood in explicit form. When examining frequencies of the item responses in SPSS, it is clear that most respondents rate the knowledge they acquire as complex (85.3% respondents choose responses 4 to 7) and difficult to identify knowledge without personal experience (96.2% of respondents choose responses 4 to 7). By these metrics nearly all knowledge acquired is more tacit. By contrast, the remaining items showed more variance in responses and refer to the individuals' ability to communicate, understand and document the knowledge they acquire in written reports, manuals and documents. Therefore, the remaining tacit knowledge scale identifies highly tacit knowledge as that which is difficult to articulate, communicate and document in written form while low values in this scale relate to knowledge that can be made explicit. Item PU1 was also removed from the perceived usefulness of seeking scale. This item asked if seeking knowledge from consultants was useful for their work of which 95.3% of respondents agreed (includes responses from 4 to 7), while the remaining three items ask if seeking knowledge improves performance, productivity, and reduces time taken to accomplish tasks. The remaining items are arguably more relevant, as they better represent individual expectations of performance outcomes from seeking knowledge rather than their attitude toward seeking. Finally, items INT3 was removed from the interpreting scale. This item asks if NCHDs share a common language, while the remaining items relate to the shared knowledge among NCHDs and whether this eases the ability to decipher, understand, and decide how useful another doctors' knowledge is. The remaining items therefore focus more on the ability of the junior doctor group as a whole to interpret knowledge specifically, rather than commonality of language. The final measurement model met all goodness of fit statistics prescribed by Hair *et al.,* (2010) for studies with a sample size >250 and

>30 observed variables (χ^2 (506) = 1.616, CFI = 0.939, SRMR = 0.052, RMSEA = 0.051, PCLOSE = .394). All observed variables had significant ($p<0.001$) loadings ranging from .510 to .963 on their latent factor.

To determine the reliability and validity of the model, convergent and discriminant validity were calculated. As evidence of convergent validity, all variables had an average variance extracted (AVE) estimate greater than the recommended value of .50 (Fornell & Larcker, 1981). The discriminant validity of the model was tested by comparing the square root of the AVE and the correlation between each set of two constructs (Hair et al., 2010). This is illustrated in appendix 4.2; the square root of the AVE is on the diagonal in bold. All variables are deemed to be discriminately valid, as the square root of the AVE for each construct was greater than intercorrelation values (Gaskin, 2012). Finally, the composite reliability for each construct was above the recommended .70 value, indicating reliability (Raykov, 1997). The data is therefore both valid and reliable.

4.5.5 Common Method Bias

As the data were collected using a single instrument for both independent and dependent variables, findings could be effected by common method bias. Common method bias (CMB) can inflate relationships between variables. However, several steps were taken to minimise this problem: the items for the endogenous, exogenous, and mediator variables were separated into different sections of the survey; using multiple items to measure the constructs (Harrison et al., 1996). To test for this issue, we used the procedure recommended by Podsakoff and colleagues (2012). The items representing the latent variables were entered into an unrotated exploratory factor analysis with a forced one-factor solution. Data that fit such one-factor solutions indicate the possible presence of common method variance (Podsakoff et al., 2012). When tested for common method variance using the Harmon's single-factor score in which all latent items were loaded into one common factor. The total variance for a single factor was 24.942%, as this is less than 50% the variance suggests that CMB does not effect the data. However, some authors believe Harman's one-factor test to be too insensitive enough to detect CMB (Podsakoff et al., 2003). Therefore, we also compared the unconstrained common method factor model with the zero-constrained common method factor (CLF) model. The chi-square test for the zero constrained model was significant, therefore measurable bias was detected. In addition, a test of equal specific bias demonstrated unevenly distributed bias. As a result, we retained the CLF for our structural model by imputing composites in AMOS with the CLF present, and thus our variable values are CMB-adjusted.

Table 4-3 Descriptive Statistics and CFA Reliability Testing

	M	SD	CR	AVE	MSV	Max R(H)	1	2	3	4	5	6	7	8	9	10	11
1. Seeking Self-Efficacy	3.94	0.77	0.92	0.744	0.172	0.944	**0.862**										
2. Disclosure-based Trust	3.55	1.20	0.902	0.648	0.194	0.908	0.209	**0.805**									
3. Knowledge Sharing	4.28	0.69	0.933	0.779	0.172	0.955	0.414	0.44	**0.882**								
4. Perceived Usefulness	3.39	0.65	0.845	0.648	0.08	0.869	0.145	0.046	0.202	**0.805**							
5. Collective Seeking	2.93	1.36	0.895	0.81	0.415	0.895	0.337	0.261	0.349	0.354	**0.9**						
6. Reliance-based Trust	1.99	0.44	0.854	0.6	0.194	0.891	-0.05	0.303	0.207	0.419	0.216	**0.774**					
7. Tacit Knowledge	3.78	1.00	0.773	0.543	0.023	0.837	0.405	0.189	0.03	0.045	0.009	0.156	**0.737**				
8. Interpreting	3.84	0.73	0.758	0.512	0.164	0.768	0.331	0.227	0.283	-0.07	0.182	0.216	0.128	**0.716**			
9. Knowledge Acquisition	2.05	0.95	0.848	0.651	0.323	0.851	0.363	0.196	0.148	0.022	0.323	0.049	0.22	0.644	**0.807**		
10. Sharing Self-Efficacy	4.98	0.76	0.874	0.777	0.132	0.876	0.065	-0.02	0.174	-0.02	0.213	0.171	0.43	0.145	0.175	**0.881**	
11. Dyadic Seeking	2.44	1.12	0.861	0.755	0.415	0.868	0.145	0.338	0.141	0.376	0.07	0.041	0.032	0.15	0.568	0.101	**0.869**

M = Mean; SD = Standard Deviation; CR = Composite Reliability; AVE = Average Variance Extracted; MaxR(H) on the diagonal = square root of the AVE

4.5.6 Structural Model

Model 1 investigates the relationships between self-efficacy, perceived usefulness of seeking and trusting behaviours on seeking, interpreting, acquisition and sharing. The first stage in hypothesis testing involved testing the structural model using structural equation modelling (SEM) in AMOS. SEM was deemed appropriate as it enables the representation of unobserved or latent constructs, corrects for measurement error, and facilitates the examination of multiple, interrelated relationships (Hair et al., 2010). The structural model outlined in Figure 4.2, was tested in AMOS using composites generated during the CFA. The model indicates good fit; (χ 2 = 31.184, df = 23, χ 2/df = 1.356, CFI = .99, SRMR = .034, RMSEA = .039, PCLOSE = .685). The mediators dyadic and collective seeking are not causally correlated, but as they share components (the items both represent seeking behaviours but in different settings) we can allow them to correlate (Hermida, 2015). In response, the error terms of the mediators dyadic and collective seeking were covaried to achieve good model fit, as we wanted to account for their correlation without adding theoretical complexity to our model (David Kenny, 2012; Gaskin, 2018). In the interests of the parsimony of the model, preliminary data analysis was used to identify and include only the control variables that demonstrated the significant correlations to the dependent variables. This resulted in the inclusion of age, tenure and reciprocal norms.

4.5.7 Hypothesis testing

Direct Paths

The results of the structural model are reported in Table 4.3. Direct path hypotheses of H2 and H4 to H8 were tested by this model. The findings for the proposed antecedents to knowledge seeking are first discussed. The influence of two cognitive factors were examined in H4a - H6c. Firstly, H4a-c proposed that self-efficacy of seeking would predict the frequency of dyadic seeking (H4a), and collective seeking (H4b), and positively influence interpreting (H4c). The path analysis revealed the expected positive, significant relationships between seeking self-efficacy and dyadic seeking (β= .158*), collective knowledge seeking (β= .134*), and a significant positive effect on interpreting (β= .194**). Therefore, H4a – c were supported. H5 proposed that self-efficacy of sharing would predict knowledge sharing. The path analysis shows that sharing self-efficacy had a significant effect on knowledge sharing (β= .302***). Therefore, hypothesis 5 was fully supported. H6a-c proposed that the outcome expectations of perceived usefulness of seeking knowledge would positively effect the frequency of dyadic seeking (H6a) and collective seeking (H6b), and positively influence interpreting (H6c). The path analysis reveals that perceived usefulness of seeking knowledge had the expected effects on dyadic seeking (β= .111†) and a significant positive effect on interpreting (β= .204***), but no effect on collective seeking. Therefore, hypothesis 6 was only partially supported via H6a and H6b but not H6b.

Next, the influence of disclosure and reliance-based trust were examined in H7a – H8d. H7a – d proposed that disclosure-based trust would positively predict the frequency of dyadic seeking (H7a) and collective seeking (H7b), interpreting (H7c) and knowledge acquisition (H7d). The path analysis revealed that disclosure-based trust did not have a significant effect on dyadic seeking, but did reveal a significant effect on collective knowledge seeking (β= .206**), interpreting (β= .110†), and knowledge acquisition (β= .148**). Therefore hypothesis 7 was only partially supported via H7b – d, but not H7a. H8a – d proposed that reliance-based trust would positively predict the frequency of dyadic seeking (H8a) and collective seeking (H8b), interpreting (H8c) and knowledge acquisition (H8d). The path analysis shows that there was no significant effect of reliance-based trust on dyadic or collective seeking. However, there was a positive, significant effect between reliance-based trust and interpreting (β= .177*) and knowledge acquisition (β= .324***). Thus, hypothesis 8 was partially supported via H8c and d, but not H8a and b.

Finally, the influence of interpreting on the outcome of knowledge sharing was examined in H3. This hypothesised that knowledge sharing would positively impact interpreting. The path analysis revealed the expected, positive relationship between knowledge sharing and interpreting (β= .144*). Therefore hypothesis 3 was supported.

Table 4-4 Direct Path Hypotheses Findings

No.	Hypotheses	Estimate	Conclusion
H2	Knowledge sharing will have a positive effect on interpreting	.144*	Supported
H4a	Seeking self-efficacy will have a positive effect on dyadic seeking	.158 *	Supported
H4b	Seeking self-efficacy will have a positive effect on collective seeking	.134 *	Supported
H4c	Seeking self-efficacy will have a positive effect on interpreting	.194**	Supported
H5	Sharing Self-efficacy will have a positive effect on knowledge sharing	.302 ***	Supported
H6a	Perceived Usefulness of seeking will have a positive effect on dyadic seeking	.111 †	Supported
H6b	Perceived Usefulness of seeking will have a positive effect on collective seeking	.034	Not Supported
H6c	Perceived Usefulness of seeking will have a positive effect on interpreting	.204***	Supported
H7a	Disclosure-based trust will have a positive effect on dyadic seeking	.059	Not Supported
H7b	Disclosure-based trust will have a positive effect on collective seeking	.206 **	Supported
H7c	Disclosure-based trust will have a positive effect on interpreting	.110 †	Supported
H7d	Disclosure-based trust will have a positive effect on acquisition	.148**	Supported
H8a	Reliance-based trust will have a positive effect on dyadic seeking	-.057	Not Supported
H8b	Reliance-based trust will have a positive effect on collective seeking	-.12	Not Supported
H8c	Reliance-based trust will have a positive effect on interpreting	.177 *	Supported
H8d	Reliance-based trust will have a positive effect on acquisition	.324 ***	Supported

The control variables age, tenure and reciprocal norms were retained in the structural model. Age had a significant negative effect on dyadic seeking (β= -.197**) and collective seeking (β= -.171**). This supports prior research which shows that as age or expertise increases the frequency of seeking is reduced (Tesluk & Jacobs, 1998) and that younger physicians appear to make greater use of colleagues than their older counterparts (Gruppen, 1990). Tenure had a significant positive

effect on sharing (β= .131*), as tenure was measured using NCHD's job roles these findings suggests that as NCHD's move into more senior job roles their sharing increases. Reciprocal norms had a significant negative effect on acquisition (-.209***) and a significant positive effect on knowledge sharing (.286***). This shows when norms of reciprocity are high, NCHD's are less likely to acquire knowledge but more likely to share knowledge. Figure 4.2 displays the results of SEM and hypotheses testing on the research model. For the sake of clarity, we excluded the paths for the control variables and the nonsignificant paths. The interaction effects are depicted with dotted lines. The remaining hypotheses, H1a – b and H3 a -b, were measured with the mediation model (H1a and b) and interaction model (H3a and b), discussed below.

Mediation Analysis

Mediation was tested using 2000 bias corrected bootstrapping resamples in AMOS to address hypotheses H1 - b. The results are summarised in the table 4.4 below. H1 proposed that interpreting would mediate the positive effect of dyadic seeking (H1a) and collective seeking (H1b) on knowledge acquisition. The mediation influence of interpreting on the relationship between dyadic seeking and acquisition was first tested. As shown in the table below, dyadic seeking significantly influenced acquisition prior to and subsequent to the inclusion of the mediator. Counter to the hypotheses, dyadic seeking had a significant, but negative indirect effect on acquisition via interpreting. This is an example of competitive partial mediation, where the effect of the indirect path a × b differs from that of path c (Zhao, Lynch & Chen, 2010). In this case, the competitive partial mediation result suggests that interpreting reduces the positive relationship between the dyadic seeking and knowledge acquisition. Secondly, the mediating role of interpreting on the relationship between collective seeking and acquisition was explored. As shown in the below table, collective seeking significantly influenced acquisition prior to, and subsequent to the inclusion of the mediator. Bootstrapping revealed that collective seeking had a significant, indirect influence on acquisition, via its relationship with interpreting. It is concluded that collective seeking influences knowledge acquisition via interpreting.

Table 4-5: Hypothesis Summary for Mediation

Hyp.	Mediation	Evidence	Supported?
H1a	Interpreting mediates the positive relationship between dyadic seeking and knowledge acquisition	Direct w/o med: .335***	Counter-evidence, partial competitive mediation
		Direct w/Med: .317***	
		Indirect: -.019 †	
H1b	Interpreting mediates the positive relationship between collective seeking and knowledge acquisition	Direct w/o med: .203**	Yes, partial complimentary mediation
		Direct w/Med: .227**	
		Indirect: .024*	
(*** p < 0.001; ** p < 0.010; * p < 0.050; † p < 0.100)			

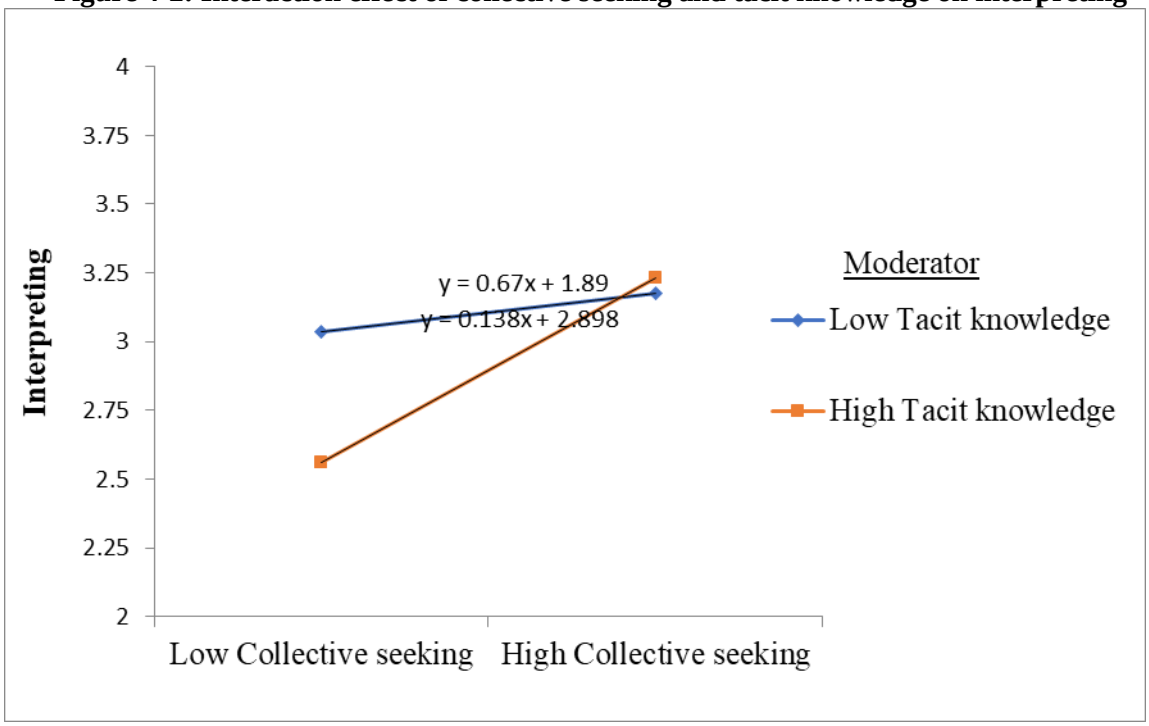
Interaction effects: moderating effect of tacit knowledge

Hypothesis 3 posited that tacit knowledge would moderate the relationship between dyadic and collective seeking and interpreting. To test the interaction hypotheses, we first standardised the independent variables (dyadic and collective seeking) and then created product variables of tacit knowledge and dyadic seeking (Tacit x Dseek) and tacit knowledge and collective seeking (Tacit x Cseek). We trimmed non-significant interaction regressions one at a time until only significant paths remained. In this case, only one significant path remained, from Tacit x Cseek to Interpreting. Therefore, hypothesis 3a was not supported as the relationship between dyadic seeking and interpreting did not change with the addition of tacit knowledge while hypothesis 3b was supported. The results of the interaction tests are summarised in table 4.5 and plotted as shown in the figure 4.2 below. Figure 4.2 shows that collective seeking was positively and significantly associated with interpreting in scenarios of high tacit knowledge (β= .133, p=.015). This model also revealed that the direct paths between tacit knowledge and interpreting (-.105 †) was negative and significant, indicating that tacit knowledge directly hinders interpreting. Additionally, model fit was good (cmin/df = 1.398; CFI .987) for the final moderated model.

Table 4-6: Interaction Hypotheses: the moderating effect of tacit knowledge

No.	Interaction Hypotheses	Interaction Effect	Supported?
H3a	An increase in tacit knowledge will strengthen the positive relationship between dyadic seeking and interpreting	-.033	No
H3b	An increase in tacit knowledge will strengthen the positive relationship between collective seeking and interpreting	.133*	Yes, stronger positive effect
(*** p < 0.001; ** p < 0.010; * p < 0.050; † p < 0.100)			

Figure 4-2: Interaction effect of collective seeking and tacit knowledge on interpreting



Interaction effects: moderating effect of trust

Hypothesis 9 and 10 posited that trust would moderate the relationship between dyadic and collective seeking and interpreting in order to assess whether this relationship changed when accounting for high or low values of trust. Therefore, two interaction analysis tests were performed. The first tested whether disclosure-based trust moderated the relationship between dyadic and collective seeking and interpreting. The second tested whether reliance-based trust moderated the relationship between dyadic and collective seeking and interpreting.

For both tests the independent variables were standardised and new product variables were created, for example dyadic seeking and disclosure-based trust (DBtrust x Dseek). We trimmed non-significant interaction regressions one at a time until only significant paths remained. Table 4.6 demonstrates the results of these tests. Disclosure-based trust significantly moderates the relationship between dyadic seeking and interpreting (β= .107, p=.056). This is illustrated in figure 4.3 and shows that in scenarios of low disclosure-based trust, dyadic seeking reduces interpreting. Model fit for this moderated model was good (cmin/df = 1.432; CFI .988).

Table 4-7: Interaction Hypotheses: the moderating effect of tacit knowledge

No.	Interaction Hypotheses	Interaction Effect	Supported?
H9a	Disclosure-based trust will moderate the positive relationship between dyadic seeking and interpreting	.107 †	Yes

H9b	Disclosure-based trust will moderate the positive relationship between collective seeking and interpreting	-.046	No
H10a	Reliance-based trust will moderate the positive relationship between dyadic seeking and interpreting	.080	No
H10b	Reliance -based trust will moderate the positive relationship between collective seeking and interpreting	-.123	No
(*** p < 0.001; ** p < 0.010; * p < 0.050; † p < 0.100)			

Figure 4-3: Interaction effect of dyadic seeking and disclosure-based trust on interpreting

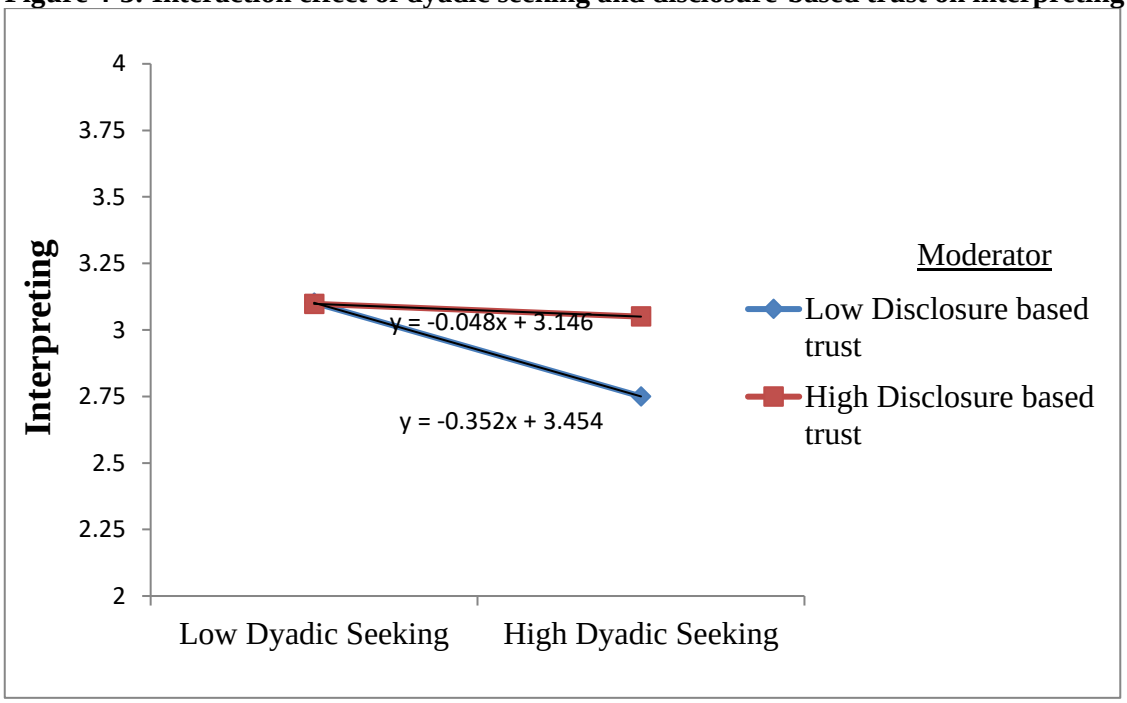
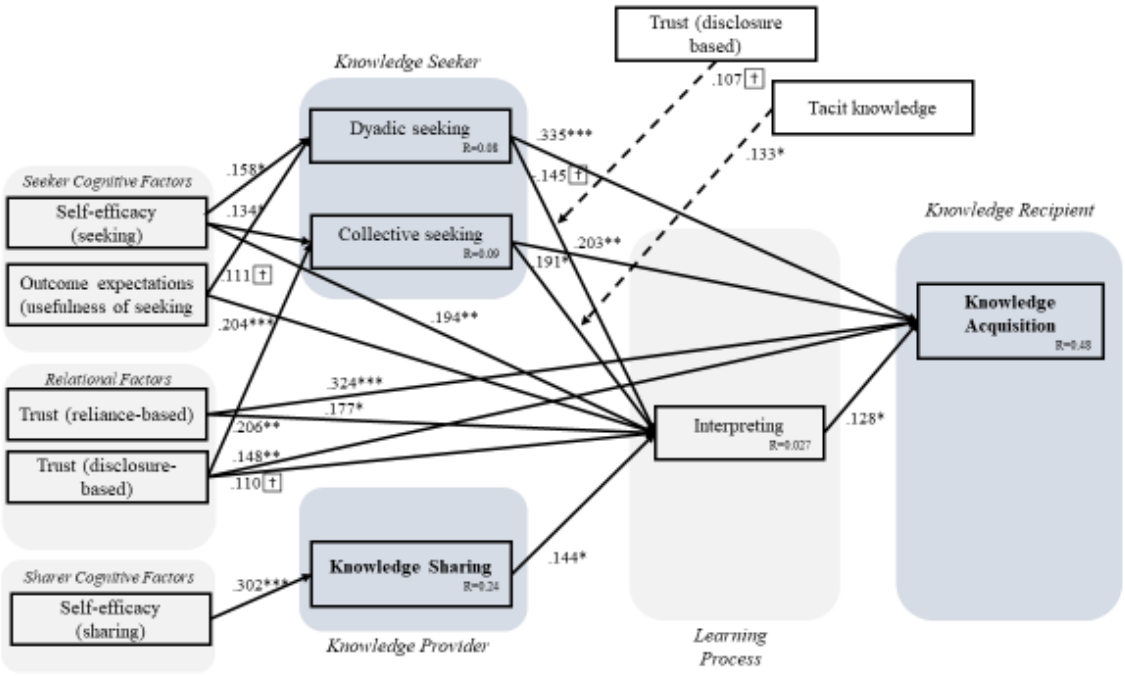


Figure 4.4 displays the results of SEM and hypotheses testing on the research model. For the sake of clarity, we excluded the paths for the control variables and the nonsignificant paths. The interaction effects are depicted with dotted lines.

Figure 4-4: Structural Model



Note: Summary of standardised path coefficients for the hypothesised model with the full sample ($N = 238$). Solid Lines represent significant coefficients and dotted lines represent moderation, † $p < .10$ * $p < .05$; ** $p < .01$; *** $p < .001$

4.6 Findings and Discussion

Sharing knowledge is a bi-directional process involving both provider and recipient (Tangaraja et al., 2015), in which the knowledge seeking is a distinct phase of sharing (Hansen et al., 2005) in which the recipient attempts to proactively acquire the knowledge they need. Existing literature does not differentiate between the individual and social factors which influence sharing to those which effect the phases of knowledge seeking or acquisition (Hansen et al., 2005). Additionally, tacit knowledge is a particularly valuable form of knowledge which can only be acquired through face-to-face interaction (Nonaka & Takeuchi, 1995). Despite this, much research cannot examine tacit knowledge seeking as research does not differentiate the factors which influence information seeking or seeking from electronic sources, from those which influence interpersonal knowledge seeking. Therefore, this study examined cognitive and social antecedents of two forms of interpersonal knowledge seeking - dyadic and collective seeking. The results suggest that dyadic and collective seeking are not motivated by the same factors. The frequency of dyadic knowledge seeking is cognitively motivated, evidenced by the finding that seeking self-efficacy and perceived usefulness of seeking knowledge positively influence dyadic seeking. This suggests that individuals must feel capable of engaging in discourse and deciphering knowledge in order to seek directly from another person. In addition, the perceived usefulness of seeking knowledge for improved task performance is one outcome expectation that will motivate individuals to seek directly from another person.

Likewise, seeking self-efficacy positively influences collective seeking suggesting that the perceived capability of seeking also effects seeking from groups. However, the frequency of collective seeking from workplace groups was not effected by perceived usefulness of seeking. While unexpected, one explanation for this insignificant relationship is that collective seeking may be associated with different outcome expectations for performance. Despite this, these findings broadly support the Social Cognitive Theory perspective that a persons behaviour is partially shaped and controlled by the influences of a persons cognition (Bandura, 2012). This explains that interpersonal knowledge seeking, and in particular dyadic seeking, is motivated by confidence in the capability to seek and expectations that seeking will improve job performance.

In addition, trust motivates collective seeking but not dyadic seeking. Specifically, collective seeking is influenced by disclosure-based trust. This indicates that the willingness to disclose personal information informs how frequently junior doctors seek knowledge within groups. As collective seeking requires interacting with many people of varying levels of expertise, seekers must be vulnerable and willing to disclose their lack of knowledge or other personal information to groups. However, reliance-based trust had no effect on frequency of either dyadic or collective seeking, despite research suggesting that seekers select providers based on their level of knowledge (Hansen, Mors, & Løvås, 2005; He & Wei, 2009). This study is the first to demonstrate at the individual level of analysis that disclosure-based trust is particularly important for collective knowledge seeking.

Results additionally show that self-efficacy to seek and perceived usefulness of seeking positively effect interpreting. This suggests that individuals must feel capable of engaging in dialogue and deciphering knowledge in order to interpret their knowledge and produce insights with others. Additionally, seekers must value the outcome expectations of seeking in order to interpret knowledge received, in particular the usefulness of seeking for performing tasks. This suggests that seekers cannot realise their performance expectations of seeking without also engaging in the interpreting process. In addition, trusting behaviours (both reliance and disclosure) predict both interpreting knowledge and the frequency by which people choose to acquire knowledge. This shows that while relying on others knowledge does not effect seeking, it does inform the seekers interpreting and acquisition behaviour. These results suggest the importance of investigating the outcomes of knowledge seeking, such as interpreting and acquisition. Though factors such as reliance-based trust do not effect seeking, reliance-based trust does still influence the successful outcome of seeking through its effect on interpreting and acquisition. Likewise, disclosure-based trust can effect interpreting and frequency of knowledge acquisition. This supports prior research showing useful knowledge acquisition depends on trusting relationships (Adler, 2002; De Long & Fahey, 2000; Locke, 1999; Lucas, 2005; McAllister, 1995; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998), and in particular reliance- and disclosure-based behaviours (Alexopoulous & Buckley, 2013). However, this study elucidates that interpreting knowledge to build shared understandings is also

dependent on both reliance and disclosure-based behaviours. These research findings support the investigation of seeking and acquisition behaviours as distinct yet interrelated concepts with different antecedents, and builds on research which has begun to examine knowledge seeking as an independent construct (e.g. Gray & Meister, 2004, 2006; Hansen, Mors, & Løvås, 2005; Wang et al., 2014).

As this study examined interpersonal seeking as a separate construct to knowledge acquisition and sharing, it was possible to examine how interpersonal seeking might lead to outcomes of knowledge acquisition via interpreting. The results show that dyadic and collective seeking both effect the frequency of knowledge acquisition. This suggests that interpersonal seeking is an important behaviour for individuals attempting to acquire useful knowledge from others, which challenges the existing literature examining sharing from the provider perspective alone. Rather than assuming that increasing an individual's exposure to knowledge and expecting that learning will take place, these findings suggests that knowledge recipients can and do take a more proactive role in their learning by actively seeking out the knowledge they need. This supports research showing that interpersonal seeking leads to cognitive learning outcomes (Gray & Meister, 2006). However, results indicate that interpreting only mediates the relationship between collective seeking and knowledge acquisition. This suggests that it is through collective seeking practices that interpreting can aid acquisition best, supporting communities of practice literature which suggests that learning is a social process of seeking and constructing meaning in groups (Brown & Duguid, 1991).

Additionally, results show that tacit knowledge moderates the relationship between collective seeking and interpreting. The direct relationships between tacit knowledge and both interpreting and acquisition were negative but significant, which demonstrates the difficulty of learning and acquiring tacit knowledge. However, this study highlights that the interpreting tacit knowledge is easier when the individual seeks knowledge from collective groups. In other words, collective seeking is an effective method to interpret tacit knowledge specifically, which also supports literature examining collective methods of learning, such as communities of practice (Brown & Duguid, 1991; Lave & Wenger, 1991) as an effective framework by which to exchange tacit practices and advice. This research also highlights the necessity of research to consider the tacit characteristics of knowledge sought when determining successful outcomes of knowledge seeking.

Finally, sharing self-efficacy positively effects knowledge sharing, and knowledge sharing positively effects interpreting. This confirms prior research which shows that self-efficacy can enable knowledge sharing behaviours (e.g. Cho & Li, 2007; Liu & Liu, 2011; Yang & Farn, 2010). This supports the 4i framework proposition that interpreting is an important sharing process enabling individuals to learn. This is achieved through sharing insights when interacting with others (Crossan et al., 1999). Therefore, these findings provide previously lacking empirical support for the 4i

framework, which supports the idea that sharing knowledge between individual and groups can ultimately lead to organisational learning through integrating and institutionalising. Additionally, findings support the SECI model which contends that knowledge sharing occurs through verbalisation and socialization, similar to interpreting (Nonaka & Takeuchi, 1995).

4.6.1 Unsupported Results

Curiously, results indicated counter-support for the positive relationship between dyadic seeking and the process of interpreting. Findings suggested that interpreting suppressed the positive effect of dyadic seeking on knowledge acquisition, and therefore actually reduce the ability of the recipient to acquire knowledge. However, the interaction analysis provided clarity of these results. This showed that it was in scenarios of low disclosure-based trust that dyadic seeking negatively effected interpreting. Therefore, when individuals do not engage in disclosing behaviours, they cannot fully realise the benefits of seeking knowledge such as interpreting and acquisition. This illuminates the important role that trust, in the form of disclosing behaviours, plays in explaining how people learn from specific others through one-to-one exchanges. Seeking behaviours alone do not predict that learning outcomes will occur, when trusting behaviours are not also demonstrated.

Surprisingly, neither forms of seeking were predicted by reliance-based trust. One explanation for this may lie in the context of this study, as a junior doctor's job role requires and expects hierarchical seeking from consultant doctors it is possible that junior doctor's reliance on their consultant's knowledge and expertise is immaterial to the frequency of their seeking behaviour. In other contexts where seeking is an extra-role behaviour and not required, reliance-based trust may play a larger role in deciding how and who to seek from. It is also possible that there is a certain base level of competence can be expected for consultant doctors, the referent group, as they have to meet high competence job qualifications in the first place. Therefore, it would be expected that there is a high level of reliance-based trust in consultants and more senior doctors as they are considered experts within their area of expertise. This may have attributed to the non-significant effect of reliance-based trust. research by Zhang and Chen (2018) suggest that dyadic seeking is predicted by both affect and cognition-based trust, suggesting that there may be contextual differences that play a role in when trust matters.

4.7 4.7 Limitations

While this study provides evidence about factors influencing and outcomes of hierarchical knowledge seeking in the context of complex tasks, the findings should be considered in light of the limitations of the research. A key limitation is the cross-sectional nature of the data used in testing the hypotheses. This limits the ability to make causal assertions and does not allow ruling out alternative explanations. For example, we argue that collective seeking and interpreting produce knowledge acquisition in high tacit contexts, however it is possible to derive alternative causal explanations. For example, the frequency of knowledge acquisition might result in greater levels of

interpreting, and this interpretative process could in turn lead to more frequent seeking. This issue deserves further investigation with, for example, longitudinal designs that can capture whether frequency of seeking over time leads to better learning outcomes.

Similarly, the reliance on self-report data contributed to common method variance problems. While we employed design procedures to ameliorate such problems (*e.g.*, varied response formats across scales, see Podsakoff et al., 2012) and accounted for the common factor when computing the variables during the confirmatory factor analysis, future research could include objective measures of outcome variables instead, such as performance or objective measures of seeking and sharing.

Moreover, our dataset does not allow us to directly consider the quality of knowledge seeking and acquisition, or use and application of knowledge once acquired. However, note that we indirectly capture the quality of knowledge acquired, as our measures of self-reported knowledge seeking and acquisition include items that specifically refer to the ability to complete complex tasks. This would suggest that knowledge sought and acquired is also applied to work tasks. In other words, we implicitly asked junior doctors about the extent to which knowledge seeking and acquisition led to the ability to perform relevant tasks. We also measured the perceived usefulness of seeking knowledge, which links seeking knowledge with performance outcomes of accomplishing tasks, such as productivity, performance and accomplishing tasks more quickly. However, it would be preferable that the expected association between seeking and the quality of knowledge acquisition and its application was empirically tested by triangulating self-reported performance with independent performance ratings.

Finally, the current study exclusively involved doctors who were required to seek and learn knowledge from more senior doctors. While this provides an interesting example of knowledge-based work in which learning is required, it limits the generalisability of the findings to other settings. The frequency of seeking and the factors effecting this behaviour may differ in contexts where seeking is a voluntary behaviour for example. Thus, future research should explore the significance of cognitive and relational mechanisms for seeking in a diverse range of jobs to determine their impact on work with less organisational requirement to seek.

4.8 4.8 Conclusions and Future Research

Knowledge sharing literature has tended to focus on the uni-directional exchange of knowledge from provider to recipient (Hansen, Mors, & Løvås, 2005; Kim, Song, & Jones, 2011).This study adds to the recipient perspective of the sharing process by investigating three important facets to the receiver's role in the knowledge sharing process; (1) the distinct and important role interpersonal seeking has in explaining successful outcomes of acquisition, of which collective seeking is informed by the organisational learning processes of interpreting (2) the importance of collective seeking to

interpreting tacit knowledge (3) the cognitive and social antecedents that are predictive of why people seek, acquire, and share.

Although studies about knowledge seeking exist, most studies either tend to examine knowledge sharing as a provider-only behaviour or combine knowledge seeking and sharing into one measure (e.g. van den Hooff & van Weenen, 2004; Lin, 2007). This study illustrates the distinct nature and antecedents of interpersonal seeking from knowledge acquisition and sharing. Therefore, findings suggest the importance of a more nuanced understanding of recipient learning within the sharing process. This can help to explain inconsistencies in antecedents of sharing within existing literature, and when considering factors that specifically effect interpersonal seeking, Future research should expand the knowledge seeking literature to further investigate and antecedents and outcomes of this process. This study provides an important contribution in explaining how receivers can and do play a more proactive role within the sharing process through seeking, and adds to understanding of why and in what context they best learn. Trust, in particular, was found to have a nuanced influence on each step of the seeking process. High levels of personal disclosure-based trust can enable learning through interpreting from collective seeking interactions, and low levels can suppress learning from dyadic seeking. Future research should investigate how the success of seeking and learning from others is dependent on understanding relational factors which underpin the social complexity of these behaviours.

This study also illustrates that research examining knowledge seeking should consider various methods used to seek from others, as they are motivated in different ways. In addition, research which examines interpersonal seeking should also examine how knowledge sought is interpreted and acquired in order to fully examine how social factors effect each of these processes. Future research could further explore how conditions of high and low tacit knowledge may change the relationships between seeking and other organisational learning processes, such as integrating or institutionalising, in order to further elucidate the benefits of interpersonal knowledge seeking at all levels of learning within the organisation.

CHAPTER 5: **DISCUSSION AND CONCLUSIONS**

5.1 Introduction

The primary purpose of this thesis was twofold (a) to investigate the individual and social factors which influence knowledge seeking, and (b) to examine how knowledge seeking improves knowledge acquisition, particularly within the context of sharing high levels of tacit knowledge. To explore these questions, a conceptual framework was proposed in Chapter 2. Following this, two studies were conducted. Study 1 was exploratory and used interviews with thirty-three semi-structured interviews of workers engaged in solving non-routine problems to investigate how individual and social factors influenced tacit knowledge seeking, acquisition and sharing behaviours. Study 2 tested the proposed conceptual framework using SEM to analyse 238 surveys of junior doctors which tested the effect that specific cognitive factors (seeking self-efficacy and perceived usefulness of seeking) had on dyadic and collective seeking, interpreting, knowledge acquisition and the effect sharing self-efficacy had on knowledge sharing. This study also examined the effect that social factors of disclosure-based and reliance-based trust had on dyadic and collective seeking, interpreting and knowledge acquisition. In this chapter, the answers to the two research questions are discussed based on the results obtained from the two studies presented in previous chapters. Following this, the theoretical implications and overall contributions of the research are discussed. The limitations of the research are then outlined and potential recommendations for future research are provided. Finally, the practical implications derived from the results are discussed.

5.1.1 Discussion of Research Questions

Research Question One: What factors influence the knowledge seeking behaviours of individuals engaged in tasks with high levels of tacit knowledge?

In the wider Knowledge Management literature dedicated to understanding individual knowledge sharing and its antecedents, research is emerging which suggests that knowledge seeking is a separate phase to and important aspect of successful knowledge sharing between people (Hansen, Mors, & Løvås, 2005). Prior research has shown that seeking knowledge from others increases the willingness of providers to share their knowledge (Zhang et al., 2015), improves the seeker's learning outcomes and effectiveness (Gray & Meister, 2004; 2006; Wang et al., 2014; Kankanhalli et al., 2011) and allows seekers to resolve problems, accomplish more complex tasks, and make decisions more effectively (Gray & Meister, 2004; Gray & Durcikova, 2005). However, despite these benefits, little research has investigated the individual or social factors which may prompt people to seek knowledge. The small amount of research which has investigated aspects of knowledge seeking have used a combined measure of seeking and sharing (e.g. van den Hoof & van Weenen, 2004; De Vries, van den Hooff, & de Ridder, 2006; Lin, 2007), or not distinguished between interpersonal tacit knowledge seeking and explicit forms of seeking such as from documents or electronic repositories (e.g. Cross & Borgatti, 2004; Gray & Meister, 2004; Nebus, 2004). This is problematic as knowledge

seeking from others is a separately motivated behaviour from sharing knowledge to others, and therefore likely to be influenced by different individual and social factors to knowledge sharing by the provider. Therefore, one objective in this thesis was to distinguish knowledge seeking from sharing knowledge in order to investigate those individual and social factors which effect interpersonal knowledge seeking specifically. To do so, these behaviours were investigated distinctly. Study 1 compared the individual and social factors which influenced seeking and sharing. Study 2 measured seeking and sharing as separate constructs in order to understand how the proposed individual and social factors effected knowledge seeking independently to sharing. Additionally, this research focused on seeking *tacit* knowledge, which is particularly valuable (Little, Quintas, & Ray, 2002; Gertler, 2003) and acquired through face-to-face interactions (Nonaka & Takeuchi, 1995). Therefore, to understand which individual and social factors influence tacit knowledge seeking more particularly, this research examines interpersonal knowledge seeking rather than knowledge seeking from explicit knowledge sources such as published, written or electronic sources. In addition, within both studies the research participants were asked about their seeking behaviours regarding specific highly tacit tasks. This research is one of the few known studies to investigate interpersonal tacit knowledge seeking (excepting Haas & cummings, 2015; Wang et al., 2014; Zhang & Chen, 2018) and the only known study that investigates individual and social factors which influence this behaviour. Finally, as both seeking and sharing are ineffective if the recipient does not acquire useful knowledge, this research also investigated the individual and social factors which influence knowledge acquisition. Specifically, Study 1 compared the individual and social factors which influenced knowledge seeking, acquisition and sharing. Study 2 examined the cognitive and social factors which effected acquisition, and also assessed the influence these factors had on interpreting, included as a mediating learning process to explain how knowledge seeking might lead to effective knowledge acquisition. By exploring and comparing the individual and social factors which effect knowledge seeking and learning (measured by both interpreting and acquisition) by the recipient, this research can help to understand which factors may enable knowledge seeking and consequently result in successful knowledge acquisition.

Prior literature guided the specific focus on individual and social factors with relation to knowledge seeking. Various literatures have suggested that individual factors pertaining to seeker and provider characteristics, and social factors relevant to the relationship between the seeker and provider are pertinent when considering knowledge sharing (Cross & Borgatti, 2004; Minbaeva, 2007). This is supported by the Social Cognitive Theory (SCT) adopted in this thesis as a general framework to understand factors which influence individual behaviours in the workplace. SCT recognises that cognition and environment play an important role in individual behaviours (in this case knowledge seeking and sharing) and specifically proposes the drivers of cognition; self-efficacy and outcome expectations, as central to these behaviours (Bandura, 1986). SCT provides a framework for understanding how seeking behaviours may be motivated. In addition, it illustrates

why seeking may be *differently* motivated to related behaviours of acquisition and sharing, as cognitive factors are specific to each behaviour, in this case knowledge seeking and sharing. For example, self-efficacy is not a generalised concept in which individuals feel highly capable of performing every behaviour (Bandura, 1986). Instead the perceived self-efficacy to seek is different to the perceived self-efficacy to share, as these two behaviours require different capabilities. As a result, this research explored the specific forms of self-efficacy and outcome expectations which explain individual's knowledge seeking behaviour in both Study 1 and Study 2. Specifically, Study 1 revealed through interviews that the role of both task self-efficacy and seeking self-efficacy were pertinent to knowledge seeking and also illustrated the outcome expectations relevant to knowledge seeking, namely the usefulness of seeking for improving task performance. As a result, Study 2 examined seeking self-efficacy and the perceived usefulness of seeking for task performance as relevant cognitive factors for explaining knowledge seeking. To better understand the specific social factors which may influence the relationship between the seeker and provider, this research drew on Social Capital Theory which describes the characteristics of a person's network and the set of resources embedded within it which may influence the extent to which interpersonal knowledge sharing occurs (Nahapiet & Ghoshal, 1998). The relational factors describe the kind of personal relationships people have developed with each other through a history of interactions, but while research have examined how factors such as trust and reciprocal norms impact knowledge sharing (i.e. see review by Wang & Noe, 2010), less is known about how these relational factors could impact knowledge seeking. As a result, Study 1 qualitatively examined which social factors influenced knowledge seeking, while Study 2 specifically focused on the role trust played in knowledge seeking.

Study 1 asked what individual and social factors influenced tacit knowledge seeking. The findings found support for the relevance of Social Cognitive Theory when considering which individual cognitive factors may effect knowledge seeking. Specifically, self-efficacy and outcome expectations were both primary influencers of the motivation to seek knowledge from others. In particular, high seeking self-efficacy and low task self-efficacy influenced individual's motivation to seek. Seeking self-efficacy positively influenced the motivation to seek because seekers felt more confident in asking questions or less fearful of asking stupid questions, and this was found in both apprentice and expert groups. By contrast, apprentices who were less confident in completing their tasks were more motivated to seek. While some prior research has investigated the relationship between self-efficacy and related but distinct concepts of knowledge acquisition (Kanfer & Ackerman, 1989; Kim et al., 2011), this is the first known study to find evidence that seeking self-efficacy positively influences tacit knowledge seeking, while task self-efficacy negatively influences knowledge seeking. These results were corroborated within Study 2. This study hypothesised that seeking self-efficacy would positively effect both dyadic and collective knowledge seeking, and the learning process interpreting. This study also found a significant relationship between seeking self-efficacy and the frequency of knowledge seeking. Specifically, seeking self-efficacy positively

effected the frequency of both dyadic and collective seeking by junior doctors. Additionally, seeking self-efficacy also positively effected interpreting, suggesting that individuals must feel capable of engaging in dialogue and deciphering knowledge in order to interpret their knowledge and produce insights with others. Together, these findings show support for seeking self-efficacy as a significant factor to enabling both motivations to seek and seeking behaviours, by both junior and senior staff engaged in knowledge-based work and their engagement with the interpreting process which enables them to learn.

Study 1 also found that outcome expectations were a factor influencing the motivation to seek. The outcome expectations of seeking were informed by performance goals of quickly solving tasks across apprentice, journeymen and experts. This extends prior research which has linked the outcome expectations relating to the usefulness of seeking knowledge with using electronic repositories (He, Fang & Wei, 2009). These findings indicate the importance of performance related goals to the outcome expectations of interpersonal seeking. Study 2 therefore hypothesised the outcome expectations of seeking by examining the perceived usefulness of seeking knowledge to performing tasks well. This study also found a significant positive relationship between the outcome expectation of the usefulness of knowledge seeking, and the frequency of dyadic knowledge seeking but not collective seeking. Interestingly, the perceived usefulness of knowledge did not effect collective seeking. This could be explained by potentially differing outcome expectations of individuals engaged in seeking collectively.

Cumulatively, the results from both studies suggest that seekers must feel capable of seeking knowledge through asking the right questions, and must associate knowledge seeking with positive performance outcomes. In scenarios involving dyadic exchanges, those outcome expectations relate to the usefulness of seeking knowledge to performance and task goals. Therefore, the findings point to the salience of Social Cognitive Theory in motivating knowledge seeking, while also extending the current literature to suggest that various forms of efficacy can effect motivations to seek. It also points to the likelihood that apprentices may seek irrespective of their self-efficacy to seek when they have low levels of task self-efficacy. However, as individual's gain expertise in completing their tasks, seeking self-efficacy is more likely to be the differentiator in explaining the effect of efficacy on motivations to seek.

By contrast, Social Cognitive Theory did not reliably explain the individual factors which influenced knowledge acquisition. In Study 1, neither self-efficacy nor outcome expectations influenced knowledge acquisition. Instead, knowledge acquisition was most influenced by themes of knowledge seeking, interpreting and learning attitude. Specifically, seeking knowledge improved the likelihood of acquiring knowledge, and "interpreting" behaviours improved the understanding of that knowledge acquired. Interpreting involved the questioning and verbalisation of shared knowledge in

order to learn. Finally, the recipient's pro-learning attitudes also influenced knowledge acquisition. Those with a greater interest in learning from others were more likely to understand knowledge acquired. As a result of these findings, self-efficacy and perceived usefulness of seeking were not examined with relation to knowledge acquisition in study 2. However, in Study 2 seeking self-efficacy and outcome expectations of the usefulness of seeking knowledge did significantly and positively effect interpreting. Therefore, while the cognitive factors described in Social Cognitive Theory did not effect the acquisition of knowledge, they did effect the learning process by which individuals understood knowledge acquired (i.e. interpreting). This suggests that Social Cognitive Theory is a useful mechanism for understanding the individual cognitive factors which influence seeking, and the process of learning, both of which can lead to greater knowledge acquisition.

Additionally, this research found mixed support for Social Capital Theory as a lens to inform the social factors which influence knowledge seeking and acquisition. Study 1 found support for various structural factors which effect the opportunity to seek knowledge from specific others, such as access and close ties. As access to others is an important component of knowledge availability, access to the right people allowed seekers to identify the available providers they could seek knowledge from at the time they needed it. Access also increased seekers awareness of others expertise. Additionally, the development of close ties enabled seekers to form trusted networks of experts who could provide them with specific knowledge. These findings support prior research which has considered the effect structural factors such as relationship strength, access, and proximity have on knowledge seeking (Borgatti & Cross, 2003; Hansen, Mors & Løvås, 2005). Equally, close ties also influenced knowledge acquisition and sharing. This demonstrates the importance of relationship strength in particular to successful seeking, acquisition and sharing.

Relational factors, particularly observed behavioural norms influenced knowledge seeking, acquisition and sharing. In particular, perceived positive collaborative and pro-seeking norms improved individuals' attitude toward knowledge seeking. Pro-seeking norms enabled individuals to observe others seeking, and informed their expectations regarding the outcomes of seeking. Therefore, individuals who perceived positive norms of helping others and seeking help had more positive attitudes to seeking, while the reverse was also true. Additionally, collaborative norms also influenced knowledge acquisition, while norms of sharing (rather than seeking) influenced sharing behaviour. Additionally, norms of reciprocity influenced both knowledge acquisition and sharing. While the relational perspective of Social Capital Theory tends to focus on the salience of reciprocal norms, these findings suggest that other behavioural norms are pertinent to seeking, acquisition and sharing behaviours too. Study 2 used reciprocal norms as a control variable and found it had a significant negative effect on knowledge acquisition, and a significant positive effect on knowledge sharing. Therefore, expectations that sharing knowledge must be reciprocated was a cost to acquiring knowledge but an enabler of sharing that knowledge.

Another important relational factor investigated was trust. In study 1, trust particularly was an important component of the relational social capital which influenced seeking knowledge. Two forms of trust were considered across the two studies; professional or reliance-based trust and personal or disclosure-based trust. This two-dimensional model of trust is consistent with the view that people choose to trust in some ways but not in others (e.g. Gabarro, 1978; Lewis & Weigert, 1985), but has not been previously examined with relation to knowledge seeking. Study 1 found both professional and personal trust played an important role in determining who individuals would seek from specifically. Interestingly, while high professional and personal trust enabled decisions of whom to seek from, these forms of trust also acted as a boundary condition of seeking. In other words, if professional or personal trust were absent, individuals may not seek from specific people.

Study 2 focused on examining trusting behaviours, reliance on others and disclosing to others (Gillespie, 2003). However, Study 2 did not find a relationship between reliance-based trust and either dyadic or collective seeking, despite research suggesting that seekers select providers based on their level of knowledge (Hansen, Mors, & Løvås, 2005; He & Wei, 2009) and despite the results of Study 1. This is a curious contradiction between the two studies, which may be explained by the job specifics within the Study 2 research context. As a junior doctor's job role requires and expects hierarchical seeking from consultant doctors it is possible that junior doctor's reliance on their consultant's knowledge and expertise is immaterial to the frequency of their seeking behaviour. This is supported by job characteristics theory which suggests that in roles where seeking is key to completing a task, people may be "forced" or expected to seek (Foss, Minbaeva, Pedersen, & Reinholt, 2009; Hackman & Oldham, 1976) and this is likely to impact on their seeking behaviours (Sergeeva & Andreeva, 2015). Therefore, as junior doctors may feel they are expected to seek from consultants, their seeking behaviours are not informed by reliance-based trust – although this does not hold in different contexts as the findings in Study 1 demonstrate. Therefore, reliance-based trust may be more pertinent to seeking decisions in contexts where the job specifics do not demand knowledge seeking as a requirement. In addition, Study 2 did find a significant positive effect between reliance-based trust and the two learning variables measured; interpreting and knowledge acquisition. Therefore, reliance on other's knowledge did effect the individuals interpreting process, in that reliance on others may be necessary to reach shared understandings by verbalising knowledge and insights. Additionally, reliance on others informs the frequency to which individuals choose to acquire knowledge. Therefore, while reliance on others may not inform knowledge seeking, it does inform the success of knowledge seeking by enabling individuals' acquisition of knowledge sought.

Study 2 also found that disclosure-based trust significantly effected collective seeking, but did not have a significant effect on dyadic seeking. Therefore, disclosure-based trust was pertinent only to collective seeking. As collective seeking requires interacting with many people of varying levels

of expertise, seekers must be vulnerable and willing to disclose their lack of knowledge or other personal information to groups. This study is the first to demonstrate at the individual level of analysis that disclosure-based trust is particularly important for collective knowledge seeking from superiors. Additionally, disclosure-based trust also significantly effected interpreting and frequency of knowledge acquisition. This supports prior research showing useful knowledge acquisition depends on trusting relationships (Adler, 2002; De Long & Fahey, 2000; Locke, 1999; Lucas, 2005; McAllister, 1995; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998), and in particular reliance- and disclosure-based behaviours (Alexopoulous & Buckley, 2013). However, it also expands current research by demonstrating the effect disclosure-based trust has on interpreting knowledge sought. Overall, the findings pertaining to norms and trust demonstrate that Social Capital Theory can help to explain seeking within specific contexts, as well as the successful outcome of seeking - the acquisition of useful knowledge and the interpreting process by which knowledge sought is understood.

Overall, the empirical evidence within this thesis supports the perspective that knowledge seeking is motivated by both individual such as self-efficacy and outcome expectations across both contexts. However, social factors of reliance (professional) and disclosure-based (personal) trust only effect seeking within certain contexts. Specifically, it is likely that in jobs which do not demand knowledge seeking as a requirement, both professional and personal trust play a more important role in explaining decisions to seek from specific others. This supports theories such as Social Cognitive Theory which suggests cognitive and environmental factors influence individual behaviour (Bandura, 1986) and theories such as Social Capital Theory which examines the valuable resources help in relationships between provider and recipient. In addition, this thesis shows that the factors which influence seeking are largely distinct from those factors which influence acquisition and sharing within this thesis, and in prior literature. As a result, these research findings broadly support the investigation of seeking and acquisition behaviours as distinct yet interrelated concepts with different antecedents, and builds on research which has begun to examine knowledge seeking as an independent construct (e.g. Gray & Meister, 2004, 2006; Hansen, Mors, & Løvås, 2005; Wang et al., 2014). Therefore, these findings can help to explain inconsistencies in antecedents of sharing within existing literature, by considering that the importance of these individual and social factors may differ for interpersonal seeking and sharing. Therefore, at least in the Irish context of knowledge workers sampled, investigating knowledge seeking is an important and worthwhile research endeavour when examining how to encourage successful seeking and acquisition.

Research Question 2: How do knowledge seeking behaviours improve the learning outcomes of the recipient?

Realising the value of tacit knowledge is a difficult knowledge management challenge and much existing literature has attempted to understand how tacit knowledge is best shared and learned effectively. One measure of successful knowledge sharing is informed by the extent to which the recipient acquires and learns that knowledge. Therefore, investigating the value of knowledge seeking to acquiring tacit knowledge is valuable to further the understanding of effective knowledge sharing interactions. However, theories which address knowledge sharing either within the context of creating tacit knowledge such as SECI (Nonaka & Takeuchi, 1995) or steps involved in organisational learning such as the 4i organisational framework (Crossan et al., 1999) have overlooked the proactive behaviour of knowledge seeking and its effect on improving individuals acquisition of others knowledge, particularly in the context of learning tacit knowledge. Prior research has confirmed that knowledge seeking from various sources can lead to better learning outcomes and effectiveness (Gray & Meister, 2004; 2006; Wang et al., 2014; Kankanhalli et al., 2011) and allow seekers to resolve problems, accomplish more complex tasks, and make decisions more effectively (Gray & Meister, 2004; Gray & Durcikova, 2005). However, this prior research has not elucidated whether learning outcomes remain the same in the context of high tacit knowledge, or examined how seeking knowledge may enable effective knowledge acquisition. The SECI model (Nonaka & Takeuchi, 1995) centers around the premise that shared knowledge is "converted" from tacit knowledge to explicit knowledge, or exchanged through a "socialisation" process. However, this model does not explain the processes that enable this conversion and ensure that knowledge made explicit is understood and learned (Freyens & Martin, 2007; Gourlay, 2003; 2006; McIver, 2012). Therefore, this research drew from the 4i Organisational Learning Framework to understand how the individual understands and learns knowledge shared. This framework proposes that "interpreting" is a process by which individuals may understanding knowledge shared through verbalising insights shared (Crossan et al., 1999). As a result, interpreting as a process of understanding was proposed to explain how knowledge seeking can lead to effective knowledge acquisition in the context of highly tacit knowledge.

Study 1 found support for the proposition that interpreting can explain how seeking leads to acquisition. Study 1 investigated tacit knowledge through examining the knowledge required to solve non-routine problems. This study found that proactive seeking was a frequently used and useful strategy to best acquire this knowledge from others, but also demonstrated that individuals who also engaged in the interpreting process allowed seekers to best understand this knowledge. Therefore, the findings illustrated how knowledge seeking can enable effective knowledge acquisition, as initiating contact with the knowledge provider enhanced the providers' willingness to share and face-to-face seeking enabled understanding as the provider was more likely to thoroughly help. Additionally, the process of interpreting was an important theme in describing how individuals understood tacit knowledge from others. The interpreting process in this context was a proactive one, in which the seeker directed the interaction in order to best learn through active questioning of the

provider. This enabled better understanding as the seeker engaged in an active process of trying to understand through verbalisation of insights and probing of the providers knowledge.

Study 2 measured knowledge seeking, acquisition and sharing in relation to interpreting process described within the 4i organisational learning framework to understand how seeking and sharing interacted with interpreting, and investigated whether interpreting aids knowledge acquisition. This study found that while dyadic seeking had a direct positive effect on acquisition, it had a negative effect on interpreting. Therefore, while findings did not support the mediating role of interpreting in the relationship between dyadic seeking and knowledge acquisition, there was a positive and significant direct relationship. Collective seeking had both a positive direct and indirect effect on acquisition, through interpreting. Additionally, knowledge sharing had a direct positive effect on interpreting. Therefore, interpreting only mediated the relationship between collective seeking and acquisition. This study also tested the moderating effect of tacit knowledge on the relationship between collective seeking and interpreting. The direct relationships between tacit knowledge and interpreting was negative, which demonstrates the difficulty of learning tacit knowledge. Therefore, the moderating effect of tacit knowledge highlights that the difficulty of learning tacit knowledge can be eased when the recipient seeks knowledge within groups. In other words, collective seeking is an effective method to interpret tacit knowledge specifically, which extends existing literature examining collective methods of learning, such as communities of practice (Lave & Wenger, 1991) by showing that collective seeking is an effective mechanism by which to acquire tacit practices and advice. These findings specifically suggest that the interpreting process could be one mechanism by which tacit knowledge is acquired. Cumulatively, these findings take a step toward addressing the overlooked recipient within the knowledge sharing process, and improves the understanding of the role recipients can play in self-directing their learning through knowledge seeking.

5.2 Research Contributions

5.2.1 Theoretical Contributions

This thesis offers a number of valuable theoretical contributions to knowledge sharing literature. This is the first known empirical study to compare the individual and social factors which influence knowledge seeking, acquisition and sharing distinctly. Despite literature acknowledging seeking as a separate phase of knowledge sharing (Hansen et al., 2005; Zhang, 2020), and research describing the necessity of both provider sharing and recipient acquisition of knowledge (Argote & Ingram, 2000; Hansen, 1999), no prior study has compared the individual and social factors which effect all three processes within the same context. In doing so, this thesis empirically shows that seeking, acquisition and sharing behaviours are influenced by differing individual factors. This challenges the existing literature which has measured seeking and sharing as a combined concept

(e.g. van den Hoodd & van Weenen, 2004; Yin, 2007) and assumed that the factors influencing this combined measure explained both behaviours. Recent research suggests that seeking knowledge can improve the providers willingness to share (Zhang et al., 2015), therefore seeking can be a good strategy for increasing the likelihood of acquiring knowledge from reluctant providers. Study 1 shows that knowledge hoarding, or the reluctance of providers to share their knowledge, was a norm within the manufacturing context. However, by exploring the factors which influence knowledge seeking, this research provides a better understanding of the factors which may encourage individuals to seek out knowledge and reduce these barriers to seeking and acquiring knowledge from others. For example, one barrier to knowledge seeking is the personal risk of appearing incompetent to others. This is exacerbated by low levels of self-efficacy to seek, and both study 1 and 2 support the contention that high levels of seeking self-efficacy will encourage the motivation to seek and more frequent dyadic and collective knowledge seeking interactions. However, prior research has tended to examine the self-efficacy of providers rather than seekers (e.g. Lin, 2007; Yang & Farn, 2010) which does not indicate the likelihood of seeking behaviours. Another factor which mitigates the personal risk of seeking knowledge is disclosure-based trust. As Study 1 revealed, high disclosure-based trust in specific others can overcome the seekers fear of appearing incompetent and improve the likelihood of future seeking behaviour. Disclosure-based trust is also a necessary condition enabling the interpreting of knowledge. Therefore, this research shows the importance of seekers trusting behaviours, advancing current research which tends to examine the trusting behaviours of providers and its effect on knowledge sharing (e.g. Lee et al., 2010).

This thesis also advances knowledge seeking literature (e.g. Gray & Meister, 2004, 2006; Hansen et al., 2005; De Vries, van den Hooff & de Ridder; 2006; Tohidinia & Mosakhani, 2010; Zhang & Chen, 2018) by exploring the individual and social influencers of tacit knowledge seeking to understand how these relationships inter-relate (Study 1). Additionally, this research elucidating different dimensions of interpersonal knowledge seeking such as the motivation to seek, the decision of whom to seek from (Study 1) and frequency of seeking behaviours (Study 2) and highlights how individual and social factors differently influence these dimensions. Specifically, Study 1 supports prior research which has shown that outcome expectations, collaborative norms, close ties, recognition of expertise, access and trust influence seeking (Hansen, 1999; Cross & Borgatti, 2003; Hansen et al., 2005; Bock, Kankanhalli and Sharma, 2006; He, Fang and Wei, 2009; Zhang & Chen, 2018), however this research provides a more nuanced understanding of these relationships as it is evident that factors such as outcome expectations and collaborative norms influence the motivation to seek through improving individuals expectations of the usefulness of seeking knowledge, while factors such as close ties, recognition of expertise, access and trust influence the decision of whom to seek from through evaluating potential knowledge providers. Furthermore, findings indicate that these relationships inter-relate, as factors such as reliance-based and disclosure-based trust enhance the development of close ties which improve the likelihood of repeated knowledge seeking attempts.

This advances our understanding of how existing variables intercorrelate and provides a more nuanced view of seeking decisions. Additionally, both studies are the first to examine the influence of seeking self-efficacy on interpersonal knowledge seeking, while Study 2 is the first to examine the moderating effect of reliance- and disclosure-based trust on dyadic and collective knowledge seeking, although prior research has examined the effect of interpersonal trust, cognitive and affect-based trust on knowledge seeking (Chen & Hung, 2010; Zhang & Chen, 2018). Additionally, as dyadic and collective seeking have slightly different influencers and outcomes (Study 2), this extends the prior literature on knowledge seeking by investigating factors which influence collective and dyadic seeking. As this research shows that outcome expectations of dyadic and collective seeking are different, it can be surmised that the cognitive factors which motivate dyadic and collective seeking are not interchangeable. Trusting behaviours such as disclosure of personal information influence seeking knowledge from collectives, not dyadic interactions. These findings together suggest that seeking from groups requires different decisions and motivations to seeking one-to-one. Therefore, this thesis extends the empirical evidence regarding factors which effect interpersonal knowledge seeking. This has allowed a better understanding of how both knowledge seeking and sharing can be influenced, and elucidates the value in theoretically and empirically separating these behaviours.

Secondly, this thesis employed the 4i organisational learning framework (Crossan et al., 1999), in order to conceptualise and operationalise the process of learning individuals engage in when sharing knowledge with each other. This comes amidst calls to empirically examine the 4i framework (Crossan, Maurer, & White, 2011). While the 4i framework is a well-known framework within the OL literature, it has not yet (1) been integrated or tested with the knowledge processes frequently examined in the KM literature such as knowledge seeking or sharing (2) examined from the perspective of the knowledge seeker (3) tested in relation to the effect tacit knowledge may have on the efficacy of its processes. Given the calls to link learning literature to KM research (Chiva & Alegre, 2005) and to better understand how learning processes interact with knowledge at various levels of the organisation (Castaneda, 2007) this is rather surprising. This thesis extends the understanding of the 4i framework by demonstrating how interpreting leads to outcomes of knowledge acquisition and understanding across several contexts (i.e. engineers, technicians and junior doctors), and by examining how knowledge seeking can enable effective knowledge acquisition, thereby increasing the success of the knowledge sharing interaction.

Specifically, study 1 illustrates how proactive seeking and questioning within the interpreting process enables better understanding and acquisition in the context of learning tacit knowledge. The findings suggest that knowledge seeking may be a more intentional aspect of the "attending" process proposed by (Bontis et al., 2002) which can lead to interpreting. Interpreting behaviours by the seeker include verbalising insights but also require a proactive attempt to learn by

questioning the provider to aid understanding. In other words, interpreting can go beyond verbalising thoughts and insights, but is also an attempt to understand other's thoughts. Study 2 demonstrated the mediating effect of interpreting in the relationship between collective knowledge seeking and knowledge acquisition. However, interpreting was not a significant mediator of the relationship between dyadic knowledge seeking and knowledge acquisition. This shows that the method individuals use to interpret knowledge may also be different for dyadic and collective seeking. Therefore, these findings extend theory to show that different methods of seeking are not as interchangeable as the KM literature might suggest, which aligns with Gray and Meister (2006) who showed that dyadic and collective seeking have different performance outcomes. As such, research on knowledge sharing needs to fully incorporate the phase level of knowledge sharing in an organisation by acknowledging the role knowledge seeking through various methods play in successful acquisition of knowledge. Additionally, Study 2 shows that seeking knowledge from a collective group specifically can enable the process of interpreting in the context of high tacit knowledge specifically. Therefore, findings illustrate what methods employees can use to learn from others when engaged in highly tacit tasks. This advances research which has examined the difficulty of transferring tacit knowledge (e.g. Hansen, Nohria, & Tierney, 1999; Szulanksi, 1996) to show how recipient strategies such as collective seeking can overcome the difficulty in sharing and acquiring tacit knowledge. Overall, these findings extend understanding of the 4i Learning Framework by showing how interpreting interacts with the knowledge processes and behaviours examined in the knowledge management and organisational knowledge literatures, specifically knowledge seeking, sharing and acquisition. This elucidates how learning theories can aid understanding of effective knowledge sharing, by examining learning from the recipient perspective and specifically by demonstrating the recipient behaviors which enable learning. Therefore, knowledge seeking emerged as one influencer of interpreting knowledge which can explain why and how seeking can lead to better acquisition (study 1), and illustrates that collective seeking can lead to better interpreting of tacit knowledge (study 2).

5.2.2 Methodological Contributions

Another contribution of this research relates to the research method logy employed. This study applied a two-stage sequential mixed methods research design. The large majority of existing research on knowledge seeking utilises a quantitative research survey. While survey research provides some valuable insights into the influence of a variety of factors on seeking, examining the complex nature of *tacit knowledge* seeking between people, including its antecedents and outcomes, requires a more comprehensive approach. Mixed methods are viewed as superior to single method studies when the phenomenon of interest is complex (Tefflie & Tashakkori, 2009). Mixed methods studies can be applied to develop a more comprehensive understanding of a phenomenon (Venkatesh et al., 2013). However, there is a paucity of studies which utilise a mixed methods approach to

examine the knowledge seeking, and indeed the broader knowledge sharing literature (Sergeeva & Andreeva, 2015). The conceptual and methodological disclarity in knowledge sharing research has been well cited (Hansen et al., 2005; Sergeeva & Andreeva, 2015; 2016), and this study addresses these concerns by providing a comprehensive picture of the decisions involved in knowledge seeking behaviour, as well as the transference of constructs from qualitative to quantitative methods. This is the first known study which measures seeking, acquisition and sharing distinctly, despite the recognition in literature that they are separate behaviours (Hansen et al., 2005; Kim, Song, & Jones, 2011). In using mixed methods, the thesis findings can produce greater clarity and confidence in specific drivers of each behaviour as there is evidence of generalisation across two separate industry contexts and across methodologies.

This research is also one of a few studies to measure tacit knowledge and its effect on seeking and learning behaviours. Few prior studies have measured tacit knowledge in relation to knowledge seeking (e.g. Hansen et al., 2005) and none have examined how tacit knowledge moderates the relationship between seeking and interpreting or other learning processes. This extends research investigating how tacit knowledge can be best shared and learned, and therefore increases understanding on how to promote successful knowledge sharing.

5.2.3 Practical Implications

This thesis provides insight for organisations and practitioners striving to encourage employee's knowledge sharing in the context of highly tacit tasks. Previous literature has found inconsistent results regarding practices which incentivise knowledge sharing. However, little of this research looks at practices which may incentivise knowledge seeking specifically. As this research illustrates that knowledge seeking can aid the useful acquisition of knowledge, and builds on prior research which has shown that providers are more willing to share when directly asked for help (Zhang & Chen., 2018), this research suggests to practitioners that they focus on encouraging employees to seek knowledge in order to gain the learning outcomes desired from the knowledge sharing. Practitioners therefore may want to find ways to incentivise knowledge seeking, with the knowledge that this could indirectly increase knowledge sharing behaviour.

Study 1 and 2 has found that certain cognitive factors facilitate motivations to seek and frequency of seeking, such as self-efficacy to seek and positive outcome expectations from seeking. Organisations may also facilitate the development of seeking self-efficacy through developing people's mastery experiences, prioritising performance feedback and incorporating positive observational and vicarious learning practices (Bandura, 1986). In addition, study 1 provides some insight into when and how the outcome expectations may result in seeking behaviours. For example, when job performance goals align with expected outcomes of seeking, people are more likely to seek regardless of the risk in seeking knowledge and displaying a lack of

knowledge. Therefore, practitioners may encourage employees to complete their tasks to a high standard and quickly, as well as encouraging people to seek advice from others.

In addition, qualitative results show that having the behavioural norms which support the behaviours of giving help and asking for help influence the motivation to seek, learn and share. Therefore, organisations must consider the patterns of behaviour displayed by expert employees in the organisation.

Furthermore, while reliance-based trust was also important in deciding who to seek from in Study 1, both studies demonstrate the importance of high personal trust or disclosing behaviours to encourage motivations to seek (study 1) and interpret and acquire knowledge (Study 2). Organisations must encourage and facilitate the development of high trusting relationships, especially between junior staff and their superiors when knowledge needed must be sought. Study 2 demonstrates the consequence of low disclosing behaviours, in which individuals may still choose to seek knowledge from another but may disregard that knowledge or choose not to engage in learning behaviours such as interpreting. Likewise, Study 1 shows that personal or disclosure-based trust can be damaged by negative interactions between provider and seeker, in which the seeker witnesses an unwillingness to help from the provider or worse, in which the provider ridicules or teases the seeker for asking questions. This behaviour may deter seekers from choosing the same person to seek from, if there is another choice. Therefore, organisations should incorporate trust-building practices to encourage cooperation. The fragility of trust and its vulnerability in the face of trust undermining events (Kramer, 1999) suggests that the early interactions between employees matter in forming or breaking potential trusting relationships. Therefore, organisations who wish to encourage knowledge seeking must optimise the opportunities for positive and supportive interaction, through activities such as team-building (Dirks, 1999).

Finally, it is clear from the findings that learning in a high tacit context is aided by collective seeking. As a result, organisations should facilitate social and group learning for employees engaged in complex tasks which require highly tacit knowledge. For example, organisations could encourage teams engaging in group reflection or promote discussion with colleagues (Froehlich et al., 2015)

5.3 5.3 Limitations and Future Research

Despite the contributions this study makes to research and practice, there are a number of limitations that should be noted. The first limitation relates to the comprehensiveness of the research framework presented for understanding interpersonal knowledge seeking. This research leveraged a number of theories and examined several variables qualitatively and quantitatively. Therefore, this

study represents a starting point for exploring the role specific cognitive and social factors play in influencing tacit knowledge seeking as distinct from acquisition and sharing, as well as understanding the role seeking plays in interpreting and acquiring tacit knowledge. However, the framework does not include all factors which may influence tacit knowledge seeking, or acknowledge all possible theoretical perspectives that may explain knowledge seeking.

The main objective of this study was to measure individual level knowledge seeking behaviours as opposed to team, organisational or intra-organisational knowledge seeking. Therefore, the study findings should be considered in that context, as whilst it is critical to understand the factors that influence individual knowledge seeking, these my not be the factors which influence team or organisational level factors. However, knowledge seeking can occur across all levels of an organisation (Gray, Wang, & Meister, 2014) and future research engaged in team and organisational level knowledge sharing research should consider knowledge seeking as a separate process to sharing, with different antecedents.

Additionally, as this research was not exhaustive, there are a number of factors not examined within this study which may also influence knowledge seeking at various stages. For example, the literature review revealed that organisational culture factors such as communication climate (van den Hoof & de Ridder, 2004), organisational commitment, job satisfaction (de Vries, can den Hoof & de Ridder, 2006) influenced knowledge seeking, but these factors were not investigated empirically in this research. Therefore, future research may wish to expand upon this framework by investigating alternative factors which may influence knowledge seeking. Theoretically, recent literature has called for multi-level research of knowledge processes using the Coleman bathtub model from a micro-foundations perspective (Foss & Pedersen, 2019). The micro-foundations argument suggests that contextual factors, such climate or commitment, may influence knowledge seeking outcomes because that influence is mediated by individual action and interaction. This theoretical perspective could be an interesting way to examine the links between organisational level variables and the individual and social level variables that this study examined as they relate to knowledge seeking.

Additionally, this research explored a number of themes which emerged from the qualitative data that influenced various motivations and decisions to seek. Future research could test the significance of these variables in explaining behaviour, as decisions to seek may not always lead to behaviours. For example, the qualitative findings suggest that recognising expertise, close ties and collaborative norms influence decisions to seek from specific others. This research also examined various aspects of knowledge seeking across two studies using different methodologies; in Study 1 both the motivation to seek and the decision to seek from specific others were explored, and in Study 2 the frequency of seeking from dyadic and collective sources were measured. These represent various dimensions of seeking, which are influenced in nuanced distinct ways. Therefore, future

research should further examine the differing role various individual and social factors play in explaining these dimensions of seeking behaviour, and how they may impact acquisition outcomes differently.

Secondly, Study 2 used a cross-sectional research design. Therefore, the possibility of determining the direction of causality is severely limited. This limits the ability to make causal assertions and does not allow ruling out alternative explanations. For example, we argue that collective seeking and interpreting produce knowledge acquisition in high tacit contexts, however it is possible to derive alternative causal explanations. For instance, the frequency of knowledge acquisition might result in greater levels of interpreting, and this interpretative process could in turn lead to more frequent seeking. In addition, it is evident that there is a temporal component to some of the variables evidenced in this study. For example, the qualitative study suggested that both reliance and disclosure-based trust were dependent on prior interactions with specific providers. Yet, in the quantitative study these trust behaviours did not all effect dyadic and collective knowledge seeking behaviours directly. As cross-sectional data only captures relationships at one time point, it is less evident how repeated interactions may change the significance of these relationships to knowledge seeking over time. This is worthy of further consideration in future research to clarify causal relationships. Future research should consider longitudinal research designs that can capture whether frequency of seeking over time leads to better learning outcomes. This methodology would be better able to assess nonlinear relations (i.e. reverse causation) (Cole & Maxwell, 2003). Additionally, longitudinal data would be useful to measure changes in seeking behaviours over time and the variables that are stronger predictors of seeking knowledge at different time points.

Finally, all the measures in this study were self-reported measures. The reliance on self-report data contributed to common method variance problems. While we employed design procedures to ameliorate such problems (*e.g.*, varied response formats across scales, see Podsakoff et al., 2012) and accounted for the common factor when computing the variables during the confirmatory factor analysis, future research could include objective measures of outcome variables instead, such as performance. Moreover, our dataset does not allow us to directly consider the quality of knowledge seeking and acquisition, or use and application of knowledge once acquired. However, note that we indirectly capture the quality of knowledge acquired, as our measures of self-reported knowledge seeking and acquisition asked recipients to specifically refer to their ability to complete complex tasks. Therefore, we implicitly asked junior doctors about the extent to which knowledge seeking and acquisition led to the ability to perform relevant tasks. We also measured the perceived usefulness of seeking knowledge, which links seeking knowledge with performance outcomes of accomplishing tasks, such as productivity, performance and accomplishing tasks more quickly. Nonetheless, it would be preferable that future research consider investigating the expected association between seeking knowledge and the quality of knowledge acquisition with the

performance measures to judge the application of that knowledge for specific tasks. These relationships could also be better assessed by triangulating self-reported performance with independent performance ratings. Given the existing research linking knowledge sharing and performance (e.g. Srivastava, Bartol & Locke, 2006), it would be interesting to assess the importance of knowledge seeking, as a phase of knowledge sharing, to these same performance metrics.

5.4 Conclusions

Despite the limitations outlined in the previous section, this study makes several valuable contributions to the knowledge seeking and sharing literature. These contributions include strong empirical support for the investigation of knowledge seeking as a distinct construct to knowledge sharing. Several relationships are empirically supported either in the qualitative or quantitative data including antecedents to interpersonal knowledge seeking, interpreting as a mediator between seeking and acquisition, and moderating factors such as disclosure-based trust. The study extends knowledge sharing literature, the 4i learning framework, and tests Social Cognitive Theory and Social Capital Theory in the context of seeking. This provides a more comprehensive understanding of the impact of cognitive and relational factors on knowledge seeking, as well as the effect of knowledge seeking on learning processes. This framework can be retested and developed further in future research. The insights from this study can be leveraged by HR practitioners and managers interested in encouraging workplace learning.

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APPENDICES

APPENDIX A: Interview Schedule

Participant Demographics	1. Title 2. Position 3. Length of time in current role 4. Length of time in company 5. What is your background in terms of education and training? 6. What is your role and the tasks within the role you do now 7. To what extent does your current role utilise the knowledge you acquired from a) your education and b) training 8. Length of time in this role with this task 9. Do you have opportunity for job rotations? Explain 10. What other roles and tasks have you worked in 11. How similar are these to the role and tasks you perform now? Explain. 12. What elements of your current role do you find: a. Most rewarding b. Enjoy the least c. Why? 13. In the last year have you undertaken any other training, education either formal or on-the-job? a. What was this for? b. what did it focus on?
Describing & Categorising Job Tasks	3 Categories in Company Maintenance Technician Work **1.** Preventative Maintenance (Proactive) **2.** Maintenance on a machine break down which is sudden (Reactive) **3.** Improvement of Maintenance Approaches (Proactive) In relation to your job as a maintenance technician can you tell me: What value is this job element to a) your job b) the unit and c) the company? Why? **Describe: How did you first learn to do this job element? Probe** 1. Evaluate: To what extent did this prepare you for doing the job in real-life circumstances? 2. How effective was this method of teaching you about this job element? Why? 3. Improve: Anything about this way that could be improved or better? 4. **Did you ever experience situations after you first started working on this job element when you did not know what to do?** 5. **Describe: How did you find out how to do it?** 6. Evaluate: How effective was this way of finding out how to do this job element? Any challenges with this method? 7. Improve: Anything about this way that could be improved or better? 8. How much time (as a %) do you spend in your job looking for the knowledge that you need to do the job?
Critical Incidents/ Examples	**In relation to the Non-Routine/Reactive Maintenance element of your job:** Can you give me one **example (**you may need to push for 3 examples if the examples given are weak in helping understanding the persons tacit knowledge retrieval, access and sharing habits and working with others) of a non-routine task that you have conducted in the last 6 months? (note example) In relation to this (example) can you describe the task?
Task Description	**1.** What triggers the beginning of this task? **2.** What did you do to execute the task? **3.** How do you know the task is completed successfully? **4.** What procedures are required for this task? **5.** How effective are they? **6.** To what extent do they match the actual process?

	7. Where can they be <u>improved?</u> **Are there opportunities to <u>work-around</u> the procedures or are there unwritten practices that happen that enable the work to get done but are not proceduralised? Tell me about them? Why are they not proceduralised?**
Information Requirements & Process	• <u>Describe:</u> What information do you need to conduct the task? • <u>Retrieve:</u> Where do you get this information from? • Is there anywhere else to get this information?
Critical Incidents	**In relation to the Non-Routine/Reactive Maintenance example you `provided (repeat the below with an introduction to each of the provided examples).**
Knowledge Requirements	• <u>Describe:</u> What knowledge do you need to conduct the task? • Describe the knowledge you need to do this task? • Have you learnt much about your role from your peers? i. What? ii. Whom have you learnt most from? iii. What obstacles are there to helping your learn from your peers?
Knowledge Management Process	Pose each of these questions, where relevant, for each of the examples given by interviewee: RETRIEVE Where did you get this knowledge from? • Is there anywhere else to get this knowledge? • Why do you choose this option? • <u>Evaluate:</u> How effective is this as a way for you to get the knowledge that you need? • Why? • How could it be improved? SEEK • How do <u>you go about</u> getting this knowledge from here? • Are there any challenges or difficulties for you or others in getting this knowledge this way? • How do you know where to get it? • Why do you go to this source? ACCESS • What do you have to do to get this knowledge? What is the process you have to go through? • Is this knowledge available on systems/technologically based systems? Do you use these? Why/why not/to what extent? • <u>Evaluate:</u> How effective is this process/mechanism? Is there anything that needs to be done to improve it? • Are there examples of knowledge that you need that you cannot get access to or find great difficulty in accessing? What knowledge were you looking for? Explain the difficulties. • Are you aware, either personally or otherwise, of incidences where someone has asked for this type of knowledge and the answer has not been provided? i. Why was it not provided? ii. Whom asked? iii. Whom did not answer? iv. Why did they not answer? v. How often does this happen?

	vi. What can be done/needs to be done to improve this? Capture • What do you need to do to enable you to understand this knowledge? How do you go about understanding this knowledge from this other source? • What do you need to know to be able to understand this knowledge sufficiently? Store • What do you do with this knowledge once you get it (capture it)? • What would you do if you needed this same knowledge a second time? • Is there any method available to you that you use to store it so that you have it for future reference? • Evaluate: How effective is this method? Why? • How comfortable are you with using technology based media for storing/accessing knowledge (specify the media that the participant cited). Why? • Are there procedures for recording a) new solutions b) new ideas. Tell me about them? • Do you use these mechanisms and why/why not?/to what extent? Transfer • To what extent can you take this knowledge and use it on the task? Explain • Evaluate: Are there any challenges to you trying to use this knowledge on the task? • What could be done to make this easier? • What do you find is the easiest way for you to be given/take others knowledge/knowledge from elsewhere and be able to understand it? Probe Verbal, Visual, Words, Pictures • How similar is this knowledge to what you already know? Explain Share • Are there occasions when your knowledge of this task is useful for others when they are conducting the task? • If others need your knowledge of the task how would they go about accessing it? • Was there any incidence in the last 6 months when someone required your knowledge of this task in order to enable them to do this task or a similar task? • What happened? i. Beginning of the interaction ii. What took place during the interaction iii. When did the interaction end • How did you feel about engaging in this interaction? • Evaluate: Was there anything difficult about engaging in this interaction? • What did you do to help them understand your knowledge? • Is there anything that could be done to have made it easier or improve it? • If you were to come up with some good/new/better way of doing something in this task: i. What would you do with the idea? ii. Is there any benefit to you to sharing it? iii. Why would you want to let others know about it? iv. How would you go about sharing it? • Whom usually, in the last 6 months, comes to you looking for knowledge? (names)

Social Network	**Non-Routine/Reactive Maintenance** In relation to you work as a maintenance technician and the reactive maintenance tasks you perform can you tell me: Whom do you most frequently work with to get the knowledge you need to do this task? (continue using this list and ask questions in table 1.)
Knowledge Descriptor Exercise	• Can you take these cards please and take your time and select the cards/words/phrases that best represent the type of knowledge you have to work with in here? • Get the participant to discuss and explain why each and all cards represent the knowledge s/he DOES and DOES NOT work with. • Is there anything else we missed that you could tell us about that would help us better understand and find ways to improve how knowledge is accessed, understood or shared in this unit?
	On average, how do <u>you get access to</u> each of these types of knowledge you need to do your work o 1 – *never* need to get access to this o 2 – get access by *requesting* it and to *specific persons/media* o 3 – get access by *request*ing it from *everybody in the unit/searching all media* o 4 – get access by *it being supplied to me unrequested* by *specific persons/stored by them on media voluntarily* o 5 – get access by it *being supplied to me unrequested* by *everybody/voluntarily stored by them on media* • experience-based, learning by doing etc. type knowledge • conceptual skills and cognitive abilities etc. type knowledge • shared understandings between co-workers, incidents, etc. type knowledge • Company specific routines and procedures, etc. type knowledge • manuals and job procedures etc. type knowledge
	On average, how do you share each type of knowledge you possess 1 – never 2 – on request and to specific persons 3 – on request to everybody 4 – unrequested to specific persons 5 – unrequested to everybody[i] • experience-based, learning by doing etc. type knowledge • conceptual skills and cognitive abilities etc. type knowledge • shared understandings between co-workers, incidents, etc. type knowledge • Company specific routines and procedures, etc. type knowledge • manuals and job procedures etc. type knowledge

Table A- 1: Interview Schedule ctd -

Name	**1**	**2**	**3**
What for			
What knowledge do they have that you need			
How frequently do you go to this person for knowledge (1-5; 5 being very frequently?			
How close are you to this person (1-5 5 being very close)			

Why do you go to this person for this knowledge specifically?	• What personal attributes makes them someone you go to?			
Was the knowledge they provided useful (1-5 very useful)				
Why? Or How?				
Did you use that knowledge? Implement it? How?				
How difficult was it for you or were there any challenges to you understanding this person's knowledge? (1-5 very difficult)				
Why? What were the difficulties?				

APPENDIX B: Ethical approval

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

DCU

22nd May 2015

Dr Finian Buckley
DCU Business School

REC Reference: **DCUREC/2015/157**

Proposal Title: **A Proposed investigation of the role of trust, norms and Self-efficacy in seeking and sharing tacit knowledge**

Applicant(s): **Dr Finian Buckley; Dr Claire Gubbins; Ms Jennifer Kennedy;**

Dear Finian,

This research proposal qualifies under our Notification Procedure, as a low risk social research project. Therefore, the DCU Research Ethics Committee approves this project.

Materials used to recruit participants should state that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee.

Should substantial modifications to the research protocol be required at a later stage, a further submission should be made to the REC.

Yours sincerely,

Dónal O'Mathúna

Dr Dónal O'Mathúna
Chairperson
DCU Research Ethics Committee

DCU
Research & Innovation

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APPENDIX C: Sample Survey

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

Business School, Dublin City University
Royal College of Physicians in Ireland

Tacit Knowledge Seeking Survey :
For Basic Specialist Trainees

Department: Dublin City University Business School

Principal Investigators: Jennifer Kennedy (jennifer.kennedy29@mail.dcu.ie), Dr. Claire Gubbins, Dr. Finian Buckley.

Introduction to the Research Study
You have been invited to be part of a research project for DCU Business School. The research study will investigate how people seek, learn, and share their "tacit" or experience-based knowledge in the workplace. Factors such as workplace trust, norms of collaboration and capability will also be assessed as potential contributing factors to effective knowledge seeking, learning, and sharing.

Details of what involvement the Research Project will require:
This research study will require you to complete an online survey. The survey consists of 34 questions and should take approximately 30 minutes to complete. There are no potential risks associated with the study for the participants. The surveys are anonymous and involvement/non-involvement is voluntary. The confidentiality of any information provided is subject to legal limitations and will be destroyed upon completion of the research analysis. Participants may withdraw from the Research Study at any point. There will be no penalty for withdrawing from the study. Completion of the survey is taken as an indication of your consent to participate in this project.

For more information regarding this research please contact: jennifer.kennedy29@mail.dcu.ie

If you have concerns about this study and wish to contact an independent person, please contact:
The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000

SECTION 1: KNOWLEDGE SEEKING

These questions investigate the knowledge you actively seek from co-workers at a higher level than you, either your supervisor or registrars. When answering these questions **please consider a recent situation (in the last month) in which you had to complete a difficult task, or solve a complex problem you weren't initially sure of the answer to**.

We are most interested in the type of knowledge that is acquired and improved through experience, such as formulating a management plan for a complex case/similar experience-based task.

1. The following statements are about *seeking* complex, skill-based knowledge from others

	MORE THAN ONCE A DAY	DAILY	FIVE TIMES A WEEK	THREE TIMES A WEEK	TWICE A WEEK	LESS THAN ONCE A WEEK	NEVER
I obtain useful knowledge by reading written materials authored by other doctors (online or otherwise) to solve complex problems	1	2	3	4	5	6	7
I read documents written by other doctors to increase my knowledge of complex tasks or problems	1	2	3	4	5	6	7
I use targeted one-on-one conversations with other doctors to acquire knowledge of complex tasks	1	2	3	4	5	6	7
When I need to access knowledge for complex tasks, I use personal communication with individual doctors	1	2	3	4	5	6	7
I speak with groups of doctors when I need to improve my knowledge on a complex tasks	1	2	3	4	5	6	7
I use conversations with a group of doctors as a way of acquiring knowledge of complex tasks or problems	1	2	3	4	5	6	7
I use handovers as a way to gain knowledge of complex tasks	1	2	3	4	5	6	7
When I have a complex problem, I use rounds to acquire knowledge	1	2	3	4	5	6	7

2. The following statements are about the knowledge you learn from others.

I acquire working experience or knowhow from registrars	1	2	3	4	5	6	7
I acquire the ways to solve problems from registrars at my request	1	2	3	4	5	6	7
Registrars always try to share their expertise from their education or training with me in an effective way	1	2	3	4	5	6	7
I learn a lot by observing the registrars that I work with	1	2	3	4	5	6	7
Registrars in my organisation support my efforts to gain work experience	1	2	3	4	5	6	7
I turn to registrars at my organisation for advice regarding specific complex tasks so that I learn them	1	2	3	4	5	6	7

3. The following statements are about the effectiveness of the knowledge you receive from others.

	STRONGLY AGREE	AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	DISAGREE	STRONGLY DISAGREE
I find seeking knowledge on complex tasks from consultants to be useful for my work	1	2	3	4	5	6	7
Seeking knowledge improves my performance	1	2	3	4	5	6	7

Seeking knowledge increases my productivity	1	2	3	4	5	6	7
Seeking knowledge enables me to accomplish tasks more quickly	1	2	3	4	5	6	7
I learn best by seeking knowledge on complex tasks from consultants	1	2	3	4	5	6	7

4. The following statements are about the knowledge available to you and its value

I understand the extent of my consultant's knowledge and skills. This does not mean that I have these skills or am knowledgeable in these domains, but that *I understand what skills they have* and *the domains they are knowledgeable in*	1	2	3	4	5	6	7
The consultants I work closely with have expertise in the areas that are important *to the work I do*	1	2	3	4	5	6	7

5. Assume that the extent you can access another person's thinking and knowledge is on a scale.
At one end of the scale are people who are not available to you quickly enough to help solve your problem. At the other end of the scale are those who are willing to actively help you in problem solving in a timely fashion.
With this continuum in mind, how would you rate your overall ability to access a registrars thinking and knowledge in time to help solve problems?

☐ Extremely Weak ☐ Weak ☐ Somewhat Weak ☐ Not sure ☐ Somewhat Strong ☐ Strong ☐ Extremely Strong

6. The knowledge you acquire from registrars about solving complex problems/tasks:

☐ Has subtle nuances known only to a few ☐ Not obvious to many ☐ Not obvious to few ☐ Not sure ☐ Obvious to few ☐ Obvious to many ☐ Was obvious to everyone

The next six questions assess the characteristics of experience-based knowledge you acquire from other specialist registrars and consultants (e.g. such as formulating a management plan for a complex case). Consider doctors at a higher level that you seek knowledge from.

7. The knowledge you acquire in complex problem-based scenarios is:

☐ Very Complex ☐ Complex ☐ Somewhat Complex ☐ Not sure ☐ Somewhat Simple ☐ Simple ☐ Very Simple

8. The knowledge you acquire in a complex problem-based scenarios is:

☐ Very difficult to comprehensively *document* in reports ☐ Difficult to document ☐ Somewhat Difficult to document ☐ Not sure ☐ Somewhat Easy to document ☐ Easy to document ☐ Very easy to comprehensively *document* in reports

9. The knowledge you acquire in complex problem-based scenarios is:

☐ Very difficult to precisely *communicate* through written documents ☐ Difficult to communicate ☐ Somewhat Difficult to communicate ☐ Not sure ☐ Somewhat Easy to communicate ☐ Easy to communicate ☐ Very easy to precisely *communicate* through written documents

10. The best solutions to complex problem-based scenarios is:

☐ Very difficult to *identify* without personal experience in the task	☐ Difficult to identify without personal experience	☐ Somewhat difficult to identify	☐ Not sure	☐ Somewhat easy to identify	☐ Easy to identify without personal experience	☐ Very easy to *identify* without personal experience In the task

11. The knowledge you attempt to acquire in complex problem-based scenarios is:

☐ Very difficult to comprehensively *understand* from written documents	☐ Difficult to understand in writing	☐ Somewhat difficult to understand in writing	☐ Not sure	☐ Somewhat easy to understand in writing	☐ Easy to understand in writing	☐ Very easy to comprehensively *understand* from written documents

SECTION 2: LEARNING ON THE JOB

These questions are trying to determine your learning behaviours in the workplace **over the last month** - Specifically in relation to complex experience-based tasks, (for example formulating a management plan for a complex case)

12. The following statements are about your individual learning preferences

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I don't like to have to do a lot of thinking	1	2	3	4	5	6	7
I try to avoid situations that require thinking in depth about something	1	2	3	4	5	6	7
I prefer to do something that challenges my thinking abilities rather than something that requires little thought	1	2	3	4	5	6	7
I prefer complex to simple problems	1	2	3	4	5	6	7
Thinking hard and for a long time about something gives me little satisfaction	1	2	3	4	5	6	7
I trust my initial feelings about people	1	2	3	4	5	6	7
I believe in trusting my hunches	1	2	3	4	5	6	7
My initial impressions of people are almost always right	1	2	3	4	5	6	7
When it comes to trusting people, I can usually rely on my "gut" feelings	1	2	3	4	5	6	7
I can usually feel when a person is right or wrong even if I can't explain how I know	1	2	3	4	5	6	7

13. The following statements are about learning in groups

It is easy to decide what knowledge gained from registrars will be most useful in solving complex problems	1	2	3	4	5	6	7
The shared knowledge amongst my peers makes it easy to understand new material presented from registrars	1	2	3	4	5	6	7
The SHOs and other NCHDs share their own common language	1	2	3	4	5	6	7
The people who I need to work closest with are able to decipher the knowledge we receive from others that will be most valuable to us in completing these tasks	1	2	3	4	5	6	7

SECTION 3: TACIT KNOWLEDGE SHARING

These questions determine the types of knowledge you share with more junior colleagues in the workplace. They refer to interns, but if you do not work with interns answer these questions with SHOs or other co-workers in mind.

14. The following statements are about your intention to share knowledge

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I intend to share my working experience or knowhow with interns frequently	1	2	3	4	5	6	7
I am willing to share my ways to solve problems at the request of interns	1	2	3	4	5	6	7
I am willing to try to share my expertise from my education or training with interns in an effective way	1	2	3	4	5	6	7

15. The following statements are about your knowledge sharing behaviour

I share my job experience and case experience with interns	1	2	3	4	5	6	7
I share my expertise at the request of interns	1	2	3	4	5	6	7
I share my thoughts on cases and tasks with interns	1	2	3	4	5	6	7
I talk about my tips on cases with interns	1	2	3	4	5	6	7
I show interns special procedures so that they can learn	1	2	3	4	5	6	7
I support interns efforts to gain learning opportunities	1	2	3	4	5	6	7
Interns learn a lot by watching me on the job	1	2	3	4	5	6	7

SECTION 4: WORKPLACE TRUST

16. The following statements are about workplace trust among hierarchical roles

	STRONGLY UNWILLING	UNWILLING	SOMEWHAT UNWILLING	NOT SURE	SOMEWHAT WILLING	WILLING	STRONGLY WILLING
How willing are you to rely the work-related judgments of the registrars that you work closely with	1	2	3	4	5	6	7
How willing are you to rely on registrars task related skills and abilities	1	2	3	4	5	6	7
How willing are you to depend on registrars to handle an important issue on your behalf	1	2	3	4	5	6	7
How willing are you to rely on registrars to represent your work accurately to others	1	2	3	4	5	6	7
How willing are you to depend on registrars to back you up in difficult situations	1	2	3	4	5	6	7
How willing are you to share your personal feelings with registrars that you work closely with	1	2	3	4	5	6	7
How willing are you to confide in registrars that you work closely with about personal issues that are effecting your work	1	2	3	4	5	6	7
How willing are you to discuss honestly how you feel about your work, even negative feelings and frustration	1	2	3	4	5	6	7
How willing are you to discuss work-related problems or difficulties that could potentially be used to disadvantage you	1	2	3	4	5	6	7

How willing are you to share your personal beliefs about your job with registrars that you work closely with	1	2	3	4	5	6	7

SECTION 5: WORKPLACE NORMS AND PERSONAL SELF-EFFICACY

17. The following statements are about workplace norms

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I know that registrars will help me, so I'm obligated to help other NCHDs	1	2	3	4	5	6	7
I know that registrars will help me, so it's only fair to help other NCHDs	1	2	3	4	5	6	7
When I share knowledge with other NCHDs, I believe that those NCHDs would help me if I need it.	1	2	3	4	5	6	7
When I share knowledge with other NCHDs, I believe that my queries for knowledge from them will be answered in future.	1	2	3	4	5	6	7

18. The following statements are about confidence in seeking knowledge from others

	NOT AT ALL CONFIDENT	NOT CONFIDENT	SOMEWHAT NOT CONFIDENT	NOT SURE	SOMEWHAT CONFIDENT	CONFIDENT	STRONGLY CONFIDENT
I am confident seeking out registrars' ideas and perspectives through participating in discussions	1	2	3	4	5	6	7
I am confident seeking out registrars' experiences, insights or expertise by engaging in conversation with them	1	2	3	4	5	6	7
I am confident seeking out registrars' know-how, experiences, insights, ideas, tips or expertise	1	2	3	4	5	6	7
How confident are you in repeating or paraphrasing the knowledge you received back to the registrar to ensue you have the correct interpretation?	1	2	3	4	5	6	7
How confident are you in maintaining or continuing a conversation or discussion until you have a clear understanding of the knowledge the registrar is providing?	1	2	3	4	5	6	7

19. The following statements are about perceived capability in seeking knowledge

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I would be able to acquire the knowledge I need by asking registrars	1	2	3	4	5	6	7
To get the knowledge I need I am willing to ask registrars	1	2	3	4	5	6	7
I have a high degree of competence when it comes to receiving knowledge from the registrars that I ask for knowledge from	1	2	3	4	5	6	7

20. The following statements are about confidence in sharing knowledge to others

I have confidence in my ability to provide knowledge that others in my workplace consider valuable	1	2	3	4	5	6	7
I have the expertise needed to provide valuable knowledge for my workplace	1	2	3	4	5	6	7
Most other NCHDs can provide more valuable knowledge to others than me	1	2	3	4	5	6	7

SECTION 6: LEARNING PERFORMANCE

21. The following statements are about perceived performance

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I always complete the duties specified in my job description	1	2	3	4	5	6	7
I fulfil all responsibilities required by my job	1	2	3	4	5	6	7
I often fail to perform essential duties	1	2	3	4	5	6	7
I never neglect aspects of the job that I am obligated to perform	1	2	3	4	5	6	7
I meet all the formal performance requirements of the job	1	2	3	4	5	6	7

22. Estimate your performance relative to your peers on the following dimensions

	IN THE BOTTOM 25%	ABOVE 25% AND BELOW 50% OF MY PEERS	ABOVE 50% AND BELOW 75% OF MY PEERS	IN THE TOP 25%
Overall performance	1	2	3	4
Completing tasks on time	1	2	3	4
Quality of performance	1	2	3	4
Achievement of work goals	1	2	3	4
Quantity of work performed	1	2	3	4
Knowledge and skill about the job	1	2	3	4

SECTION 7: DEMOGRAPHICAL INFORMATION

23. Your age ☐ Under 21 ☐ 21-25 ☐ 26-30 ☐ 31 – 35 ☐ 36 – 45 ☐ 46 or older

24. Your gender ☐ Male ☐ Female

25. Your nationality

☐ Australian/NZ
☐ British
☐ Indian
☐ Western/Northern European
☐ Asian
☐ Eastern European
☐ Other
☐ Irish
☐ Middle Eastern
☐ North American
☐ South American
☐ African

26. Country in which undergrad degree was received: _____

27. Your job title? ☐ SHO ☐ Other

28. Year you began BST? _____

29. Year you obtained membership programme? _____

30. Please indicate your Specialty ☐ General Internal Medicine ☐ Obstetrics & Gynecology

☐ Histopathology ☐ General Pediatrics

31. How many rotations have you completed (not including current rotation)?

32. How long have you been on your current rotation (in months)?

33. In which hospital group/scheme are you currently training?

34. Due to the number of hospitals partaking in this survey at different intervals, this question is a unique code to track duplicate data. Please identify a six-digit code based on the day of your birth (e.g. 04), the first two letters of your mother's first name (e.g. AN), and the number of siblings you have (02) - i.e. 04AN02

☐ ☐ ☐ ☐ ☐ ☐

THANK YOU FOR YOUR TIME AND COOPERATION

Business School, Dublin City University
Royal College of Physicians in Ireland

Tacit Knowledge Seeking Survey :
For Higher Specialist Trainees

Department: Dublin City University Business School

Principal Investigators: Jennifer Kennedy (jennifer.kennedy29@mail.dcu.ie), Dr. Claire Gubbins, Dr. Finian Buckley.

Introduction to the Research Study
You have been invited to be part of a research project for DCU Business School. The research study will investigate how people seek, learn, and share their "tacit" or experience-based knowledge in the workplace. Factors such as workplace trust, norms of collaboration and capability will also be assessed as potential contributing factors to effective knowledge seeking, learning, and sharing.

Details of what involvement the Research Project will require:
This research study will require you to complete an online survey. The survey consists of 34 questions and should take approximately 30 minutes to complete. There are no potential risks associated with the study for the participants. The surveys are anonymous and involvement/non-involvement is voluntary. The confidentiality of any information provided is subject to legal limitations and will be destroyed upon completion of the research analysis. Participants may withdraw from the Research Study at any point. There will be no penalty for withdrawing from the study. Completion of the survey is taken as an indication of your consent to participate in this project.

For more information regarding this research please contact: jennifer.kennedy29@mail.dcu.ie
If you have concerns about this study and wish to contact an independent person, please contact:
The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000

SECTION 1: KNOWLEDGE SEEKING

These questions investigate the knowledge you actively seek from co-workers at a higher level than you, either your supervisor or more senior specialist registrars. When answering these questions **please consider a recent situation (in the last month) in which you had to complete a difficult task, or solve a complex problem you weren't initially sure of the answer to**.

We are most interested in the type of knowledge that is acquired and improved through experience, such as formulating a management plan for a complex case/similar experience-based task.

6. The following statements are about *seeking* complex, skill-based knowledge from others

	1 MORE THAN ONCE A DAY	2 DAILY	3 FIVE TIMES A WEEK	4 THREE TIMES A WEEK	5 TWICE A WEEK	6 LESS THAN ONCE A WEEK	7 NEVER
I obtain useful knowledge by reading written materials authored by other doctors (online or otherwise) to solve complex problems	1	2	3	4	5	6	7
I read documents written by other doctors to increase my knowledge of complex tasks or problems	1	2	3	4	5	6	7
I use targeted one-on-one conversations with other doctors to acquire knowledge of complex tasks	1	2	3	4	5	6	7
When I need to access knowledge for complex tasks, I use personal communication with individual doctors	1	2	3	4	5	6	7
I speak with groups of doctors when I need to improve my knowledge on a complex tasks	1	2	3	4	5	6	7
I use conversations with a group of doctors as a way of acquiring knowledge of complex tasks or problems	1	2	3	4	5	6	7
I use handovers as a way to gain knowledge of complex tasks	1	2	3	4	5	6	7
When I have a complex problem, I use rounds to acquire knowledge	1	2	3	4	5	6	7

7. The following statements are about the knowledge you learn from others.

I acquire working experience or knowhow from consultants	1	2	3	4	5	6	7
I acquire the ways to solve problems from consultants at my request	1	2	3	4	5	6	7
Consultants always try to share their expertise from their education or training with me in an effective way	1	2	3	4	5	6	7
I learn a lot by observing the consultants that I work with	1	2	3	4	5	6	7
Consultants in my organisation support my efforts to gain work experience	1	2	3	4	5	6	7
I turn to consultants at my organisation for advice regarding specific complex tasks so that I learn them	1	2	3	4	5	6	7

8. The following statements are about the effectiveness of the knowledge you receive from others.

	1 STRONGLY AGREE	2 AGREE	3 SOMEWHAT AGREE	4 NOT SURE	5 SOMEWHAT DISAGREE	6 DISAGREE	7 STRONGLY DISAGREE

I find seeking knowledge on complex tasks from consultants to be useful for my work	1	2	3	4	5	6	7
Seeking knowledge improves my performance	1	2	3	4	5	6	7
Seeking knowledge increases my productivity	1	2	3	4	5	6	7
Seeking knowledge enables me to accomplish tasks more quickly	1	2	3	4	5	6	7
I learn best by seeking knowledge on complex tasks from consultants	1	2	3	4	5	6	7

4. The following statements are about the knowledge available to you and its value

I understand the extent of my consultant's knowledge and skills. This does not mean that I have these skills or am knowledgeable in these domains, but that *I understand what skills they have* and *the domains they are knowledgeable in*	1	2	3	4	5	6	7
The consultants I work closely with have expertise in the areas that are important *to the work I do*	1	2	3	4	5	6	7

5. Assume that the extent you can access another person's thinking and knowledge is on a scale.
At one end of the scale are people who are not available to you quickly enough to help solve your problem. At the other end of the scale are those who are willing to actively help you in problem solving in a timely fashion.
With this continuum in mind, how would you rate your overall ability to access a registrars thinking and knowledge in time to help solve problems?

☐ Extremely Weak	☐ Weak	☐ Somewhat Weak	☐ Not sure	☐ Somewhat Strong	☐ Strong	☐ Extremely Strong

12. The knowledge you acquire from registrars about solving complex problems/tasks:

☐ Has subtle nuances known only to a few	☐ Not obvious to many	☐ Not obvious to few	☐ Not sure	☐ Obvious to few	☐ Obvious to many	☐ Was obvious to everyone

The next six questions assess the characteristics of experience-based knowledge you acquire from other specialist registrars and consultants (e.g. such as formulating a management plan for a complex case).
Consider, where possible, doctors at a higher level that you seek knowledge from.

13. The knowledge you acquire in complex problem-based scenarios is:

☐ Very Complex	☐ Complex	☐ Somewhat Complex	☐ Not sure	☐ Somewhat Simple	☐ Simple	☐ Very Simple

14. The knowledge you acquire in a complex problem-based scenarios is:

☐ Very difficult to comprehensively *document* in reports	☐ Difficult to document	☐ Somewhat Difficult to document	☐ Not sure	☐ Somewhat Easy to document	☐ Easy to document	☐ Very easy to comprehensively *document* in reports

15. The knowledge you acquire in complex problem-based scenarios is:

☐ Very difficult to precisely *communicate* through written documents	☐ Difficult to communicate	☐ Somewhat Difficult to communicate	☐ Not sure	☐ Somewhat Easy to communicate	☐ Easy to communicate	☐ Very easy to precisely *communicate* through written documents

16. The best solutions to complex problem-based scenarios is:

☐ Very difficult to *identify* without personal experience in the task	☐ Difficult to identify without personal experience	☐ Somewhat difficult to identify	☐ Not sure	☐ Somewhat easy to identify	☐ Easy to identify without personal experience	☐ Very easy to *identify* without personal experience In the task

17. The knowledge you attempt to acquire in complex problem-based scenarios is:

☐ Very difficult to comprehensively *understand* from written documents	☐ Difficult to understand in writing	☐ Somewhat difficult to understand in writing	☐ Not sure	☐ Somewhat easy to understand in writing	☐ Easy to understand in writing	☐ Very easy to comprehensively *understand* from written documents

SECTION 2: LEARNING ON THE JOB

These questions are trying to determine your learning behaviours in the workplace **over the last month** - Specifically in relation to complex experience-based tasks, (for example formulating a management plan for a complex case)

13. The following statements are about your individual learning preferences

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I don't like to have to do a lot of thinking	1	2	3	4	5	6	7
I try to avoid situations that require thinking in depth about something	1	2	3	4	5	6	7
I prefer to do something that challenges my thinking abilities rather than something that requires little thought	1	2	3	4	5	6	7
I prefer complex to simple problems	1	2	3	4	5	6	7
Thinking hard and for a long time about something gives me little satisfaction	1	2	3	4	5	6	7
I trust my initial feelings about people	1	2	3	4	5	6	7
I believe in trusting my hunches	1	2	3	4	5	6	7
My initial impressions of people are almost always right	1	2	3	4	5	6	7
When it comes to trusting people, I can usually rely on my "gut" feelings	1	2	3	4	5	6	7
I can usually feel when a person is right or wrong even if I can't explain how I know	1	2	3	4	5	6	7

23. The following statements are about learning in groups

It is easy to decide what knowledge gained from consultants will be most useful in solving complex problems	1	2	3	4	5	6	7
The shared knowledge amongst my peers makes it easy to understand new material presented from registrars	1	2	3	4	5	6	7
The specialist registrars and other NCHDs share their own common language	1	2	3	4	5	6	7
The people who I need to work closest with are able to decipher the knowledge we receive from others that will be most valuable to us in completing these tasks	1	2	3	4	5	6	7

SECTION 3: TACIT KNOWLEDGE SHARING

These questions determine the types of knowledge you share with more junior colleagues in the workplace. They refer to SHOs, but if you do not work with SHOs answer these questions in relation to more junior registrars/interns.

24. The following statements are about your intention to share knowledge

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I intend to share my working experience or knowhow with SHOs frequently	1	2	3	4	5	6	7
I am willing to share my ways to solve problems at the request of SHOs	1	2	3	4	5	6	7
I am willing to try to share my expertise from my education or training with SHOs in an effective way	1	2	3	4	5	6	7

25. The following statements are about your knowledge sharing behaviour

I share my job experience and case experience with SHOs	1	2	3	4	5	6	7
I share my expertise at the request of SHOs	1	2	3	4	5	6	7
I share my thoughts on cases and tasks with SHOs	1	2	3	4	5	6	7
I talk about my tips on cases with SHOs	1	2	3	4	5	6	7
I show SHOs special procedures so that they can learn	1	2	3	4	5	6	7
I support SHOs efforts to gain learning opportunities	1	2	3	4	5	6	7
SHOs learn a lot by watching me on the job	1	2	3	4	5	6	7

SECTION 4: WORKPLACE TRUST

26. The following statements are about workplace trust among hierarchical roles

	STRONGLY UNWILLING	UNWILLING	SOMEWHAT UNWILLING	NOT SURE	SOMEWHAT WILLING	WILLING	STRONGLY WILLING
How willing are you to rely the work-related judgments of the consultants that you work closely with	1	2	3	4	5	6	7
How willing are you to rely on consultants task related skills and abilities	1	2	3	4	5	6	7
How willing are you to depend on consultants to handle an important issue on your behalf	1	2	3	4	5	6	7

How willing are you to rely on consultants to represent your work accurately to others	1	2	3	4	5	6	7
How willing are you to depend on consultants to back you up in difficult situations	1	2	3	4	5	6	7
How willing are you to share your personal feelings with consultants that you work closely with	1	2	3	4	5	6	7
How willing are you to confide in consultants that you work closely with about personal issues that are effecting your work	1	2	3	4	5	6	7
How willing are you to discuss honestly how you feel about your work, even negative feelings and frustration	1	2	3	4	5	6	7
How willing are you to discuss work-related problems or difficulties that could potentially be used to disadvantage you	1	2	3	4	5	6	7
How willing are you to share your personal beliefs about your job with consultants that you work closely with	1	2	3	4	5	6	7

SECTION 5: WORKPLACE NORMS AND PERSONAL SELF-EFFICACY

27. The following statements are about workplace norms

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT DISAGREE	NOT SURE	SOMEWHAT AGREE	AGREE	STRONGLY AGREE
I know that consultants will help me, so I'm obligated to help NCHDs	1	2	3	4	5	6	7
I know that consultants will help me, so it's only fair to help NCHDs	1	2	3	4	5	6	7
When I share knowledge with other NCHDs, I believe that those NCHDs would help me if I need it.	1	2	3	4	5	6	7
When I share knowledge with other NCHDs, I believe that my queries for knowledge from them will be answered in future.	1	2	3	4	5	6	7

28. The following statements are about confidence in seeking knowledge from others

	NOT AT ALL CONFIDENT	NOT CONFIDENT	SOMEWHAT NOT CONFIDENT	NOT SURE	SOMEWHAT CONFIDENT	CONFIDENT	STRONGLY CONFIDENT
I am confident seeking out consultants ideas and perspectives through participating in discussions	1	2	3	4	5	6	7
I am confident seeking out other consultants experiences, insights or expertise by engaging in conversation with them	1	2	3	4	5	6	7
I am confident seeking out other consultants know-how, experiences, insights, ideas, tips or expertise	1	2	3	4	5	6	7
How confident are you in repeating or paraphrasing the knowledge you received back to the consultant to ensue you have the correct interpretation?	1	2	3	4	5	6	7
How confident are you in maintaining or continuing a conversation or discussion until you have a clear understanding of the knowledge the consultant is providing?	1	2	3	4	5	6	7

29. The following statements are about perceived capability in seeking knowledge

	STRONGLY AGREE

	AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	DISAGREE	STRONGLY DISAGREE	
I would be able to acquire the knowledge I need by asking consultants	1	2	3	4	5	6	7
To get the knowledge I need I am willing to ask consultants	1	2	3	4	5	6	7
I have a high degree of competence when it comes to receiving knowledge from the consultants that I ask for knowledge from	1	2	3	4	5	6	7

30. The following statements are about confidence in sharing knowledge to others

I have confidence in my ability to provide knowledge that others in my workplace consider valuable	1	2	3	4	5	6	7
I have the expertise needed to provide valuable knowledge for my workplace	1	2	3	4	5	6	7
Most other NCHDs can provide more valuable knowledge to others than me	1	2	3	4	5	6	7

SECTION 6: LEARNING PERFORMANCE

31. The following statements are about perceived performance

	STRONGLY AGREE	AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	DISAGREE	STRONGLY DISAGREE
I always complete the duties specified in my job description	1	2	3	4	5	6	7
I fulfil all responsibilities required by my job	1	2	3	4	5	6	7
I often fail to perform essential duties	1	2	3	4	5	6	7
I never neglect aspects of the job that I am obligated to perform	1	2	3	4	5	6	7
I meet all the formal performance requirements of the job	1	2	3	4	5	6	7

32. Estimate your performance relative to your peers on the following dimensions:

	IN THE TOP 25%	ABOVE 50% AND BELOW 75% OF MY PEERS	ABOVE 25% AND BELOW 50% OF MY PEERS	IN THE BOTTOM 25%
Overall performance	1	2	3	4
Completing tasks on time	1	2	3	4
Quality of performance	1	2	3	4
Achievement of work goals	1	2	3	4
Quantity of work performed	1	2	3	4
Knowledge and skill about the job	1	2	3	4

SECTION 7: DEMOGRAPHICAL INFORMATION

23. Your age ☐ Under 21 ☐ 21-25 ☐ 26-30 ☐ 31 – 35 ☐ 36 – 45 ☐ 46 or older

24. Your gender ☐ Male ☐ Female

25. Your nationality

☐ Australian/NZ
☐ British
☐ Indian
☐ Western/Northern European
☐ Asian
☐ Eastern European
☐ Other
☐ Irish
☐ Middle Eastern
☐ North American
☐ South American
☐ African

26. Country in which undergrad degree was received: _____

27. Your job title? ☐ Registrar ☐ Specialist Registrar ☐ Senior registrar ☐ Other

28. Year you began HST? _____

29. Year you obtained membership programme? _____

30. Please indicate your Specialty ☐ General Internal Medicine ☐ Obstetrics & Gynecology ☐ Histopathology ☐ General Pediatrics

31. How many rotations have you completed (not including current rotation)?

32. How long have you been on your current rotation (in months)?

33. In which hospital group/scheme are you currently training?

34. Due to the number of hospitals partaking in this survey at different intervals, this question is a unique code to track duplicate data. Please identify a six-digit code based on the day of your birth (e.g. 04), the first two letters of your mother's first name (e.g. AN), and the number of siblings you have (02) - i.e. 04AN02

☐ ☐ ☐ ☐ ☐ ☐

THANK YOU FOR YOUR TIME AND COOPERATION